THE NORTH OF SCOTLAND COLLEGE OF AGRICULTURE

AGRICULTURAL ECONOMICS DEPARTMENT

ECONOMIC REPORT NO. 37

DAIRYING IN CAITHNESS

by

D. GODFREY

November, 1953

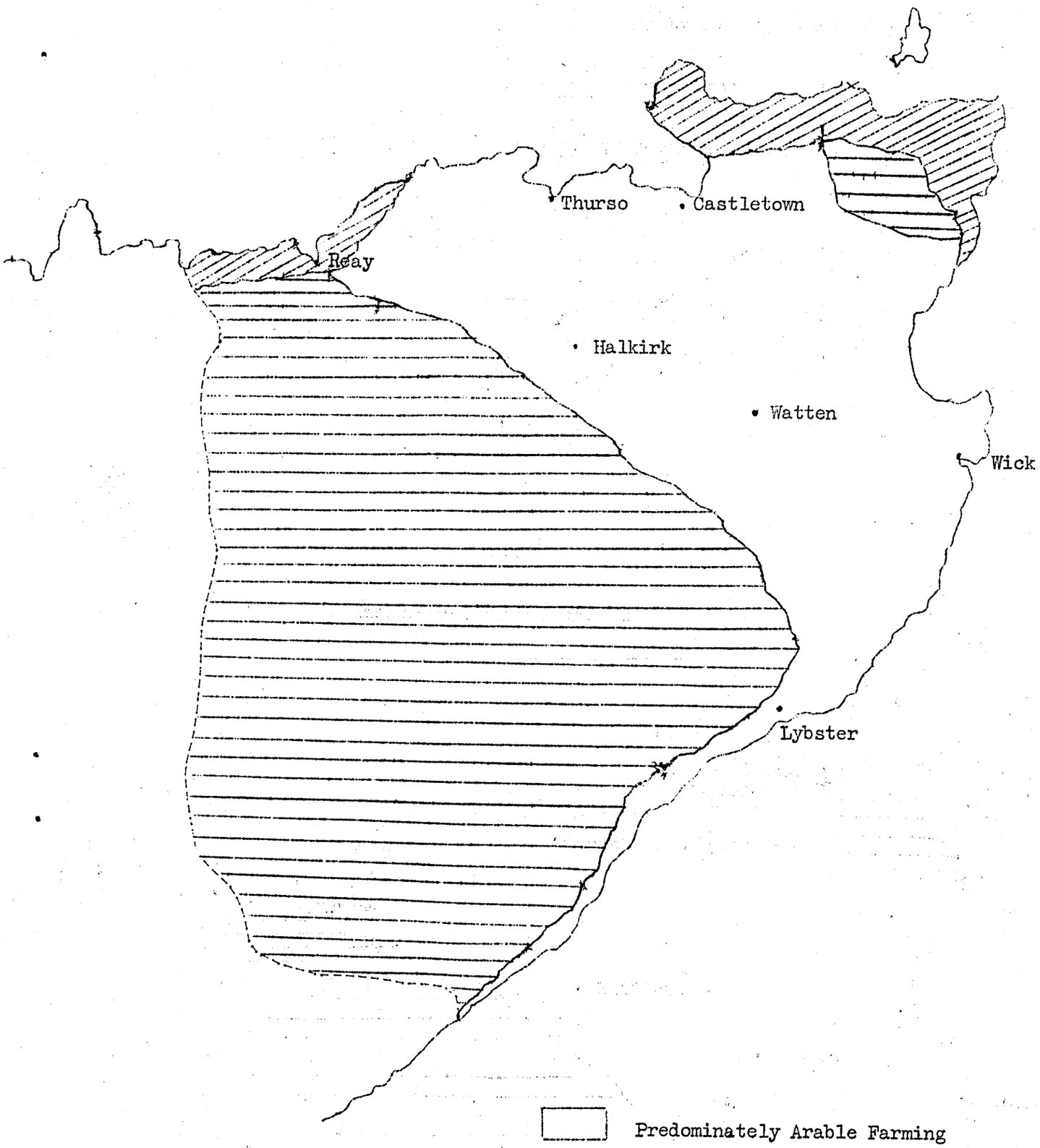
AGRICULTURAL ECONOMICS DEPARTMENT

Provincial Advisory Officer	Albert D. Imper, M.B.E., B.Sc.(Agr.) M.S.(Econ.), Ph.D., N.D.A.
Senior Advisory Officer	Gordon G. Hayes, B.Sc.(Econ.), N.D.A.
Advisory Officers	John Clark, B.Sc.(Agr.), N.D.A. Vernon Baker, B.Sc.(Econ.) Alexander Grant, B.Sc.(Agr.) Dip. Agr. Econ.
Assistants	David Godfrey, B.Sc.(Agr.) Miss Margaret Haughs, B.Sc.(Agr.) Wm. A. C. Jones, B.Sc.(Agr.) Miss Audrey M. Chalmers, B.Sc.(Agr.)
Technical Assistants	George Cowie. Walter A. Duthie.

North of Scotland College of Agriculture,
Economics Department,
41½ Union Street,
Aberdeen.

MAP 1

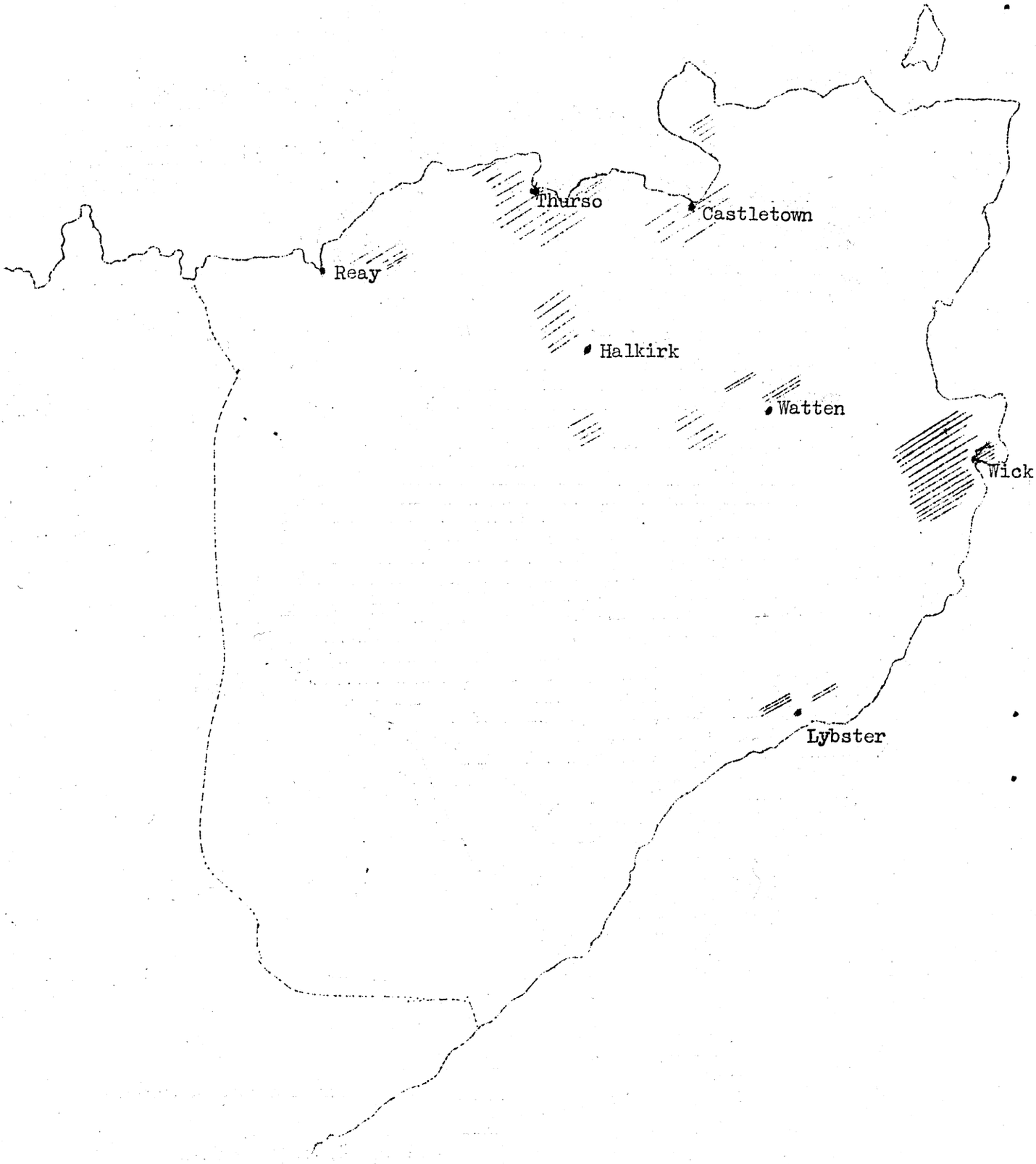
Showing Areas of Farmland



Scale 5 miles to 1 inch

MAP 2

Location of Dairy Farms in Caithness



Scale 5 miles to one inch

DAIRYING IN CAITHNESS

INTRODUCTION

A casual glance at a map of Scotland shows that Caithness is the most northerly county of the Scottish mainland, containing John O' Groats, the bleak windswept mecca of so many tourists. The County is a flat treeless plain and traditionally has been a great stock rearing county, considerable numbers of store cattle and sheep being sold to southern farmers each year.

It comes as a surprise therefore to learn that there are between 90 and 100 dairy farms in Caithness and that they produce far more milk than the resident population requires. Certain questions arise. Why is this milk produced so far from the consumer markets of the industrial midlands of Scotland? Do the farmers produce their milk at times when it can best be used for purposes other than sale (as fresh milk) in Caithness? Is Caithness suited to milk production and is the milk being produced efficiently? Has dairy farming paid or would the farmers be better producing the available alternatives?

These are large and complicated issues and this report is no more than an attempt to consider certain aspects of Dairying in Caithness with a view to answering them.

ACKNOWLEDGMENTS

The information used in this report was obtained from numerous sources and the Economics Department of the North of Scotland College of Agriculture wish to express their thanks to all who gave information and particularly to the Milk Recording Societies, the North of Scotland Milk Marketing Board, the Department of Agriculture for Scotland, and also the farmers who provided much of the data used in the report.

THE COUNTY

Caithness extends to 438,800 acres, of which 93,623 acres was classified as crops and grass in June 1950 and 251,863 acres as rough grazing. Map 1 indicates the way in which the county can be divided into -

a) Moorland: Rough, uncultivated land.

b) Crofting areas: i.e. where most of the holdings are under 30 acres and where the rough land is held as common grazing.

c) Farm Land; i.e. most holdings over 30 acres and where there is little or no common rough grazing.

The three area types have no rigid boundaries and small crofts are found throughout the farm land area whilst many of the farms have a proportion of rough grazing attached to them.

Within the farm land area lie the 90-100 dairy farms and Map No 2 shows that about half of them are within 5 miles of the county town of Wick (population 7,000) and about one quarter with 5 miles of Thurso (population 3,400). The remaining quarter are scattered widely, about 8 being round the smaller town of Castletown and some of the remainder near small villages.

It would be true to say that the dairy farms are on the better class of land and their concentration round Wick may be as much due to the fertile land there as to any other single factor. The climate varies locally in Caithness and the presence of several dairy farms between Castletown and Thurso coincides with a slightly more favourable climate in that district.

The rainfall in Wick is lower that that of Inverness, Aberdeen or Prestwick, (the latter being representative of the South West dairying area), the average figures over the past five years being:

Wick	30.70	inches per annum
Inverness	31.40	do.
Aberdeen	34.50	do.
Prestwick	37.40	do.

The advantage of a comparatively dry climate is offset by the tendency to have a wet autumn, the three wettest months of the year being January, November and October, in that order. Caithness has a cold climate and harvesting does not normally start until September, so that there is frequently a protracted and broken grain harvest, whilst in some years potatoes may have to be abandoned in the ground. The area is thus unsuitable for cash cropping, although some farms do manage to sell quite large quantities of oats.

The three driest months are April, June, and May, which means that the sowing of the crops usually presents little difficulty and this dry spell is also helpful for the lambing.

One further disadvantage of the climate should also be mentioned, viz: the cool winds which seem to sweep over the plains of Caithness right through the year and so often make bright sunny days comparatively cool.

The county is very isolated as the following distances show:

Town	Distance from Wick	Population
Inverness	130 miles	30,000
Aberdeen	235 miles	200,000
Industrial Belt of Scotland	300 miles	2,000,000

Any milk produced surplus to local demand has thus a long distance to travel before it can find a place in the liquid milk market. The position over the last three years is indicated by the figures given below:-

	Total Milk Produced	Liquid Milk		
		Consumed in Caithness	Exported	Made into Butter
1949/50	1,274,000	41%	59% *	nil
1950/51	1,254,000	42%	6%	52%
1951/52	1,200,000	57%	8%	35%

Liquid milk is required in the south in the winter months and thus from the point of view of economic stability, the Caithness milk producers should be encouraged to concentrate on winter milk (October-March) since the making of butter (the alternative use) is likely to remain less profitable than the sale of liquid milk. At the moment many of the farmers consider that the extra bother and cost required in producing winter milk is not balanced by the extra price received and therefore do not aim to get a large number of autumn calvers. Figures supplied by the Department of Agriculture for Scotland over the years 1944-51 for 97 herds in production for most of these years show that -

In 45 herds winter production was less than 40% of Total production
15 herds winter production was about 40% of Total production
35 herds winter production was 40% - 55% of Total production
2 herds winter production was over 55% of Total production

There are thus a considerable number of herds which rely on summer production with its low price per gallon. Is such a policy worth while? This question will be dealt with at a later stage in the report.

---

* much of this would have been used for manufacturing purposes.

THE DAIRY FARMS

The Department of Agriculture for Scotland publication "Types of Farms in Scotland" gave 91 farms in Caithness which could be considered under the heading of Dairy Farms and the size of holding is compared in Table I with the size of farm in North East Scotland and the whole of Scotland.

TABLE I

Size of Dairy Farms in Caithness

	No. of Caithness Farms	%	% Dairy Farms in Scotland	% Dairy Farms in North East Scotland
1 - 25 acres	5	6	3	3
25 - 50 acres	7	8	7	9
50 - 100 acres	25	27	20	29
100 - 250 acres	40	44	48	44
250 - 500 acres	11	12	17	12
500 - 1,000 acres	3	3	4	3
Over 1,000 acres	-	-	1	-
Total	91	100%	100%	100%

The size of the dairy farms in Caithness is thus somewhat smaller than that of the farms of Scotland as a whole. With the exception of the larger number of farms under 25 acres, the acreage variation in Caithness is very similar to that for North East Scotland.

The number of dairy farms in this county has shown little increase over the last 30 years, the yearly figures being approximately -

94+	in	1922
94+	"	1928
73	"	1938
95	"	1943
98	"	1948
95	"	1952

+Sanitary Inspectors Figures which may include some very small scale producers.

Although the number of producers has not varied much over the years, the amount of milk produced in the county has increased, since there has been a distinct tendency for milk production to occupy an increasingly important place on dairy farms.

The farmers interviewed were therefore asked to state when they developed milk production to an important enterprise, and although in some cases no definite answer could be given, the following 43 farmers replied thus:

TABLE II

Time when dairying became important

Old Dairy Farms -	17 farms
1916 - 20	4 farms
1933 - 36	5 farms
1940 - 43	5 farms
1944 - 47	12 farms

Of the 17 old dairy farms, 9 were near Wick and 6 were close to Thurso; the other two were near large villages. Originally dairying was important only near the towns, but it has since spread to other farms especially during

a) The 'boom' period of (and following) the first World War (1916-20).

b) About the time when the Milk Marketing Board's were being established (1933 - 3

C) During the later war years and the immediate post-war years (1940-47).

It was during the periods 1933-36 and 1942-47 that milk production tended to be more profitable than alternative less exacting types of farming. It should also be mentioned that towards the end of the last war the presence in Caithness of a County Agricultural Adviser with considerable interests in dairying exerted a profound influence in persuading farmers to think more seriously about their milk production.

Since the Caithness dairy farms tend to be rather smaller than those of the rest of Scotland, it is not unexpected that the size of herd is also rather small. The Caithness figures for 97 herds are compared with those of all Scotland and North East Scotland in Table III, the data being extracted from the publication "Types of Farming in Scotland."

TABLE III

No. of Cows per herd - 1947

No. of Cows	Caithness No. of Herds	%	All of Scotland No. of Herds	%	N. E. Scotland No. of Herds	%
1 - 9	17	17.6	507	6.1	77	8.5
10 - 19	36	37.1	1821	21.9	276	30.2
20 - 29	30	30.9	2193	26.4	223	24.4
30 - 39	6	6.2	1698	20.4	158	17.2
Over 39	8	8.2	2087	25.2	180	19.7
	97	100%	8306	100%	914	100%

Well over half the herds in Caithness have less than 20 cows whereas in the whole of Scotland only just over one quarter of the herds have fewer than 20 cows. Of great interest is Table IV which shows the changes in the number of cows per herd from 1944-51 for herds in production during most of these years (99 herds).

TABLE IV

Changes in the Number of Cows per Herd (1944-51)

Av. No. of Cows through the years	No. of Farms Cow Numbers Constant	Cow Numbers Increased	Cow Numbers Decreased
1 - 10 cows	19	3	-
10 - 20 "	20	14	1
20 - 30 "	8	18	2
30 - 40 "	3	5	-
Over 40 "	3	3	-
	53	43	3

Although there has been a tendency for the size of the herd to increase since 1944 the table shows that many of the small herds are apparently not able to do this, probably because of limited acreage and byre accommodation. The 20-30 cow group showed the greatest increase and it was found that many of these farms were fairly large and had had several enterprises besides dairying. They have increased their herds at the expense of other enterprises and provide an illustration of the tendency dairy farmers have to concentrate upon milk production.

In compiling this table care was taken not to be misled by the effects of such factors as a change over to T.T., which may cause a temporary decrease in the number of cows carried. The very large herds did not show much increase over this period - nor was this unexpected. The very fact that they are large herds shows that they have already specialised in dairy farming, so that in their case the maximum herd size has been reached.

A classification of the holdings also illustrates the tendency for the dairy farms to be mainly concerned with milk production.

Of 97 herds the classification was -

Dairy Farms	63
Dairy + Crops	14
Dairy + Hill Sheep	1
Stock Rearing	4
Stock Rearing & Feeding	1
Part Time	5

Nine farms are now dairying which were not in 1947 (at the time of the classification). At that time they were classified:

Stock Rearing	4
Stock Rearing & Feeding	4
Hill Sheep	1

During the period 1944-51 there was no pronounced sway into or out of dairying. Ignoring those farmers who commenced dairying for a short while and then gave it up, 21 farmers commenced milk production in these years (an average of 3 per year) whilst during the same period 15 farmers went out of dairy farming (an average of 2 per year). Of the 21 entrants 15 have T.T. herds and only 6 produce milk designated "ordinary" whereas almost all those who have gone out of dairying (there are two exceptions) were producing "ordinary" milk.

The reasons given by farmers for entering the dairying industry were -

a) The stability of the monthly milk cheque.

b) Belief that dairy farming was more profitable than the type of farming they had been engaged in.

The reasons ex-dairy farmers gave for going out of dairying were various, viz:

a) Retirement, where new man had no experience of dairying, or for other reasons did not use the farm as a milk selling farm.

b) The amount produced had never been large and the farmer considered it more bother than it was worth.

c) Labour difficulties.

d) The trouble of seven days per week working and the increasing strictness of the standards required for clean milk production.

In most cases it was for more than one of the above reasons that the farmer gave up milk production.

INTENSITY OF STOCKING

The basis of the calculation of stock carry is the Livestock Unit, the scale used being -

1 Horse (adult) 1 Cow, Bull 1 Cattle beast over 2 yrs.	= 1 Livestock Unit
1 1-2 yr. Cattle	= .75 Livestock Unit
1 6 month-1 yr. cattle	= .50 Livestock Unit
Calves suckling and under 6 months	Not Counted
1 ewe or sheep over 6 months old	= .25 Livestock Unit
1 sheep 3-6 months old	= .07 Livestock Unit
Lambs under 3 months old	Not Counted
1 pig	= .20 Livestock Unit
1 hen	= .01 Livestock Unit

In Table V the Livestock units per 100 adjusted arable acres (rough pasture was taken at 1/6th of an arable acre) is shown for the dairy farms of Scotland as a whole and also for the North East Area. The figures have been calculated from Table 45 (Page 80) of the report "Types of Farming in Scotland"* and the figures for the sample of 33 dairy farms in Caithness are shown alongside.

---

* Department of Agriculture for Scotland.

TABLE V

Livestock Units per 100 Acres

	North East Dairy Farms	All Scotland Dairy Farms	Sample of Caithness Farms
Dairy Cattle	29.5 L.S.U.	36.1 L.S.U.	31.4 L.S.U.
Beef Cattle	2.7	1.0	3.5
Sheep	4.0	5.4	13.6
Pigs	0.3	0.3	1.1
Poultry	1.8	0.8	1.1
Horses	1.5	1.7	2.0
	39.8	45.3	52.7

Why should the figures for Caithness be greater than for Scotland as a whole?

(a) The main reason is that the growing of cash crops is negligible in Caithness and therefore the farming is wholly dependant upon its livestock.

(b) Sheep are far more important on Caithness dairy farms than on those of most other areas and it might be argued that in charging four ewes = one dairy cow, the sheep are being assessed too highly. However, even if seven ewes were taken as = one dairy cow, the total L.S.U. per 100 acres would still be 48.5 and considerably higher than for the North East of Scotland.

The large numbers of sheep in Caithness is the main difference between the dairy farms there and elsewhere and this may explain why the milk yields in Caithness are not very high. On many of the Dairy farms the cows "do not get it all their own way" and the management has to be adjusted for the needs of the ewe flock. Many of the farms could best be described as "Dairying with Sheep" whereas in other areas many farms are Dairying with Crop Sales. The Department of Agriculture for Scotland figures for Caithness which were used in compiling Table 45 of the aforementioned report confirm the intensive stock in Caithness (50.4 L.S.U. per 100 acres) and show an even greater preponderance of sheep.

Would it be worth while giving up the ewe flock and concentrating entirely on dairying? Most Aberdeenshire dairy farmers decided that it was some years ago but in Caithness, farmers have generally decided against it although they have reduced their sheep enterprise. As it is, there is no clear indication that the milk yield is better for the Caithness dairy farmers without sheep than for those with sheep and individual circumstances and conditions may mean that no general answer can be given to this question.

The stock on the Caithness dairy farms is heavy and allows only for two acres of arable land per cow; this applies to many of the farms without sheep as well as those which have a ewe flock. Since the dairy cow requires about 2¼ acres per year under normal farming practice, the stocking is very high and indeed several of the farmers candidly stated that they were over-stocked. This too may partly account for the indifferent yields per cow on many farms and one feels that in some cases, smaller herds of higher yielding cows would be more profitable than larger herds giving less milk, especially since the cows are of the Ayrshire and not of a dual purpose breed.

INVESTMENT IN DAIRY ENTERPRISE

This section is an attempt to find out how much capital each farmer has "locked up" in his dairying enterprise. Capital investment includes the valuation of dairy livestock, milking, cooling and sterilising equipment and other items which have to be provided by the tenant, e.g. water bowls and lighting plant. In the case of buildings, where a sum had been spent by the tenant or where owner-occupiers had made renovations that too was included. From the 30 herds furnishing complete details of invested capital, the average figures are shown in Table VI.

TABLE VI

Average Investment per Cow

(1952 Valuation)

Cow	61: 4: -
Bull	2:16: -
Other Cattle	19:14: -
Alterations to Buildings	11: 9: -
Dairy Equipment	9: 6: -
	£104: 9: -

Milking machines and other large equipment have been depreciated at normal Inland Revenue rates, except that deductions for Initial Allowances were excluded.

The investment of £93 per cow (excluding buildings) may seem high and in fact in every case except six it exceeded the direct milk sales per cow per year.

A number of factors influenced the level of invested capital per cow. Some are discussed below.

A. Hand Milking For the hand milked herds the money locked up in equipment tended to be much less than for the machine milked herds, the relevant figures being:-

Dairy Equipment per cow:

7 Hand milked herds	£3:17: -
23 Machine Milked herds	£10:19: -

B. Herd Quality and Investments It would naturally be expected that the 'T.T.' Herds would tend to have a higher investment per cow, since not only are the cows more valuable but buildings and equipment have to reach a high standard. Furthermore the T.T. herds tend to be self-contained to avoid the risks of having to purchase stock each year.

In Table VII the investment per cow for 17 machine milked T.T. Herds is compared with 6 'Ordinary' Herds. The hand milked herds have been omitted from this consideration since all except one were producing undesignated milk and they would have weighted the results unduly.

TABLE VII

Average Investment per Cow

	17 Herds Producing T. T. Milk	6 Herds Producing Ordinary Milk
Cows	66:17: -	53: 7: -
Bull	2:13: -	3:13: -
Other Cattle	24:14: -	18:17: -
Alterations to Buildings	11:12: -	10:15: -
Dairy Equipment	10: 9: -	12:10: -
	£116: 5: -	£ 99: 2: -

The extra investment of £17 per cow in the higher quality herds is well worth while, since an extra return of 2d. per gallon on T. T. Milk brings in 2d. x 600 = £5 per year for each cow giving 600 gallons of milk for sale. Thus the return per extra capital invested is $\frac{£5}{£17}$% or 30%.
Any additional day to day expenditure in producing T.T. milk is more than compensated by the (usually) better health and freedom from disease of the cows[*].

C. Size of Herd The herds in Caithness are all on the small side with few having over 50 cows and none at all over 100 cows. Hence the influence of size of herd on the invested capital cannot be measured very easily. When the herds are divided into three groups, according to size there is no clear difference in capital invested between the two larger groups whilst the lower investment of the smallest group is because they are mainly hand milked and producing milk of 'Ordinary' grade.

TABLE VIII

Herd Size and Invested Capital

	No. of Cows	Capital per Cow
10 Larger Herds	26 cows	£113
10 Smaller Herds	15 cows	£112
10 Smallest Herds	9 cows	£88

It seems likely that in larger herds the investment per cow would fall since the buildings and equipment tend to be fully used and the bull (s) too is fully employed.

D. Milk Yields and Sales per Cow The yield per cow is largely independant of the capital invested since higher yields depend mainly on good management and increase only the day to day running costs of the herds (e.g. extra food). Indeed the yield per cow can be doubled without increasing to any extent the capital invested per cow and since high yields generally are more profitable it may well be foolish to be sparing with concentrates, etc., costing say £10 per cow per year when the capital investment per cow is over £100.

[*] See Milk Report No. 26, Table IX, North of Scotland College of Agriculture Economics Department.

The only relation between milk sales and invested capital occurs with some of the small herds with a low capital investment and a correspondingly low milk sale per cow. These herds were, however, inclined to be of a "dual purpose" type and a number of suckled (beef) calves were reared in addition to the milk sales

TABLE IX

	Six herds with Highest Capital Investment per cow	Six herds with Lowest Capital Investment per cow
Investment per cow	£145	£68
Sales of milk per cow (1951)	£89	£64
Milk sold per cow	695 gallons	500 gallons

The herds with a high capital investment might have been expected to have had a higher yield per gallon since the farmers concerned are obviously going wholeheartedly into the dairying enterprise.

ANAYLSIS OF NET RECEIPTS

The results refer to 28 farms for the year March 1951/52. In some cases accounts for previous years were available and from these any gross abnormalities could be noted. As a result some extreme results have been omitted from the averages.

The analysis was restricted to that of receipts alone in order to find out the percentage of total income due to dairying.

If the fattening of purchased store cattle or sheep had been of much importance, it would have been necessary to deduct from the receipts the purchase price of the stores but fortunately the enterprises in Caithness are those which involve a breeding herd or flock and a fixed sum of capital.

Table X shows the average receipts per farm and per 100 acres, together with the percentage of income due to the various enterprises.

TABLE X

Proportion of Income Due to Various Enterprises

	Per Farm	Per 100 acres	%
Milk	£1512	£1818	56
Dairy Cattle	219	266	8
Beef and Store Cattle	105	114	5
Sheep and Wool	329	290	12
Pigs	259	251	6
Poultry	254	271	8
Crop	15	12	-
Others	103	122	5
	£2796	£3144	100

The average results for the dairy farms included in the Financial Report No. 23 of this Department are shown below (Table XI) and it will be seen that whilst the proportion of income due to dairying is similar for both groups of farms the total receipts per 100 acres are considerably higher in the farms included in the Financial Report.

TABLE XI

Total Receipts per 100 Acres for Dairy Farms

Throughout the North of Scotland

Average of Results 1950/51 and 1951/52

Milk	£2289	54%
Dairy Cows	272	7
Beef Cattle	157	3
Sheep and Wool	115	3
Pigs	126	3
Poultry and Eggs	328	7
Crops	799	19
Other	173	4
	£4259	100%

The lower receipts in the Caithness groups of farms is due to the absence of sale crops (mainly oats, barley and potatoes) on all except 4 farms. For the few farms round Wick where crop sales are important, the total figures are well up to the better results of the financial account farms. It will be noted that sheep are more important on the Caithness dairy farms than those of the North of Scotland as a whole and of the 28 farms, 16 kept sheep and 10-30% of the total farm receipts came from that source. In most cases a breeding flock of North Country Cheviots was kept.

The apparent importance of pigs is deceptive and was due to there being a fairly large scale pig enterprise on 4 of the farms in the sample. 12 of the farms recorded no income from pigs in the year 1951/52.

Hens assume a variable importance on 23 out of the 28 farms and it is undoubtedly the comparatively low yield of oats and barley in Caithness which deters the dairy farmer from launching out on to pig or poultry enterprises. Most of the corn is used for the dairy cattle and hence on many of the farms pigs and poultry would have to rely on purchased foodstuffs.

Beef Cattle. From the point of view of all non-dairy farmers, the complete changeover of the dairy farms to the Ayrshire breed is to be regretted although in practice and from a business point of view it was sound. Of the 28 farmers, only 7 had any income from store or fat beef cattle and these were mainly farming on poor land and (as far as net receipts are a guide) were working their holdings at a rather lower intensity than most of the other farms. Thus it seems that in this area (as in most others) if a farmer has decided to go into dairying he has done so wholeheartedly and made it a major item so that the heavy outlay of capital might prove worthwhile. This is illustrated when we consider the proportion of income due to dairying on the 28 farms.

TABLE XII

Sale of Milk and Dairy Cattle	Number of Farms
Under 25%	1
25 - 50%	9
50 - 75%	11
Over 75%	7

Milk Sales

During the year 1951/52 the North of Scotland College Milk Costs gave £85 as the cost of keeping a cow for a year in the North of Scotland Milk Marketing Board Area and therefore an average sale of about 575 gallons per cow was necessary to cover all costs. If the labour cost of the farmer and his family is omitted, however, a sale of 500 gallons milk per cow will cover all the costs.

Taking these standards and applying them to the farms giving information in this section, it was found that of 28 farms, 12 had milk receipts of well over 575 gallons per cow and were therefore almost certainly producing their milk at a profit. A further six farmers were selling between 500 and 575 gallons per cow and were therefore likely to be making a profit provided family labour was deducted from costs.

The remaining 10 farms had sales of under 500 gallons per cow but three were working with dual purpose cows and were also raising store cattle from their cows. One other farmer was concentrating on the sale of young dairy stock, but for the remaining six herds there was no apparent reason why receipts per cow should be low and it seems unlikely that their herd was running at a profit for the year in question.

It might have been thought that the farms mainly dependent on milk production would have had a high yield per cow but this did not always prove to be the case as Table XIII shows.

TABLE XIII

Milk Sales per Cow and Dependence Upon Dairying

Proportion of Receipts from Milk and Dairy	Number of Farms	Average Milk Sales per Cow
Under 50%	10	549 galls.
50 - 75%	11	607 "
Over 75%	7	592 "

There were farms in all groups which pulled down the average sales per cow and these figures also suggest that in some cases a much higher milk yield should be aimed at.

COST OF MILK PRODUCTION

In this section it is proposed to examine the various factors which influence the cost of milk production in Caithness and to determine the effect of the geographical position of Caithness upon the working of the dairy herds.

Milk Yield This is probably the greatest single factor affecting the per gallon cost of milk production and the average yield per cow per year over the period 1947-51 is set out in Table XIV for the areas of the three Scottish Colleges and also for some English districts.

TABLE XIV

Average Milk Yield per Cow per Year 1947-51

Milk Cost Investigation

Aberdeen Milk Marketing Board Area	757 gallons
North of Scotland M.M.B. Area	665 "
East of Scotland College	694 "
West of Scotland College	675 "
North East England	643 "
North West England	714 "

The Caithness results included in those of the North of Scotland Milk Marketing Board Area showed an average of 694 gallons, which is 60 gallons lower than the consistently high average of the Aberdeen Milk Marketing Board Area. In actual fact the true yields are probably lower than the above figures indicate, since it is often only the better farmers who are willing to keep cost records. The Milk Records Association gave 606 gallons as their average yield for Caithness over the years 1948-50 and the farms giving statistics in this survey had an average of 601 gallons milk sales per cow for 1951/52 which was increased to 637 gallons if milk going to the farmhouse, farmworkers and calves is included.

The cost records suggest then that farmers in the North, including Caithness, tend to have lower yielding herds than the Aberdeen area. Why should this be? It is not due to the breed of cow since the Ayrshire preponderates in both areas. It is true that the Caithness winter is a little longer than in Aberdeenshire but this should not exercise much influence since all cows are kept inside throughout the winter in both areas. Rather is the reason likely to be that many Caithness herds till recently have been increasing in size and when this is done yields per cow usually fall since little culling is practised. Furthermore quite a number of the Caithness farmers have only been dairying for about 10 years or less and thus may not yet be such experienced managers as farmers

in Aberdeenshire parishes where dairying has long had a firm standing. The area is comparatively new to dairying and this combined with its remoteness may mean that competitive standards are not so great. Altogether one feels that once capital has been invested in the dairying enterprise it would pay many farmers to go for higher yields even if some day to day expenses are increased. Even when official milk recording is not practised every farmer should weigh each cow's milk regularly so that an accurate record of the milk yield of each cow can be obtained and culling practised. In a similar way it is doubtful whether enough attention is paid to the interval between calvings and the length of the lactation when the merits of individual cows are being assessed and compared.

Butter Fat Content As almost all the herds are pure or cross Ayrshire the average buter fat % is close to that of the Ayrshire breed. The Milk Recording Society's figure for 1948-50 was 3.81%.

Labour Costs Labour Costs in Caithness are no higher than elsewhere and the average number of hours spent looking after each cow per year varied bewilderingly from farm to farm wherever it could be calculated. The variation was from just over 100 to 240 hours per cow per annum. It so happens that the milk costs average of 151 hours per cow per year is only 2 hours higher than that for the Aberdeen Area Milk Cost (149 hours per cow per year). [*]

Hand and Machine Milking Of a sample of 48 herds it was found that only 11 were milked by hand and all of these except one were producing 'Ordinary' (Non-designated) Milk. None of the hand milked herds had over 20 cows and 6 had under 10 cows so that the vast majority of the dairy cows of Caithness are machine milked.

Labour Difficulties is one of the main reasons given for farmers growing dissatisfied with milk production and it was therefore interesting to find out (a) whether farmers had experienced labour troubles or not; (b) whether they themselves found the continual daily grind or 'tie' of milk production sufficiently troublesome to cause them occasionally to think of giving it up. The replies can be summarised as follows:-

17 Farmers using Hired Labour 12 had experienced no real difficulties in getting and keeping labour. The main reason for this was their proximity to either

---

[*] The average hours per cow for herds in the West of Scotland (1950/51) was 135.

Wick or Thurso plus the fact that they possessed good cottages, and working conditions seemed good. These factors are obviously of greater importance than the cash wage paid. The five other farmers had experienced occasional labour difficulties but all except one were settled at the time of the questionnaire.

24 Farmers relying on Family Labour Twelve of these stated that the tie of dairying had not proved any bother to themselves or their family. A further 8 farmers had felt some inconvenience but considered the remuneration was well worth the extra trouble, whilst the remaining four farmers were either just stopping dairying or intended to do so and named labour ties and the general 'trauchel' associated with milk production as one of the contributory causes of their defection.

Foods: (a) PURCHASED 1) Concentrates - In the winter time the amount of purchased concentrates fed in the North of Scotland Milk Marketing Board area has consistently been lower than that of the Aberdeen Milk Marketing Board area according to the Milk Costings Investigation. Thus -

Aberdeen area	8.29 cwt. per cow	1948/49
	7.05	1949/50
	8.00	1950/51
North of Scotland area	6.36	1948/49
	5.89	1949/50
	6.14	1950/51

The Caithness results included within the North of Scotland Milk Marketing Board average were themselves lower than the average and during the summer the same tendency could be discerned:

Aberdeen Area	3.57 cwt. per cow
North Area	2.14 cwt. per cow
in which is included Caithness	1.46 cwt. per cow

One of the main reasons for the Caithness farmers sparing use of purchased concentrates is explained by their higher cost in that county. Thus in late 1951 the cost was 9d. per cwt. higher than in Aberdeenshire due to high freight costs. The carriage cost from the proprietory mills to Caithness was about 3/9 per cwt. by rail or 2/6 per cwt. by sea. The great increase in the price of concentrates during 1951/52 has caused an even greater reduction in the consumption of these foods and of 32 dairy farmers interviewed 9 used no purchased cake (most of them had given it up in the last three years), two of

these farmers having replaced it by locally made dried grass. A further seven farmers had reduced the amount they used so that it stood at less than 2 cwt. per cow per winter, whilst the remaining 14 used variable amounts of purchased concentrates the range being $2\frac{1}{2}$ - $9\frac{1}{2}$ cwt. per cow with an average of 4.5 cwts.

No reliable information exists on the advantages and disadvantages of the use of purchased cake, but the fact that so many successful Aberdeenshire farmers used more concentrates should induce Caithness milk producers to consider its possibilities. A good practice is to take stock of all foodstuffs available on the farm at the beginning of the winter and discuss the proposed rations with the College Advisory Officers. In at least one case considerable economies have been made by such a practice.

2) Draff (Wet Distillers Grains) - Of 39 farmers interviewed, 15 used Draff, the amount varying from $7\frac{1}{2}$ lbs. per cow per day up to 25 lbs. per day, with an average of $12\frac{1}{2}$ lbs. per day. Formerly the nearest source of supply was Brora, which is 50 miles away, but during the 1951/52 season Wick Distillery was again operating, so that a steady supply of this food was available for any who wanted it. Carriage costs are heavy for farms not in the vicinity of Wick, but in practice it was found that several of the farmers using draff were widely scattered and among those furthest from the distillery. With a cost of 9d. per bushel the cost per lbs. S.E. was $1\frac{1}{2}$d. compared with $5\frac{1}{4}$d. per lb. S.E. of purchased concentrate (at 36/7d. per cwt.). It is thus a much cheaper food than purchased cake provided that carriage costs are not too heavy and the question may be asked why it is not used more. It seemed that the objections were:

a) Contract - The farmer has to agree to take the draff as long as the distillery is operating and this means that he may be having to collect and pay for it in May when the cows are at grass and need no supplementary food. In relation to its relative cheapness the number of weeks 'waste' is however not many, especially since the grass is usually slow to grow in the springtime in Caithness. In any case it should be possible to ensile extra draff if it is accumulating in any quantity.

b) Hard on Cows - The old argument that draff is injurious to cows had not been proven and provided it is not used to excess there is no reason to think that it 'depresses the butter fat' of the milk or 'causes infertility' to mention two of the current fears.

c) Small Herds - Draff can only be collected or delivered in fairly large quantities so that small producers may not be able to deal with a full load. This difficulty could be overcome by two or more small producers combining, taking a full load, and dividing it between them.

d) Summer Milk Production - Those dairy farmers who have most of their cows calving in the spring do not feed up their cows very much in the winter and tend to use little cake. Hence they are not very enthusiastic about draff which is a part substitute for cake. In practice the herds using draff also used cake and were aiming at high winter milk production. With a swing to winter production it seems likely that farmers would need to use more cake, dried grass and also draff.

Foods: (b) HOME GROWN 1) Dried Grass - Of 32 farmers interviewed only 6 used significant quantities of dried grass over the winter 1951/52 and of these only in 2 cases was the amount consumed over 3 cwt. per cow per year. (These 2 farmers replaced purchased cake entirely by dried grass). Caithness farmers are probably wise in going canny with dried grass since the quality is so variable. The best dried grass can replace high protein concentrates whereas some of it is little better than good hay.

The price per ton should thus always be related to the protein content and provided that this factor is taken into account, most farmers would do well to bear in mind the possibilities of dried grass as a part substitute for Concentrates.

In late 1952 the cost of a dairy cake commonly fed was 38/- per cwt. with a protein content of 18½%. Thus the cost per 1% of protein was $\frac{38}{18\frac{1}{2}}$ = 2/0½d. If dried grass is offered for sale at 30/- cwt. with a protein content of 15% then the cost per 1% of protein is 2/-. At this charge the dried grass is as cheap per cwt. of protein as dairy cake. If the same quality dried grass costs £2 per cwt. then the cost per unit of protein would be $\frac{40}{15}$ shillings = 2/8d. which is relatively expensive compared with cake at 2/0½d. per unit of protein.

2) Oats were fed by all the farmers interviewed and are one of the staple foods in the Caithness dairy herds.

Apart from the dairies of small holders only one farmer had to purchase oats for feeding during the winter 1951/52 but many others fed all their oats to the dairy stock and had to purchase seed. On the more fertile land however a few of the farmers were able to grow oats for sale.

The milk cost data suggests that the amount of oats fed per cow per year averages 6.6 cwt. whilst interviews with the farmers not doing milk costings gave an estimate of 7.1 cwts. per cow per year. This works out at an average of 4 lbs. per day through the winter and this is very little higher than the Aberdeenshire results 1951/52 (6.5 cwt. per cow per year).

The cost of oats per acre is not likely to be much greater than in other areas but the average yield per acre for the dairy farmer is only 6 qr. and this means that the cost per cwt. of oats given tends to be high compared with other areas where the average yield is between 7 and 8 qrs. per acre. The farm to farm variation in yield is of course very great and some farms near Wick may thresh 9 qr. per acre whereas near the moors 4 qr. per acre is a normal yield.

Bad seasons occur fairly frequently in Caithness and in 1951 the average yield for the farms doing milk costs was only just over 4 qr. per acre.

The cost of milk production in Caithness and other exposed areas is thus indirectly increased by the lower yields per acre and each cow requires about 1/3 acres of oats for adequate feeding compared with 1/4 acre in more favoured districts.

3) Turnips and Swedes are still fed on almost every farm although on some farms they have been partially replaced by silage. The merits of the Caithness climate are few indeed but it so happens that it does suit the growing of the turnip crop which can usually be relied upon to yield about 20 tons per acre. Resowing due to the Turnip Fly is not very common.

Where it could be calculated, the acreage required per cow varied between 1/3 - 1/5 acre with an average of about 1/4 acre and since the yields per acre are generally good the cost per ton tends to be rather less than elsewhere.

4) Hay is a chancy crop due to the uncertain climatic conditions and it is felt that grass silage might be considered more as a substitute for hay than for turnips. The amount of hay fed per cow average 14 cwts. for the years 1948-51 (Milk Costings) whilst the estimated yield varied from $1\frac{3}{4}$ tons per acre in 1948/9 down to $1\frac{1}{4}$ tons in 1950/51. Allowing for aftermath growth about 1/3 acre per cow is needed for hay if it is to be used to any extent in the feeding programme. The present emphasis on grassland manuring may lead to surplus mid season grass which should be used for hay or silage.

Grazing. If the Caithness climate does not particularly suit milk production based on arable crops, its suitability for milk production based upon grassland farming is certainly no greater. The milk costs data shows that over the past four years, average grazing season was 24 weeks compared with 26 weeks for

Aberdeenshire and it is difficult to see how the grazing season could be extended since it is limited by the slow growth in the spring which is so frequently cold and damp. The beef cattle costs give May 16th as the average date of turning out to grass in 1951 and May 3rd in 1952. The average grazing cost for the dairy cattle was 3/4 per cow per week in 1952 (Milk Costs) compared with 2/8 for the Breeding Cows (Calf Costs). The lower rate for the latter was due to the abundance of rough grazing on some of the farms whereas on the dairy farms even when rough grazing is available it cannot be used for milking cows.

The acreage of grass per cow for grazing during the summer was 1¼ acres according to the Milk Costs Investigation and this figure was confirmed by a study of the breeding cattle costs referring to farms on better land.

Acreage per Cow · This works out at 2.16 excluding dried grass or other home grown concentrates except oats. It was made up of:

Oats	0.33 acres
Hay	0.33 "
Turnips	0.25 "
Grass (Grazing)	1.25 "
	2.16 acres

With a greater emphasis on high yields and winter milk it is likely that the acreage of oats required would be increased still further to balance extra high protein concentrates.

Miscellaneous Expenses The cost of proprietary medicines, milking machine replacements, detergents and most other dairy sundries is the same all over the country so that the Caithness producer is at no disadvantage. There are, however, a few items which cost more in Caithness than elsewhere.

In early 1951 coal coming by sea cost £6: 8: 9 to farmers within 4 miles of Wick and Thurso and £6:15: -.to farmers further away. By no means all farmers use coal as fuel for sterilising the dairy equipment but for those that do the amount used (College records) came to about 10/- (2 cwts.) per cow per year. The figure varied greatly and reached £1 per cow in some cases but other farmers used a proportion of coke whilst occasionally wood was used.

Over all the dairy farms the extra fuel cost per cow per year is very likely to be in the region of 1/- to 2/- compared with farms near the industrial belt of Scotland. Although the extra costs are small these little items may have a psychological effect far outweighing their financial effect.

Carriage Costs are the 'bete noire' of most people living in the North of Scotland. If the farmer purchases livestock in say, Lanark, he not only has considerable time and cost in getting to the sales but also has an expenditure of about £4 per head in bringing them home by rail. Even heifers purchased at Inverness and brought home by road or rail will cost over £1 per head. It should also be noted that petrol costs ½d. per gallon more in the north than in other areas and this too has a small indirect effect on milk production costs.

The attendance of Caithness dairy farmers at big dairy shows and exhibitions also means a long journey at considerable expense and yet if such occasions are not taken advantage of the farmers will tend to have a restricted outlook and will be less inclined to try out new ideas and techniques.

Total Extra Costs It is very difficult to pin down extra costs exactly since they will vary from farm to farm, but using average figures they are likely to be, using 1952 price levels:

	Per Cow
Oats - 7 cwt. at 4/- per cwt.	1: 8: -
Concentrates - 5 cwt. at 9d. per cwt.	-: 3: 9
Coal, etc.	-: 2: -
Estimated carriage costs and show expenses	-:15: -
Labour, all other foods and miscellaneous expenses are the same as in other areas	-: -: -
	£2: 8: 9

If the cow gives an average of 600 gallons per year, the extra cost of producing milk in Caithness compared with Aberdeenshire or the south of Scotland is just under 1d. per gallon. This represents the extra cost due to unavoidable factors, i.e. geographical position and northerly climate. The variation of 1d. per gallon is thus very small compared with the tremendous farm to farm variation in cost due to management which is shown so clearly by the milk yield of the cows. Hence rather than consider at length the difficulties of producing milk so far from the industrial areas (a risk of production known before dairying was embarked upon and which remains whatever type of farming the farmer adopts) it it better to look to the yield per cow and seasonality of production and endeavour to sharpen up the management since these factors have an overwhelming influence upon costs and returns.

This brief survey of costs, however, would not be complete without mentioning the consumer's point of view which may well be expressed in the question, "Why do we have to bear the cost of transporting (or otherwise dealing with) milk produced in such remote areas when all our needs could be met with at a lower cost from farms nearer at hand?" The answer to this is partially considered in the conclusion but in passing it should be stated that it would be fair for Caithness producers to bear the cost of transporting milk south or an equivalent cost if it is retained for Butter making.

Summer and Winter Milk Production It was noted on Page 3 that many farmers did not produce much milk in the winter months and from the interview too it was apparent that there were many who just did not think that it was worth the extra bother. In certain cases where, for example winter byre accommodation is very limited, it may be the wisest plan to concentrate on spring calvings but in most instances there can be no doubt that winter milk production pays much better. During the year April 1952 - March 1953 the average price received over the whole lactation for milk from autumn (September) calving cows has been calculated at 3/7¼ per gallon whereas for cows calving in March the average price received per gallon of total milk produced is likely to be 2/6½[*]. For a cow giving 600 gallons of milk the difference in total revenue will therefore be £31:17: -. (1/-¾ x 600 gallons). Against this extra revenue from autumn calvers must be charged the extra cost of producing winter milk and whilst no exact figures are available for this area there is no doubt that quantities of turnips, silage and hay would not be different whether the cows are milking or dry in the winter. Spring calvers however, require very little oats or purchased concentrates since most of their milk is produced on the grass. Thus the extra cost of winter milk production is likely to be in the order of two thirds of the oats and all the concentrates of the average foods shown in the Milk Costs data, i.e.

5 cwts. of Oats (at cost of production)	£5: -: -
15 cwts. of Draff	2: 2: -
5 cwts. of Concentrates	10: -: -
	£17: 2: -

[*] Based on Lactation Curve of the English M.M.B. Productivity Report.

Of the other items making up the cost of production, the cash wages, miscellaneous items and grazing are unchanged whenever the cows calve and whilst some farmers believe that depreciation on the cows is heavier with autumn calvings the point has yet to be proved.

Hence under normal conditions each cow calving in the autumn will cost about £17: 2: - extra compared with a spring calver but will bring in an additional revenue of £31:17:-. This leaves a balance of £14:15: - per cow in favour of autumn calvers and indicates that where most of the cows calve in autumn, milk production will generally be more profitable. There remain however, other immeasurable factors which make winter milk production more bother and deter farmers from going into it wholeheartedly. For example, it is difficult to spot cows on heat in the middle of the winter and moreover with some of the badly laid out byres the serving of a cow may cause considerable trouble and commotion. Where no bull is kept it may be virtually impossible to get cows in calf during the winter months.

No cash value can be put against difficulties like this, but they have been the deciding factor for many of the farmers. Nevertheless a careful weighing of the position should bring more farmers round to the idea that the extra revenue from winter milk production does balance adequately the inconvenience and extra expenditure incurred.

ALTERNATIVES TO DAIRYING

It was extremely difficult to get accurate information of the sales from the dairy farms before they went into dairying since in most cases it meant referring to accounts several years old. However, many farmers stated at the time that their farm receipts had doubled without any great increase in expenditure apart from the initial outlay and investment. What sort of return might be expected to-day if the farmers were to return to their old system? This subject was discussed with several farmers and some examples are given below showing the income and extra expenses incurred in dairying on the right and the expected effect of an alternative production on the left.

No account is taken of farm enterprises unaffected by the dairy herd, e.g. the ewe flock in example 2.

Example 1

Small herd. Good Land. No outrun. Some of the cows dual purpose. Family labour.

Alternative		Dairying		
Sales		Sales		
3 cast ewes	£14	Milk (9 cows)		£765
14 lambs	70	1 farrow cow		28
Wool	8			793
1 cast cow	50	Less		
7 stirks	280	Extra concentrates	70	
Oats	126	Equipment replacements & renewals & sunday expenses	58	
	548	4% charge on capital invested	29	157
Less 4% charge on capital invested	23			£636
	£525			

Difference in favour of dairying - £111 or £12 per cow.

With a higher yield per cow the relative advantage in dairying would be greater. On this small farm a large number of sheep would almost certainly result in a diminution of receipts with the land becoming "sheep sick." No extra labour has been charged to the dairy since in none of these examples was it likely that the change from dairying would result in the saving of cash wages, although, of course, the hours put in would be less and the general day to day 'grind' would be reduced.

Example 2

Small hand milked herd. Dual purpose cows. Family labour. Limited byre accommodation.

Alternative		Dairying	
Sales		Sales	
1 cow	£45	Milk (8 cows)	£480
10 stirks	450	4 stirks	150
15 qr. oats	60	1 cow	45
5 tons hay	45		£675
	600		
Less		Less	
6 calves purchased	120	Extra expenses (Dairy renewals etc.)	34
4% capital invested	11	4% on capital invested	28
	£469		£613

Net advantage to dairying - £144 or £18 per cow.

In this case the sheep stock was neither increased nor reduced when the farmer went into dairying. Although the milk sales per cow are low, the system works in quite well and better grassland management has since enabled the ewe flock to be increased without any change in the dairy herd.

There may be a tendency for any major change in farm policy (e.g. going into or out of dairying) to induce a general tightening up and betterment of the farm management so that the new system shows up in a better light than is strictly correct. This tendency is observable in Example 3.

Example 3

This is a rather larger farm on fairly good land and the herd is machine milked with family labour. Once again there is a considerable advantage to dairying and it could probably be increased further by feeding more purchased foods and raising the milk yield per cow.

Alternative		Dairying		
12 cast ewes	£54	Milk (28 cows)	£1485	
75 lambs	450	Cast cows	148	
8 calves	240	Calves	22	£1655
1 fat cow	40			
Wool	70	Less		
		Foods	8	
	854	Extra expenses due to dairy enterprise	168	
Less 4% interest on Capital invested	26	4% interest on Capital invested.	89	265
	£828			£1390

Advantage to dairying - £562 or £20 per cow.

It might be wondered why no oats were sold under the old system and the answer lies in the more intensive working of the holding since dairying was commenced.

Example 4

The last example comes from a small farm on much poorer land where milk production has just been given up. The milk yield per cow had been low and the crop yields were indifferent, the winter being very long. The switch has been to pigs, weaned calves and the sale of oats. A considerable acreage of hill carried the suckling cows well through the summer but could not support the dairy cows on milk production.

Alternatives			Dairying		
5 fat pigs		£115	Milk (8 cows)	£607:10:-	
11 weaned calves		330	2 cows	60: -: -	
Oats sold		182	calves	18: -: -	685:10: -
1 cow		50			
		677	Less		
			Equipment	45:10: -	
			4% Interest on capital invested	20: -: -	
Less Pigs purchased	35		Foods	50: -: -	115:10: -
capital invested	21	56			
		£621			£570: -: -

Net disadvantage to dairying £51 or £6 per cow.

This changeover too seems to have resulted in better management and in addition there is the easier labour position since the toil of dairy chores has ended. The herd was handmilked and the direct investment in dairying was low so that the changeover was not difficult.

If more money had been invested in the herd then it is probable that an alternative solution would have been to raise the milk yield but in the circumstances (a small arable acreage with a large outrun) it was probably as well to go out of dairying.

Conclusions

Even although the net advantage of dairying over the alternatives is less than it was some years ago, milk production will still be worth while on most dairy farms especially because a lot of the invested capital is locked up in specialised equipment.

The higher yielding herds naturally showed to greater advantage and, despite the high cost of purchased foods, increased yields per cow is probably the answer to much of the complaining about dairying being unprofitable. The only cases not covered by the foregoing are where labour is difficult or where by going out of dairying either a full man's cash wages would be saved or the farmer and his family decide to win deserved respite from the daily toil of milk production. The illustration of a farm successfully going out of dairying shows that on small farms, especially when there is a large acreage of rough grazing a changeover might prove advantageous.

The time when all herds in Scotland will produce T.T. milk cannot be far distant and in Caithness as elsewhere some of the small ordinary producers will certainly be forced to some alternative enterprises. Hence the number of dairy farms is likely to settle down at about 80 and ideally most of these would be selling over 700 gallons of milk per cow per year, getting maximum utilisation of the land and producing a high proportion of winter milk. Many producers, have, however, a long way to go to reach these objectives. The cost of producing the extra milk need not really be much higher than elsewhere, but the cost of transporting any of it to the south is heavy and the present policy of not attempting to squeeze out near marginal producers can only find its justification in the fact that we are living in a troubled era and in any future time of emergency, milk and especially winter milk is likely to be needed greatly, just as it has been in the last fourteen years.

The dairy herds of Caithness and other remote areas are thus a kind of insurance policy which, however, is borne by the people of Britain at a heavy annual premium since it means that the farmers are each summer paid for a lot of milk which is produced far from the consumer markets, is not needed anyway, and is ultimately made into butter at a loss. Whilst this may seem ridiculous when a changeover to the traditional breeding and/or store and feeding cattle would help to give the country meat which is in short supply (the transport costs south would then be largely borne by the industry itself) it remains a moot point as to just how long meat will remain in such great demand. Furthermore, most dairy farmers have a heavy investment in dairying and rely for over half their income upon the returns from milk production, so that any changeover would cause considerable hardship, especially to those smaller producers who have specialised in dairying to the exclusion of all other sale products.

Recent surveys suggest that dairying in the North of Scotland is by no means as profitable as it was compared with other types of farming, but it still provides a reasonable income and over a long time has always shown more stable returns than other types of farming. (Financial Accounts Reports, North of Scotland College of Agriculture, 1928-52).

Of the problems facing the farmers, labour difficulties and the tie of dairying do not prove as bad as might have been expected but if farmers are to attain the economic higher yields desirable, then certain other

questions, far beyond the scope of this enquiry, must be answered, such as:

What place does silage have?

How much concentrates should be used)

Whether facilities for drying grass are worth taking.

How fertilisers can be used profitably on grassland

The pros. and cons. of strip grazing.

Another question of quite a different nature is the possibility of artificial insemination being introduced to Caithness. Many of the smaller dairy farms would find it a boon but their numbers are insufficient to warrant a station being set up. If however, the non-dairying farmers and crofters can be won to artificial insemination, it might be possible to set up a station say Aberdeen Angus, Beef Shorthorn and Ayrshire Bulls. For non-dairy farmers especially, considerable time and bother is spent in taking the cows to the bull especially during the busy summer days and except where a premium scheme is working really well, the owner of the bull would also probably welcome the relief. One advantage in Caithness is that the herds (both non-dairy and dairy) are all close to each other, so that the overhead travelling costs for artificial insemination would not be too great. The future of artificial insemination is, however, absolutely dependant on good co-operation between dairy and non-dairy farmers.

SUMMARY OF FINDINGS

1. General Milk is being produced a long way from the centres of consumption. Geographical and climatic conditions in Caithness are not specially suited to dairying.
2. The size of Dairy Herd in Caithness is lower than in most other areas and over 80% of the herds have less than 30 cows.
3. The Intensity of Stocking per acre on the Dairy farms is very high and is characterised by the high sheep numbers. Most dairy farms have a ewe flock as a second enterprise on the farm.
4. The Investment per cow is high (£104) and is higher in the T.T. herds than in the others. The extra return from T.T. Milk adequately balances the extra invested capital.
5. The analysis of receipts shows that an average of just over 60% of the total receipts are due to Dairying with sheep occupying second place in many cases.
6. Costs of Milk Production are not greatly higher than elsewhere. They are raised by (a) Medium yield per cow
   (b) Low yields of oats
   (c) High carriage costs.

   Only the latter is wholly outside the influence of the farmers own management.
7. There is no real emphasis on winter milk and as a result the summer surplus is made into butter. It would almost certainly benefit most farmers if there was a greater emphasis on winter milk.
8. Any changeover out of dairying would cause expense and hardship to all except the small producers of ordinary milk. Yet even in any future emergency, the country could probably get all the milk it requires nearer the population centres without having to rely on milk brought down from Caithness at a heavy cost.