Milk
Cost of production 0.S

EDINBURGH AND EAST OF SCOTLAND COLLEGE OF AGRICULTURE

(DEPARTMENT OF ECONOMICS)

INTERIM REPORT

ON

COST OF MILK PRODUCTION, WINTER 1945/46

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I. INTRODUCTION.

Following negotiations initiated by the three Scottish milk marketing boards a year ago, this investigation was resumed by the College on 1st October 1945, after an interval of eight years, in close collaboration with the Advisory Economics Departments of the other two Scottish Agricultural Colleges at Aberdeen and Glasgow, with a view to furnishing much-needed data on the cost of milk production. Prior to that date, a large-scale canvassing campaign was undertaken, in which we received valuable help from the Scottish Milk Marketing Board, in order to attract the necessary support from milk producers situated in all parts of the College area, and special efforts were made to secure adequate representation amongst dairy farmers with very small herds. Our circulars met with a good response, and were followed by personal interviews with all interested farmers, so that the objects and requirements of the investigation could be more fully explained. In due course, approximately 90 farmers commenced keeping the specially prepared weekly record sheets distributed for this purpose, very nearly all of whom are continuing to do so. This report, our first interim report, is based on records relating to 83 herds for which all the required particulars were furnished in time to be included in our summaries; the investigation is thus on a much bigger scale than our earlier one conducted in the 1930's. It covers the six months' Winter Period, 1st October 1945 to 31st March 1946 inclusive.

II. GENERAL DESCRIPTION OF FARMS AND HERDS STUDIED.

Location and size of herds. The geographical distribution of our sample of 83 herds, and the size of herds, is shewn in Table I. The measure of the support which we are receiving from the various counties bears a fairly close resemblance to the relative importance of dairying therein. One or two of our major milk producing counties e.g. Fife and Midlothian are rather strongly represented. In the case of the size of herd, - our average is 45 cows - the emphasis is definitely on the medium-sized and large herds, notwithstanding our efforts to ensure a good proportion of the smaller ones: as we have found by long experience, the farmers who volunteer to assist us in investigations of this character are always likely to be found amongst the more progressive men with bigger-than-average herds, and of better-than-average quality.

TABLE I. - Geographical Distribution and Size of Herd: 83 Farms.

County	Average no. of cows in herd						
	Under 20	21-40	41-60	61-80	81-100	Over 100	Total
Angus	1	-	4	3	2	-	10
E. Perth	-	4	2	-	-	-	6
Fife	1	8	6	1	3	-	19
Clackmn. & Kinross	-	1	2	-	-	1	4
West Lothian	4	4	-	-	-	-	8
Midlothian	1	8	5	2	-	1	17
East Lothian	1	3	1	1	-	-	6
Berwick	1	2	-	-	2	-	5
Roxburgh	-	2	-	-	-	-	2
Selkirk	-	1	-	-	-	-	1
Peebles	1	3	1	-	-	-	5
TOTAL	10	36	21	7	7	2	83

Type and Size of Farms. It is not easy to classify the farms into a limited number of definite types: dairying is made to fit into almost all types of farm organization, and there are various intermediate types which almost defy classification. At the one extreme we have large upland stock-raising farms on which dairying forms one - often a minor one - of several livestock enterprises: one such farm is 1700 acres in extent, though this includes a good deal of mountain and heath land. Most of our dairy farms in the Border counties, and several of those in Midlothian, are of this type. At the other extreme are a few town dairies and smallholdings; the town dairies, whose land consists solely of a limited acreage of grazing - one, in fact, has no land at all - have of course to buy in all their cattle foods, roughage included. In between these two extreme types are others on which a varying degree of emphasis is placed on milk production, and it will be seen that we endeavour in Table II to distinguish three such types. As might be expected in this area some of the farms carry quite a large acreage of arable cash crops, and, particularly in Fife, many of the farms are really arable farms with dairying as an important subsidiary enterprise. Looked at as a whole, the majority of our sample could best be described as dairy farms on which crop sales are of varying importance.

TABLE II. - Classification of farms by size and type groups.

	Adjusted Acres						Total
	Below 100	101-200	201-300	301-400	401-600	Over 600	
	---- Number of farms ----						
Stock-raising Farms with Dairy	-	-	2	1	4	3	10
Dairy Farm Type A[#]	4	8	1	-	2	-	15
Dairy Farm Type B[‡]	1	14	12	4	2	1	34
Arable Farms, with Dairy as a subsidiary	1	4	5	5	4	-	19
Town Dairy Types	5	-	-	-	-	-	5
TOTALS	11	26	20	10	12	4	83

[#]Predominantly DAIRY farms, with milk virtually the only source of income.

[‡]Primarily DAIRY farms, although crop sales may be considerable.

The farms range in size between 0 and over 1700 acres, the over-all average being 308 acres; the average rent per farm is £346, equal to 22/6d. per acre. As already stated, however, a number of the farms have rather extensive areas of mountain and heath land, which accounts for about 20% of the total acreage of all farms; it was considered desirable to convert this mountain and heath land to its equivalent acreage of arable land, and thus arrive at what may be termed the "adjusted acreage" of each farm. These "adjusted acreages" have been used in the preparation of the above table; they have the effect of reducing the average "adjusted" size of the farm to 258 acres, and raising the rent to 26/10d. per acre.

Type and composition of Herds. No attempt is being made at this stage to differentiate between the breeds kept, but, as might be expected, the majority of herds costed were either Ayrshires or crosses of this breed. The remainder consisted of Friesians and Shorthorns, and a smaller number of Red Polls and Jerseys.

The/

The total number of cows costed was 3715, of which 1010, i.e. 27% were dry cows; and of the cows in milk 37 i.e. 1% were suckling calves. The average size of herd was 45 cows. Table I has already shewn a classification of the farms according to size of herd; this varied between extremes of 7 cows and 136 cows. The percentage of dry cows ranged from NIL on three farms (two of which were Town Dairies with a "flying stock"), to as much as 48% on a farm in process of switching over from ordinary to tuberculin-tested stock. Quite a few herds had about 40% of dry cows, and in nearly all such cases, the yield of milk per cow was very much below average.

Quality of milk. All three main grades of milk were well represented in the investigation viz. ordinary or non-graded milk, standard milk, and tuberculin-tested milk. Certified milk has been classified with tuberculin-tested, since the costs of bottling milk (without which milk cannot be designated 'certified') have been excluded from our costs structure. Of our 83 farms 17 (i.e. 20%) produced ordinary milk, 24 (i.e. 29%) produced standard milk, and 42 (i.e. 51%) produced tuberculin-tested milk. Nearly 40% of the herds were attested, qualifying for extra bonuses. It is clear that the majority of the farms studied are moving with the times.

Most of the herds were milked by machine, only 9 herds being hand-milked; these were all smaller than average. In all but two of the cases - although this does not automatically follow - the net cost per gallon was rather high.

Nineteen of the farms i.e. 23% were producer-retailers retailing the major part of their production; farmers with herds of all sizes were included among those nineteen, from the largest to the smallest. All the other farmers were mainly producer-wholesalers.

Milk Yield per cow. The average milk production per cow per farm for the six months' period was 280 gallons, which we have reason to believe is rather higher than the average yield for the whole of Scotland; amongst the farms studied it varied between the very wide limits of 146 and 522 gallons per cow. In all these cases our "per cow" figures are based, not on the number of cows actually in milk, but on the total number of cows in the herd, whether in milk, or suckling calves, or dry. Some indication of the average milk production per cow per farm is given below.

TABLE III. - Milk yield per cow per farm: Winter 1945/46

	Under 200 Galls.	201 to 250 Galls.	251 to 300 Galls.	301 to 350 Galls.	351 to 400 Galls.	401 to 450 Galls.	451 to 500 Galls.	Over 500 Galls.	Total
No. of herds in group	7	21	22	20	8	2	1	2	83

It is of interest to note that, after deducting from the average yield of 280 gallons per cow the portion consumed in the farmhouse, allowed to workers or fed to calves viz. 15 gallons, the net sales per cow, work out at 265 gallons on all the farms costed.

III. COSTS OF PRODUCTION.

Preparation of costs data. Every care has been taken to ensure the utmost comparability of the data not only between different farms, but also between our own and other colleges in Great Britain.

The following principles have been adhered to.

(i) Winter and Summer Periods.

The year has been divided into two six-monthly periods viz:-

Winter ..... 1st October to 31st March inclusive
Summer ..... 1st April to 30th September inclusive

(ii) Home Grown Foods.

These have been charged at prices intended to cover costs of production, including carting to a point within close proximity to the dairy premises, from which stage the foods are handled by the dairy staff. Where necessary, variations in our standard prices have been made to suit the circumstances of particular farms. For 'average' conditions the following average prices were used, which, in the case of corn crops, included grinding or rolling:-

Crop	Price per ton £	Crop	Price per ton s.
Oats	13	Swedes & Turnips	25/-
Beans	21	Mangolds	25/-
Mashlum	16	Kale	16/-
Hay, Rotation	6	Cabbage	20/-
Oat Straw, fed	2	Silage	40/-

No charge has been made for the value of oat straw used as litter.

(iii) Labour.

Any labour which may be regarded as a cost of distribution as distinct from production (e.g. bottling milk, sterilising bottles etc.) has not been charged. The milk is really costed up to the point where it passes "over the cooler and into cans, where the farmer provides the cans".

Unpaid family labour, viz. manual work undertaken by the farmer and/or his wife or any member of his household, has been charged at rates locally current for equivalent hired labour; appropriate adjustments have been made for overtime work.

(iv) Miscellaneous Costs.

These comprise three elements viz.:-

(a) Expenses directly chargeable to the dairy herd or necessarily incurred in milk production e.g. bull upkeep, veterinary fees and medicines, consumable dairy stores, coal, milk recording fees etc.

(b) Repairs, depreciation and maintenance of dairy equipment; and

(c) Overheads i.e. an appropriate share of certain general farm expenses which has been calculated at the rate of 5/- per £ of direct labour bill incurred on milk production. The basis upon which this item is calculated is in keeping with certain tentative but not necessarily final recommendations made by the Scottish Conference of Agricultural Economists, in the light of their recent researches into this intricate accounting problem, undertaken with a view to devising a fair basis for the distribution of general farm overheads over the productive enterprises of the farm. Incidentally this is the/

the biggest element in the composition of miscellaneous costs.

(v) Herd Maintenance (or "Cow Replacement")

This important but fluctuating item of cost has been temporarily ignored in the preparation of our Interim Report, on the grounds that it can only properly be dealt with when we have detailed information covering a whole year.

(vi) Items excluded.

The following items have not been included as items of cost:-

Managerial or supervisory work.
Milk haulage, and other costs of distribution.
Interest on capital.

(vii) Credits.

From the GROSS COSTS of milk production, credits have been deducted for the following items so as to arrive at the NET COSTS per cow and per gallon:-

Calves sold or retained.
Unexhausted manurial residues.

Both these items have been ascertained on an agreed basis.

Winter Milk Costs

For the 83 herds studied, average costs worked out as setout below

TABLE IV. - Costs per Gallon and per cow (provisional)*

	Per Gallon d.	Per Cow £ s. d.	%
FOODS - Purchased	6.68	7.15.10	26
- Home Grown	10.06	11.14. 8	38
Total	16.74	19.10. 6	64
LABOUR - Hired & family	4.37	5. 2. 1	17
- Farmer & wife	1.09	1. 5. 5	4
Total	5.46	6. 7. 6	21
MISCELLANEOUS COSTS	3.86	4.10. 2	15
GROSS COSTS	26.06	30. 8. 2	100%
Less CREDITS for Calves, Manurial Residues	1.67	1.19. 1	-
NET COSTS	24.39d.	£28. 9. 1	-

*Excluding Herd Maintenance (i.e. "Cow Replacement")

It will be seen how largely foods bulk in the cost of winter milk production, for they account for 64% of the gross costs, Home Grown Foods amounting to 38%, and Purchased Foods 26%; the actual food cost per cow amounted to £19.10.6d. for the six months, of which £7.15.10d. was for purchased foods. Except for the town dairies, and a few farms which buy roots or hay, this consists mainly of concentrates and draff. Food costs per gallon of milk produced work out at 16¾d. In these days of rationing, it/

it would be regarded as ironical to point to the necessity for the economical use of feeding stuffs. Nevertheless, it is of interest to note that 4.71 lbs. of cake and meal were fed for each gallon of milk produced; this rather high figure suggests that either the available supplies were relatively low in feeding value, or, as some farmers admit, that their dairymen, given a fairly free hand in the matter so as to lessen the possibility of friction with the staff, had been rather liberal with the feeding they were fortunate to have.

The net cost per gallon averaged just over 2/-, ranging between 15.09d. and 43.01d.; the net cost per cow for the winter period averaged £28.9.1d., ranging between £17.16.10d. and £50.7.9d. A better indication of the general run of costs per gallon and per cow will be obtained from a perusal of the figures given below.

TABLE V. - Distribution of Herds according to Cost per Gallon of milk produced and Costs per Cow

	Net Cost Per Gallon							
	Under 15d.	15-20	20-25	25-30	30-35	35-40	Over 40d.	Total
No. of Herds	-	21	33	15	8	4	2	83
	Net Cost per Cow (6 mos.)							
	Under £15	15-20	20-25	25-30	30-35	35-40	Over £40	Total
No. of Herds	-	3	26	24	17	9	4	83

It will be seen that most of the dairy farmers who have furnished us with records are producing milk at from 20d. to 30d. per gallon, and it costs them from £20 to £30 to keep a cow for the six winter months. Costs vary between very wide limits.

Although our average yield of 280 gallons per cow is below the pre-war output, it represents, under the present difficult conditions, quite a creditable performance. And certainly the revenue derived therefrom will all be required to meet the present high level of costs, and cover herd maintenance and other contingencies, especially since costs are likely to rise rather than fall. Yet what prospects are there of present yields being increased so as to bring in more farm income, or even of being maintained at present levels?

Unfortunately, in view of the grim feeding stuffs position now facing the industry, conditions are certainly not such as to hold out any immediate prospect of improved yields, especially when we bear in mind the bleak dry Spring of 1946, and its sorry aftermath of bare pastures and poor turnip brairds. It will tax all the resourcefulness and managerial skill of our experienced dairy farmers even to maintain present production during the next twelve months. Meantime, the advantage seems to lie with those milk producers on arable and mixed farms where corn and other crops may be used with the utmost ingenuity to eke out the reduced allowances of purchased feeding stuffs.

ACKNOWLEDGMENTS.

Grateful acknowledgment is made of the valuable assistance so willingly given us by the dairy farmers who have kept the necessary records and have furnished us with all the other information needed, and of the courtesy unfailingly shown us on the occasion of our visits. Each collaborating farmer should by now have received a copy of his own records.

The investigation is continuing, and additional data on home-grown crop costs for 1946 are being collected. Since this investigation should furnish useful data both for advisory work in farm management and for the Annual Review of Agricultural Prices, it is hoped that, wherever possible, those farmers who have so far participated therein will continue to give us their generous help. We should however welcome the names and addresses of a few likely dairy farmers (especially men with small herds) who may be willing to co-operate in this work as from 1st October next, i.e. the commencement of our new costing year.

D.W.
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