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Milk -
Cost of
production O.S.

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THE NATIONAL INVESTIGATION INTO THE
ECONOMICS OF MILK PRODUCTION

Report of the East Midlands Province, 1948/49

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May, 1950.

The National Investigation into the Economics
of Milk Production.

Report of the East Midlands Province -
1948-49

Introduction.

This report gives details of information collected under the Milk Costs Investigation Scheme for the year October, 1948 to September, 1949.

Information was obtained concerning 74 herds and their size and distribution is shown in Table 1.

Table 1.

Distribution of Herds in the
East Midlands Province.

Size of Herd	5-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80+	Total
Derbys.	2	4	6	4	4	3	1	1	1	26
Lindsey	1	1	1	2	1	-	-	-	-	6
Kesteven	1	-	1	1	1	-	-	-	-	4
Leics.	-	7	4	2	4	3	1	2	2	25
Rutland	-	1	1	-	-	-	-	-	-	2
Notts.	-	5	2	1	1	-	1	1	-	11
Total	4	18	15	10	11	6	3	4	3	74

The direct expenses of milk production were obtained for all the herds in the sample. In addition costs of home grown food crops were obtained for the majority of herds. In cases where the costs of fodder crops were not obtained, average provincial costs have been used. Manual work done by the farmers and unpaid family workers has been charged at current minimum rates of wages. A proportion of the ascertainable farm overhead expenses was charged to milk production. Deductions from the gross costs were made for the manurial value of all foods consumed and for the value of calves born during the year.

The returns from milk include, in addition to the value of milk sold wholesale, the value of all milk fed to livestock, consumed in the farmhouses, sold to workers or sold retail.

The balance of returns over net costs includes interest on capital, returns for managerial labour and profit. The collected information shows that the comparative profit margin per cow for small herds is not as high as that earned by the larger herds. It must be remembered, however, that much of the work with small herds is done by the farmers and their families and the total family income per cow is larger than the profit margin.

General Description of Farms.

The majority of the herds were on mixed farms which specialised in dairying. The management of farms and of dairy herds, however, differed considerably. Before 1939, many of the Derbyshire farms had little or no ploughland, but during the last ten years farmers have produced a large part of the winter feed from arable crops. Milk has remained the most important sale product from these farms. Many of the Leicestershire farms

were similar in that the arable acreage has increased considerably since 1939 because of the need to produce much of the winter fodder. But the majority of these farmers also produced cash crops - wheat and sugar beet - as well as milk. The Lincolnshire farms differed in that they have been predominantly arable for a long time. Cash crops were of equal or greater importance than milk sales in the economy of these farms and milk production was to satisfy a local retail trade or the dairy herd was maintained in preference to fattening cattle as a means of producing farmyard manure. Intensity of production, therefore, varied in different parts of the province according to the differing systems of farming.

Presentation of Data.

A problem confronting many co-operating farmers is that of making full use of the financial and economic information relating to milk production. In isolation, the individual figures are meaningless. Merely to state that on a certain farm the cost of labour is 5.06d. per gallon indicates little to the farmer. Any farmer wishing to reap some benefits from a detailed knowledge of the costs of milk production must not be content with a cursory examination of the information for his own herd. It is necessary to compare the results with those obtained from other farms having similar systems of dairy herd management. The magnitude of differences in yields and in the itemised costs should be noted and broad assessments made of the causes of any differences shown.

When the individual costs are compared with an average the relative costs of production are indicated. A farmer can see the extent to which his labour costs or feeding costs conform to the average. But the average represents many different types of dairying. Some farmers use a milking parlour and covered yards whilst the majority use the normal cow-shed system. Some strive for maximum yields and feed large quantities of concentrates to achieve this end. Others are content with lower yields at lower unit costs. Indeed, under some conditions medium yields may be more economic than very high yields. The fact that the cost of manual labour on a particular farm is much higher than the average does not necessarily indicate that the manual labour needs re-organising. The particular conditions on that farm may be such that high labour requirements are unavoidable. Considerable care must therefore be taken when comparing individual costs with the average for a group of herds.

In this report the individual costs are compared with the average for the 74 herds and also with the costs from five selected dairy farms. In order to assist in the comparison a brief description of the management of these five herds is given. It may be that in some cases the costs obtained from some co-operating farmers apply to entirely different conditions from those on the selected farms. If so, little can be learned from a direct comparison of costs of production. But the selected farms provide examples of profitable, progressive dairy herd management and many of their methods could be successfully applied on many other dairy farms.

The information presented may indicate to farmers some of the weak points in their own dairy enterprise. The usefulness of the information on costs of milk production is in emphasising problems to which farmers should give some thought when modifications to the dairy enterprise are being considered.

Costs, Returns and Margins per Cow.

The costs for the individual farm are compared in Table

TABLE 2.

Costs, Returns and Margins per Cow.

	Your Farm 1947/48	Your Farm 1948/49	Average 74 Farms 1948/49	Average of 5 Selected Farms 1948/49
	£. s. d.	£. s. d.	£. s. d.	£. s. d.
Purchased Foods			11.18. 0.	14.10. 0.
Home Grown Foods			16. 0. 0.	14. 8. 0.
Grazing			3.14. 0.	3.16. 0.
Total Foods			31.12. 0.	32.14. 0.
Labour			14. 0. 0.	15.10. 0.
Miscellaneous			10. 2. 0.	10. 6. 0.
Herd Replacement			3.18. 0.	4. 0. 0.
Gross Costs			59.12. 0.	58.14. 0.
Credits (-)			3. 8. 0.	3.12. 0.
Net Farm Costs			56. 4. 0.	55. 2. 0.
Total Returns			87. 6. 0.	106.10. 0.
Margin			31. 2. 0.	51. 8. 0.
Average Yield	Gals.	Gals	664 gals	780 gals.
Average No. of Cows	Cows	Cows	35 cows	29 cows
% Cows in Milk	%	%	77.3%	85.3%

2 with those for the same farm in the previous year, with the average for 1948-9 and with the average for five selected farms.

A comparison of the individual costs for two years may indicate a number of changed conditions to which farmers should direct their attention. Changes in milk yield and their effect upon the profitableness of milk production should be noted and the reasons for the changes ascertained. Modifications of the organisation of labour and its effect on the costs of labour is another point to note. Comparisons should help the farmer to judge the effect of any change in the organisation of the dairy enterprise.

Costs and Returns on Five Selected Herds.

The costs as shown in Table 3 are those of the five selected herds. They provide a better basis for comparison with individual costs than an average of many herds.

Farm No. 1 is an intensively managed farm of 43 acres in Leicestershire. Besides milk production, about seven breeding sows and a flock of 700 poultry are maintained. Despite intensive cropping the limiting factor on this farm is food. The relatively high cost of home grown foods is an indication of the extent to which intensive food production is attempted. Labour and capital are available and the farmer finds it profitable to produce as much food as possible, even at relatively high costs.

All the work is done by the farmer, his wife and son. The very low cost of labour on milk production is due to a good layout of buildings and a well planned labour routine. Owing to pressure of other work, the daily routine has been organised to take the least possible time. Regular control methods have prevented any serious outbreak of disease. As a result, a profit of 10/- per average cow in the herd has been realised from the sale of cows. This compares with the average loss of £3 8s. 0d. shown for all herds.

Farms 2 and 5 are both situated on the Derbyshire Hills. Farm No. 2 is a family farm of 134 acres. Two breeding sows and about 100 hens are the only other livestock. The appreciation of £3 .4s. 0d. per cow in the herd replacement account was achieved by having no attacks of disease and by the sale of five surplus cows in full profit. This farm is a typical high land farm and the production figures indicate the success which can be achieved by dairy farming in that area.

Farm No. 5 extends to 192 acres, situated on hill land rising to 1000 feet. A small breeding flock of sheep and a few poultry are kept as subsidiary enterprises to dairying. The high average yield has been obtained by good management and feeding. Purchased concentrates cost £19 16s. 0d. per cow and were supplemented by supplies of high quality home grown foods. The total gross cost of foods and grazing was £9 10s. 0d. per cow more than the average for all herds. A progressive breeding policy has led to the formation of a good quality herd with the capacity for high yields at this altitude.

Farm No. 3 is a mixed farm of 250 acres in Nottinghamshire. 40 acres of cereals and 11 acres of roots were grown for sale in 1949. A keuper marl soil which is not well drained forces the farmer to keep the dairy herd off the land for long periods during the winters. The herd has been attested for a number of years but T.T. milk production was only possible

TABLE 3.

Costs of Production per Cow on five Selected Farms.

	Farm No. 1	Farm No. 2	Farm No. 3	Farm No. 4	Farm No. 5
	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.
Purchased Foods	12. 6. 0.	14. 2. 0.	10.16. 0.	11.12..0.	19.16. 0.
Home Grown Foods	22.12. 0.	13. 0. 0.	15.18. 0.	6. 8. 0.	17.14. 0.
Grazing	1.18. 0.	4. 0. 0.	3. 2. 0.	3.14. 0.	4.12. 0.
Total Foods	36.16. 0.	31. 2. 0.	29.16. 0.	21.14. 0.	42. 2. 0.
Labour	10. 4. 0.	21.12. 0.	17. 0. 0.	18. 2. 0.	11. 8. 0.
Miscellaneous	7.18. 0.	8. 0. 0.	9. 2. 0.	13. 8. 0.	10.14. 0.
Herd Replacement	(-) 10. 0.	(-) 3.14. 0.	(-) 3. 2. 0.	3. 6. 0.	2. 8. 0.
Gross Costs	54. 8. 0.	57. 0. 0.	52.16. 0.	56.10. 0.	66.12. 0.
Credits (-)	4.14. 0.	3.14. 0.	2.16. 0.	3. 4. 0.	4. 8. 0.
Net Farm Costs	49.14. 0.	53. 6. 0.	50. 0. 0.	53. 6. 0.	62. 4. 0.
Total Returns	98.10. 0.	101. 4. 0.	94. 4. 0.	107. 4. 0.	118.16. 0.
Margin	48.16. 0.	47.18. 0.	44. 4. 0.	53.18. 0.	56.12. 0.
Average Yield	759 gals.	753 gals.	680 gals.	800 gals.	853 gals.
Average No. of Cows	12.4 cows	20.7 cows	32.8 cows	33.8 cows	47.3 cows
% Cows in Milk	83.9%	85.0%	83.5%	89.3%	84.8%
% Winter Production	42.0%	48.0%	47.0%	47.0%	55.0%
Hours per Cow	110 hours	207 hours	170 hours	190 hours	125 hours
Breed of Cow	Friesian	Friesian	Shorthorn	Ayrshire	Friesian
Grade of Milk	Accredited	T.T.	T.T. Attested	T.T. Attested	T.T.

after the erection of a new cowshed in 1948.

Farm No. 4, in South Leicestershire, may be called a "grass and wheat" farm. Approximately 50 acres of wheat are grown annually, and the remainder of the 200 acre farm is under grass. Grass silage and hay, supplemented by purchased concentrates, provide the winter rations for the livestock. The low costs of home grown feeding stuffs, together with the high yield of 800 gallons per cow per annum, indicate the relatively high quality of the foods fed. Although this farm is situated in an area where first class grazing leys are comparatively easy to establish, this system of dairying could probably be successfully practised in other areas of the East Midlands. The occupier of this farm has realised the potential qualities of good grassland and has exploited them with advantage. The replacement of crops having high manual labour requirements by silage has enabled the farm to be managed with a minimum labour supply. The rather poor layout of the farm buildings prevents the adoption of a labour saving routine in herd management.

These five farms, although situated in different parts of the province, on different soils and at different altitudes, show similar trends in the systems of dairying practised.

All the herds are being graded up by the use of sires with good milk pedigrees. Milk recording is practised by all the farmers. The result is that all the herds have a potential capacity for high yields.

More than 80 per cent of the animals in each herd were in milk. Thus, a relatively high proportion of cows were contributing towards the monthly milk cheque. On a number of dairy farms, particularly where high lactation yields are the aim, the cows are dry for an unduly long period. The resulting profit per cow is frequently lower than that which would be attained if the cows had shorter dry periods. The important consideration is the gallonage of milk per cow per year, and not that obtained in any one lactation.

Milk produced during the six winter months from October to March was almost half of the annual production. This virtually level production has, in each case, yielded a high return per cow. One of the selected farms held an Accredited licence, and the other four sold T.T. milk. The extra premiums for high quality milk produced at costs which were not greatly different from those of herds producing ordinary milk resulted in a greater than average return per gallon of milk.

Milking machines were used on all these five farms, and attention to the daily labour routine resulted in low manual labour requirements per cow. The costs of production on these farms were above the average but the yields and also the profit margins per cow were considerably above the provincial average.

Observations on Costs of Milk Production.

High Profits, not Low Costs.

The object of a dairy farmer is to obtain from the farm the largest continuous profit consistent with the need to farm according to the accepted rules of good husbandry. This usually means obtaining a high profit per cow in the dairy herd. The object is not to produce milk at a low cost per cow. Milk produced at a low cost per cow does not necessarily mean

profitable milk production. This will be seen from Table 4.

TABLE 4. Spread of Costs per Cow & Profit Margin per Cow.

Profit Margin in £ per Cow.	Costs in £ per Cow							Total
	Under 40	40-	50-	60-	70-	80-	90 & over	
Under 10	1	2	4	1	1	-	2	11
10 -	3	1	2	1	-	4	-	11
20 -	-	6	4	3	1	-	-	14
30 -	1	4	3	4	3	1	-	16
40 -	-	2	6	4	1	-	-	13
50 -	1	2	1	2	1	-	-	7
60 and over	-	-	-	-	1	1	-	2
Total	6	17	20	15	8	6	2	74

There seems to be little connection between the costs per cow and the profit margin. Some herds with low costs have a high, others a low margin of profit per cow. Similarly, some herds with high costs have a high and some a low profit margin. The dairy farmer aims at a high profit margin per cow and is interested in costs only as a contributory factor.

High Yields - High Margins.

It should be pointed out that the milk yields quoted are the annual yields per cow in herd as distinct from the more commonly quoted lactation yields, and are usually about 100 to 150 gallons per cow lower than the lactation yields.

Tables 5 and 6 are especially interesting. Table 5 shows that in general costs per cow increase with milk yields. It will be seen, however, that there are exceptions, and there was one herd with an annual yield of less than 500 gallons per cow and a cost of over £90 per cow.

TABLE 5. Spread of Yield per Cow & Cost per Cow.

Yield per Cow	Costs in £ per Cow							Total
	Under 40	40-	50-	60-	70-	80-	90 & over	
Under 500 gals.	4	3	2	-	-	-	1	10
500 -	1	9	4	1	-	-	-	15
600 -	1	1	8	4	1	2	-	17
700 -	-	4	4	4	3	1	-	16
800 -	-	-	2	5	2	2	-	11
900 and over	-	-	-	1	2	1	1	5
Total	6	17	20	15	8	6	2	74

TABLE 6.

Spread of Yield per Cow & Margin per Cow.

Yield per Cow	Margin in £ per Cow							Total
	Under 10	10-	20-	30-	40-	50-	60 & over	
Under 500 gals.	6	4	-	-	-	-	-	10
500 -	3	2	5	5	-	-	-	15
600 -	1	3	8	3	1	1	-	17
700 -	-	1	1	5	8	1	-	16
800 -	-	1	-	3	4	3	-	11
900 and over	1	-	-	-	-	2	2	5
Total	11	11	14	16	13	7	2	74

Table 6 shows the very strong relationship between yield and profit margins per cow. It follows from this that in general, cows with the capacity for high yields are the most costly and most profitable dairy animals. Tables 5 and 6 indicate that there are some exceptions to this general condition but these are special cases either operating under abnormal conditions or experiencing some special difficulties.

Intensive and Extensive Management.

The intensity of management varied considerably and Table 7 shows the yield and profit margin per cow in herds with relatively high costs. The management was good on each of these nine farms and the high costs are indicative of intensive management. With one exception, due to very low milk production during the winter months, all the six herds with an annual yield per cow of more than 800 gallons had a high profit margin. The three herds with relatively low yields had a low margin of profit per cow, although the intensity of management was similar to that of herds with high yields. If intensive management is to be practiced it is necessary to

TABLE 7. Costs, Yield and Margin per Cow.
High Costs.

Herd No.	Cost per Cow	Yield per Cow	Margin per Cow
	£	gals.	£
1	87.4	1179	70.1
2	74.6	973	63.2
3	110.4	961	6.1
4	74.0	937	52.3
5	89.5	878	35.1
6	69.9	838	47.7
7	81.2	699	11.3
8	75.9	623	2.1
9	82.7	693	18.6

have cows with high milk capacities. Other requirements for intensive management are:-

- (a) There must be an adequate supply of high quality foods and minimum use of low grade foods and roughages.
- (b) There must be freedom from disease.
- (c) A high standard of building accommodation is required.
- (d) The skill and disposition of managerial and manual labour must be first class.

It is when some of these requirements are missing that intensive management is unprofitable. Herds 7, 8 and 9 in Table 7 are examples of intensive management without one or more of the essential requirements, and it would probably be more profitable for these farmers to manage their herds less intensively.

If milk production is not the only important livestock enterprise on the farm, the dairy cows may have to compete with other animals for the high quality foods. Further, when there are other important enterprises the farmer cannot spend all his time supervising work on the dairy herd and his managerial skill is divided between the various enterprises. In the first five examples of Table 7, the farmers spend most of their working time with the dairy cows. This is clearly impracticable on many dairy and cash crop farms. When first class cowmen are difficult to obtain it may be more profitable to aim at something less than maximum production per cow.

Some farmers are aware that intensive production is not possible under prevailing conditions and aim at a reasonable margin per cow at much lower costs per cow. Table 8 shows the considerable financial success achieved by some farmers even though the milk yields of their cows were relatively low. Comparison of the profit margin per cow in Tables 7 and 8 indicates that intensive management expressed in costs per cow is not always as profitable as a more extensive system of dairying. If the cows in a particular herd have not the inherent capacity for high yields, no system of intensive management will produce high yields, and a more extensive management of such cows is more profitable.

TABLE 8. Costs, Yield and Margin per Cow.
 Low Costs.

Farm No.	Costs per Cow	Yield per Cow	Margin per Cow
	£	gals.	£
1	49.7	786	44.5
2	49.7	759	48.8
3	46.8	738	51.4
4	41.9	594	36.9
5	44.5	575	33.9
6	36.8	572	32.0
7	40.8	564	33,1

Autumn Calving.

For a number of years the national policy has been to encourage autumn calving and winter milk production. Thirty-three herds in which more than half the calves were born from September to December had an average profit margin per cow of £32 10s, 0. Eleven herds in which more than 40 per cent of the calves were born from March to June had an average margin per cow of £11 10s. 0d.

Table 9 shows the relationship between autumn calvings and profits. The relatively low profit margin per cow for under 30 per cent autumn calving indicates the desirability of concentrating calvings into those months. There is a further tendency for the margin per cow to be higher when about one-third to one-half of the calves are born from September to December than when calvings are unduly concentrated in the autumn months. The peak calving period is only one of many

TABLE 9. The Percentage of the Calves Born From September to December and the Margin per Cow.

Profit Margin in £ per cow	% Autumn Calving						
	Under 20	20-	30-	40-	50-	60-	70 & over
	9.2	16.6	41.3	25.5	35.5	35.2	26.5

factors affecting the profit margin per cow, and the other factors mask the general connection between autumn calving and high profits.

Table 10 shows that the profit margin increases as the irregularity of seasonal production decreases.

TABLE 10. The Percentage of Milk Produced from October to March & the Profit Margin per Cow.

% Winter Production	Under 40	40-	45-	50-	55-	60 & over
Profit Margin in £ per Cow	17.1	33.3	31.4	28.0	30.4	27.1

(1)

A recent report from Bristol University indicated a

(1)

R. R. Jeffery, "Production Costs and Returns in Seasonal and Level Dairies in the West and South West of England, 1947/48".

margin per cow per year of £12 in favour of level production. The relatively high price for winter milk provided an incentive for at least 50 per cent winter production.

Concern has been expressed at the low level of milk production during the months of August and September. If dairy farmers wish to have a permanent remunerative market

for milk they must produce an adequate supply throughout the year. Future prices are, therefore, likely to discourage early summer production in favour of more milk in August and September.

Disease: Prevention is Better than Cure.

The average depreciation per cow on all 74 herds was £3 18s. 0d. For some herds where cows died or had to be sold at low prices because of disease, it was more than £10 per cow. On some other farms where cows were sold at high values and where losses due to disease were low, the herd replacement accounts showed profits ranging up to £4 per average cow in the dairy herd. The high losses for some farms indicate that some improvement in the health of the cattle is desirable. Farmers know that when disease becomes established in a dairy herd the cost of eradication may impose a heavy financial burden. There is the direct loss of dead or screw cows. There are also heavy veterinary expenses, and the milk yield from diseased herds tends to be low, resulting in lower profits per cow.

The first aim should be to prevent disease infecting the dairy herd. Frequent sources of infection are purchased cows. The average depreciation in herds highly dependent upon purchased replacements was £5 2s. 0d. per cow. Self maintained herds had an average depreciation of only £1 14s. 0d. per cow. The higher costs of depreciation of herds is due partly to buying diseased animals and partly to buying poor yielders which have to be sold after one, or perhaps two, lactations.

Some herds had a high rate of disposal due to the need to sell off defective animals and reactors to the tuberculin tests. A few herds are maintained solely by buying in cows and selling them after a small number of lactations. The high cost of depreciation for such herds and rate of disposal is shown by Table 11. If a large proportion of the herd is sold

TABLE 11. Rate of Disposal & Cow Depreciation.

Cows removed as % of Cows at opening valuation.	Under 20	20-	30-	40-	50-	60 & over
Depreciation in £ per cow	1.3	2.1	1.8	1.4	4.7	8.3

prior to obtaining a T.T. licence, the cost of depreciation is an exceptional cost and may be justified. In some other cases the high rate of disposal may involve high annual costs and cause relatively low yearly profits per cow. One farmer with a herd of less than 10 cows spent over £60 on veterinary expenses during the year. It was realised that milk production would be more profitable if disease were eradicated and suitable measures taken to prevent its re-appearance. The heavy expenditure was felt to have been justified.

T.T. Milk Production.

The report on the costs of milk production in the East Midlands Province for the year 1947/48 showed that herds producing T.T. milk had a profit margin £9 per cow greater than those producing accredited or ordinary milk. This higher

margin is obtained by (a) higher premiums on T.T. milk, and (b) higher yields due to healthier cattle.

In view of the Milk (Special Designation) (Raw Milk) Regulations, 1949, dairy farmers producing milk of ordinary or accredited quality are advised to consider T.T. or Attested milk production. The regulations state that no new licences for T.T. milk production will be issued after September, 1954 except in respect of attested herds. The present premium of 2 $\frac{3}{4}$ d. per gallon will not be available to farmers who are in the process of eradicating disease from their herds, and attestation will have to be reached before any premiums are obtained. It is, therefore, advisable to begin tuberculin testing the dairy herd in the near future whilst premiums are available for T.T. milk prior to attestation.

Bull Costs & Artificial Insemination.

In the herds of less than 10 cows in which a bull was kept the cost of the bull was £6 10s. Od. per cow, and in the herds of from 10 to 20 cows it amounted to £2 1s.5d. per cow in the dairy herd.

No information was obtained from farms relying entirely on artificial insemination, though a few farmers sold their bulls during the year and intend to depend wholly on artificial insemination for their future livestock breeding policy.

The wisdom of such action by farmers with small dairy herds is clear. Firstly, the cost of £31 in maintaining a bull is transformed into a profit of, perhaps, £20 from a cow which replaces the bull. The fee of 25s. per cow inseminated may be, in a small herd, more than balanced by the returns which may be obtained from an extra cow. The use, on small herds, of a proven sire or a bull from a good strain of cattle is prohibited by high purchase prices. Artificial insemination enables such farmers to carry out constructive breeding policies with the aid of bulls which were previously available only to large scale dairy farmers. A third advantage is that the temperament of an inseminator is more trustworthy than that of even the quietest bull. It is therefore advantageous both from the viewpoint of costs and of a good breeding policy that small scale dairy farmers should make every available use of artificial insemination.

In larger dairy herds the economic advantages of artificial insemination are less clear. A larger scale farmer is able to afford the services of a first class bull and yet keep the costs of bull maintenance at a low level per animal served.

Whether or not artificial insemination is practiced, a constructive breeding policy should be followed. Milk recording is a valuable aid in this direction. The average yield per cow in recorded herds was 701 gallons; in non-recorded herds it was 594 gallons per cow. It is by the use of good quality sires and with the aid of systematic milk recording that a valuable high yielding herd may be built up.

Study Your Labour Routine.

The yearly number of hours of manual labour per cow varied from 66 hours to 340 hours. The size of herd had a considerable effect on the labour requirements per cow, as shown in Table 12.

TABLE 12. Labour Requirements per Cow.

Size of Herd	5-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80 & over
No. of Herds	4	18	15	10	11	6	3	4	3
No. of Milking Machines	1	8	13	9	10	6	3	4	3
Average Hours Per Cow	272	171	157	148	147	111	120	119	113
Your Herd : Hours Per Cow									

All but four of the 52 herds with 20 cows or more were milked by machine. This was undoubtedly one of the reasons for the relatively lower labour requirements of these herds. The value of a machine for reducing the milking time in large herds is widely appreciated.

Even in the smaller herds a milking machine is a great labour saver. The eight herds each with between 10 and 19 cows which were milked by machine required an average of 146 hours of manual labour per cow throughout the year. The other 10 herds milked by hand had an average labour requirement of 190 hours. At 2s. 6d. per hour, the difference in the yearly manual labour requirements for these two groups of herds was equal to £5 10s. 0d. per cow. Even for herds of this size, the cost of a machine would not be more than 30s. per cow per annum. The farmers using a milking machine for herds of 10 to 19 cows, therefore, achieved a saving in costs of approximately £4 per cow.

There are a number of indirect advantages in using a milking machine. Much of the drudgery is removed from milking, making the job more attractive to cowmen. Many herds of the 10 to 19 size are on family farms. In the 1930's many of these herds were managed on the "cake and grass" system. There was an ample supply of family labour, and little need for labour saving machinery. Times have changed and these farms now have a considerable proportion of arable land. This extra demand for labour has to be supplied by working longer hours or reducing the time previously spent with the cows. Under these conditions a milking machine allows the family farmer to pay more attention to his arable cropping. In some cases labour is the factor limiting the number of cows kept and a milking machine would enable an extra one or perhaps two cows to be maintained with the existing labour force. In rush periods, such as haymaking, at harvest time or at week ends, the cows may be milked by a reduced labour force which allows for either continuous work in the fields or more free time at week ends.

For herds that are hand milked, half the labour time spent in the cowshed is on milking. An annual saving of 40 hours per cow is possible by the introduction of a milking

machine. On many farms a similar saving in time could be achieved by attention to the other jobs in the daily routine.

Much labour is used in handling farmyard manure several times instead of forking it into a cart and taking it straight to the fields. Water for swilling sheds is carried from a distant tap instead of piping it to the shed or using a hose. Concentrates and bulky foods are carried for one or two cows at a time. If a portable trolley or truck is used much back tracking for fresh supplies may be avoided. Haystacks or root clamps are often inconveniently sited, and much unnecessary time and cost is spent carrying food to cows.

All these are examples of how direct manual labour is wasted. They do not all apply to every farm but on most farms there are some dairy chores which could, by planning and using mechanical aids, be done with less manual labour. No standard methods can be indicated. Every farm has its individual peculiarities and every farmer has to adapt new methods to fit in with the conditions. If only 100 yards is saved each milking, there are four miles less walking to do in a year. In isolation each small reduction in time seems trivial, but in total can considerably reduce the labour costs of milk production. It is by achieving efficiency by such methods as the maximum utilisation of labour that the dairy farmer will secure his position in less favourable financial circumstances.

Summary.

The average costs of production are of little value to the individual farmer who wishes to use the detailed costs as an aid to the future management of the farm because of the varied types of business which they represent.

The costs of five selected farms indicate the costs, returns and margins of successful farmers in different districts of the East Midlands Province.

The aim of a dairy farmer is continuous high profits, not necessarily low costs.

High yields per cow were generally accompanied by high profit margins.

Cows with the capacity for high milk yields are essential if intensive management is practised.

There is a considerable financial incentive for autumn calving and level dairies.

Good methods of disease control greatly reduce the cost of dairy herd replacement.

In view of the higher profits from the production of T.T. milk and the conditions contained in the Milk (Special Designation) (Raw Milk) Regulations, 1949, dairy farmers are advised to attempt T.T. milk production or attestation wherever possible.

The cost of maintaining a bull on small dairy farms is frequently uneconomic. The use of artificial insemination in these cases would increase the profit obtained from the dairy herd.

Very large variations occurred in the labour requirements of the dairy herds. The use of a milking machine and

the development of a good dairy routine would release labour for other work on the farm.

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