Report No. 191

UNIVERSITY OF EXETER
DEPT. Agricultural Economics Unit

SUMMER MILK PRODUCTION

A Study in South West England

H. W. B. Luxton

July 1974
Price 50p

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FOREWORD

One of the country's chief dairying areas, the South West peninsula enjoys a climate ideally suited to the growth of grass for the greater part of the year. Grass being a cheap form of food, it would seem reasonable that dairy farmers in the region would endeavour to produce the bulk of their milk output off grass in the summer months when grass growth is at its maximum.

It is not surprising, therefore, that the question of seasonality in milk production had been the subject of much discussion over many years both in commercial and academic circles. Towards the end of the 1960's, the imminent prospect of this country's acceptance of E.E.C. membership, and consequently of the Community Agricultural Policy, added urgent meaning to the debate.

The Agricultural Economics Unit of the University of Exeter for many years had been an active participant in the general field of dairy farming economics, and in particular the economics of seasonality in production. In 1969, sensing the urgency of a study in depth into this topic, the University approached the Milk Marketing Board for financial assistance to undertake such a study, a proposal to which the Board readily agreed. The outcome, a three year investigation into the economics of summer milk production, was commenced in 1970 under the general direction of Mr. H. W. B. Luxton.

The analysis of the data and the field work for the costings exercise for 1970-71 and 1971-72 were carried out by Miss B. J. Roscoe. Mr. F. R. Kearsey designed the questionnaire for the motivation study and undertook the field work in addition to the costings enquiry for 1972-73. The report has been prepared by Mr. Luxton.

The Agricultural Economics Unit gratefully acknowledges the financial and advisory assistance of the Milk Marketing Board. It also wishes to record its grateful thanks to all the farmers who took part in the study.

S. T. Morris
Director
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I. INTRODUCTION

1•1 General

For a number of reasons there has been interest in the possibilities of summer milk production in the South West of England. There has for long been a tradition of summer milk production in Somerset and East Devon for cheese production taking advantage of the somewhat special climatic and physical conditions. However, the growing demand for milk for liquid consumption the year round, giving rise to higher prices and a substantial differential in favour of winter milk prices, coupled with the improvement in transport of liquid milk, brought the whole of the West Country into the liquid milk market with a consequent increased emphasis on liquid milk production with increased winter production. The higher price for liquid milk with a winter bias has also made the feeding of relatively cheap concentrate foods a viable practice and afforded the smaller farmers an opportunity of profitably increasing their size of business. The relative profitability of milk production compared with other grazing livestock enterprises has led to an enormous increase in dairying in the South West, so much so that it is now the largest single enterprise in the total farm economy of the area. The increase in milk production has been a major factor in the improvement in the overall farming economy in the South West.

There have, however, been periods over the past three decades in which the increase in milk production has resulted in sufficient surplus to threaten the pool price due to the need to divert a higher proportion of total supplies to manufacture. Consequently, the differential in favour of winter prices has been considerably reduced in order to adjust the balance between winter and summer production and the need to avoid the diversion of excessive quantities of expensive winter milk into the less remunerative manufacturing outlets. The narrowing of the winter summer price differential in the seasonal milk price schedule has encouraged some milk producers to reassess the seasonality aspects of their milk production and to consider the feasibility of a deliberate summer production policy making full use of the natural advantages for summer production existing in the South West.

The potential for grass production utilised in situ reducing expensive and wasteful conservation to the minimum is one of the main attractions which has been highlighted in a growing interest in grassland management. Grassland societies formed with the objective of improving the production, conservation and utilisation of the grass crop are flourishing in the South West and are an important influence in milk production as in all other grazing

livestock enterprises. There is a growing awareness of the potential of grass for milk production and this potential is likely to be exploited increasingly because of the recent substantial rise in purchased concentrate feed prices. The somewhat more favourable relative price for milk for manufacture under E.E.C. conditions may also be a factor favouring a shift towards greater summer milk production.

Seasonality in milk production has been a subject of interest to the Agricultural Economics Unit of the University of Exeter for a number of years. In 1962 a preliminary report, 'Seasonality of Milk Output'(1) was produced setting out statistics relating to the seasonality patterns in the Far West Region of the Milk Marketing Board and characteristics of a sample of summer producers. This was followed by a further report, 'Seasonality of Milk Production and Milk Yields from Grazing'(2) in 1965, the outcome of a study, the main objective of which was "to provide empirical results of the average and potential levels of milk yield achieved from grazing", thus linking seasonality in milk production with the broader issues of efficient grass production and utilisation. These were important contributions, particularly in setting out the problems and issues involved in seasonality in milk production in a predominantly grassland situation. It now remained to continue exploration in this field and to provide further empirical data, especially concerning the economics of summer milk production, costs, returns and profitability, for a sample of intentional summer producers to compare with available data for other production patterns. In view of these considerations it was decided to explore the possibilities of undertaking a study of summer milk production in the research period following the 1968-69 national costing investigation into the economics of milk production. A scheme was drawn up and approved by the Milk Marketing Board and a grant was made to cover a three year recording project on a sample of summer milk producing farms in Cornwall and Devon. The third year of recording coincided with the 1972-73 national milk cost investigation, thus data from a random sample of producers became available for comparative purposes.

1.2 The problem and objectives of the study

The problem may be stated in the form of an hypothesis that summer milk production is a viable financial alternative to other seasonal patterns of milk production in certain defined farm situations; this system is likely to

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1. Langley J.A. Seasonality of Milk Output. Report No. 136. 1962. Agricultural Economics Unit, University of Exeter.
2. Langley J.A. Seasonality of Milk Production and Milk Yields from Grazing Report No. 155. 1965. Agricultural Economics Unit, University of Exeter.

become more attractive due to probable future price/cost changes. In order to test this hypothesis the following general objectives for the study were laid down:-

1. To study changes in the patterns of milk production and to identify the current extent of extreme summer milk production in the Exeter Province.

2. To identify the main inputs used and to quantify the differences in costs for the different seasonal production patterns.

3. To assist in assessing the relative profitability of extreme summer milk production in the light of its effect on production costs and of the seasonal price schedule for milk.

The method of investigation proposed to meet these objectives included the identification of the universe of purposive extreme summer producers in Cornwall and Devon. The study was restricted to the two counties as they coincided with the Far West Region of the Milk Marketing Board for which many statistics were already in existence. Extreme summer producers were defined as those producing 63% or more of their total milk during the six months of April to September inclusive. The assistance of the Milk Marketing Board was enlisted in drawing up the original list of such summer producers. From this list a sample of farms would be drawn on which detailed costings of milk production would be carried out in order to identify and quantify the resources used. It was also hoped that it would be possible to obtain complete financial and physical records for the whole farm business from the majority of the farms surveyed. The information would be obtained by personal visits, the co-operating farmers being encouraged to keep the necessary records.

From the information obtained important factors in summer milk production, such as stocking rate, milk yields, calving patterns and conception rates, calving interval and turnover in dairy cows would be identified and studied. The methods of production followed by co-operators, for example in relation to capital and labour resources and grass production and utilisation, would be studied and an attempt made to identify the factors which induced farmers to concentrate on summer production. In addition to the study of the financial and physical data indicated above the personal characteristics and management objectives of the farmers concerned would also be studied. The recording would be continued to cover three complete seasonal production cycles over the 1970-71 and 1972-73 years inclusive, the last year to coincide with the national milk costings investigation which would yield comparative data for a

randon sample of dairy farms in Cornwall and Devon.

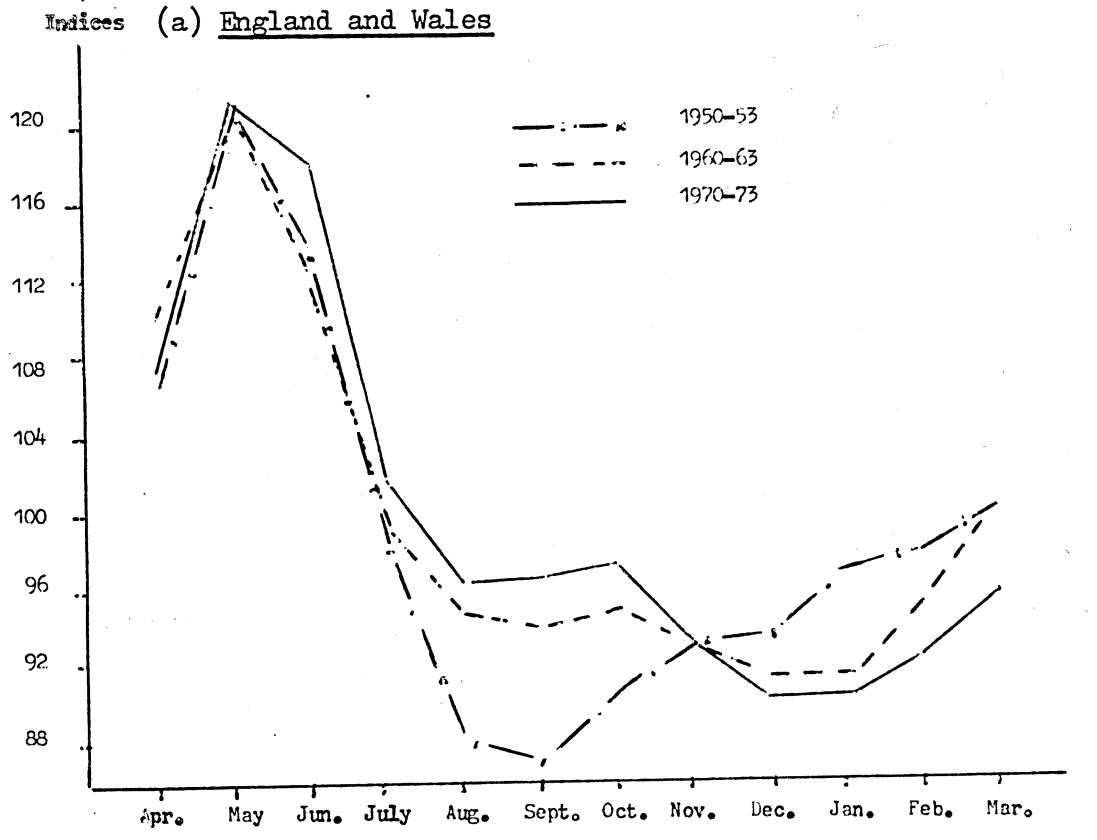
1•3 Trends in seasonality

Discussion on the relative merits of summer and winter milk production has continued over a number of years. Trends in seasonality of production and of milk and input prices are summarised in the tables in Appendix I. In Table 1•1 the percentage of total milk produced during the summer period, April to September inclusive, is given for the period 1953-54 to 1973-74 for England and Wales and for the Far West Region. While the percentage summer production is marginally higher in the Far West than in England and Wales at the beginning and the end of the period, the two sets of figures converged during 1966-67 and 1967-68. In both cases the proportion of milk produced during the summer six months had increased marginally by 1973-74.

In diagram 1•1 seasonal indices of milk production based on the figures in Appendix table 1•2 are shown for England and Wales and for the Far West Region for three three year periods. In 1950-53 the England and Wales graph shows a broad May-June spring peak with a deep August-September trough. By 1970-73 the spring peak had become much more concentrated in May and the August-September trough replaced by a trough in December-January. For the Far West Region a similar broad spring peak in May and June is evident but not the August-September trough, however, a winter trough in February was already in existence. By 1970-73 the spring peak was accentuated and centred on May with a deepening of the winter trough occurring in December, some two months earlier than in 1950-53. The net result of these changes is that by 1970-73 the England and Wales and Far West Region seasonal production patterns had become much closer in shape, but with a somewhat greater emphasis on summer production in the latter.

In Appendix tables 1•3 and 1•4 the seasonal pattern of production for the Far West Region for the ten year period 1963-64 to 1972-73 is given in greater detail. The figures looked at quarterly suggest a slight increase in autumn and winter production with no change in the spring and a small reduction in the July-September period. However, the six monthly and quarterly figures mask trends between individual months and it would appear that there has been a greater than average increase in the proportion of milk produced in March and April, the months at the end of the winter and the beginning of the summer periods. It is known that some confirmed summer producers have advanced their calving dates in order to take advantage of the relatively favourable March and April milk prices and this could at least be a partial explanation of the small change in the seasonality pattern.

Diagram 1·1 Changes in the seasonal indices of milk production 1950-53 to 1970-73



Changes in the seasonal indices of milk production 1950-53 to 1970-73

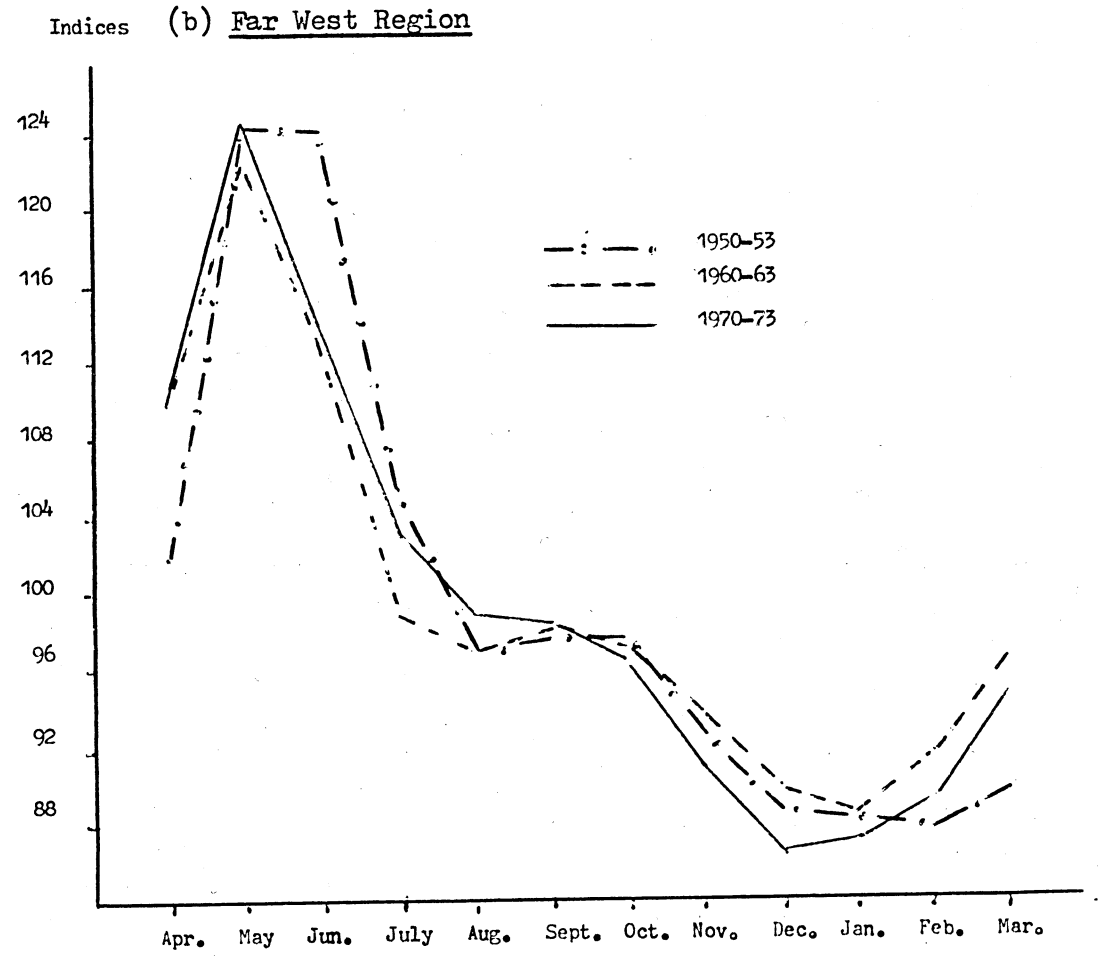
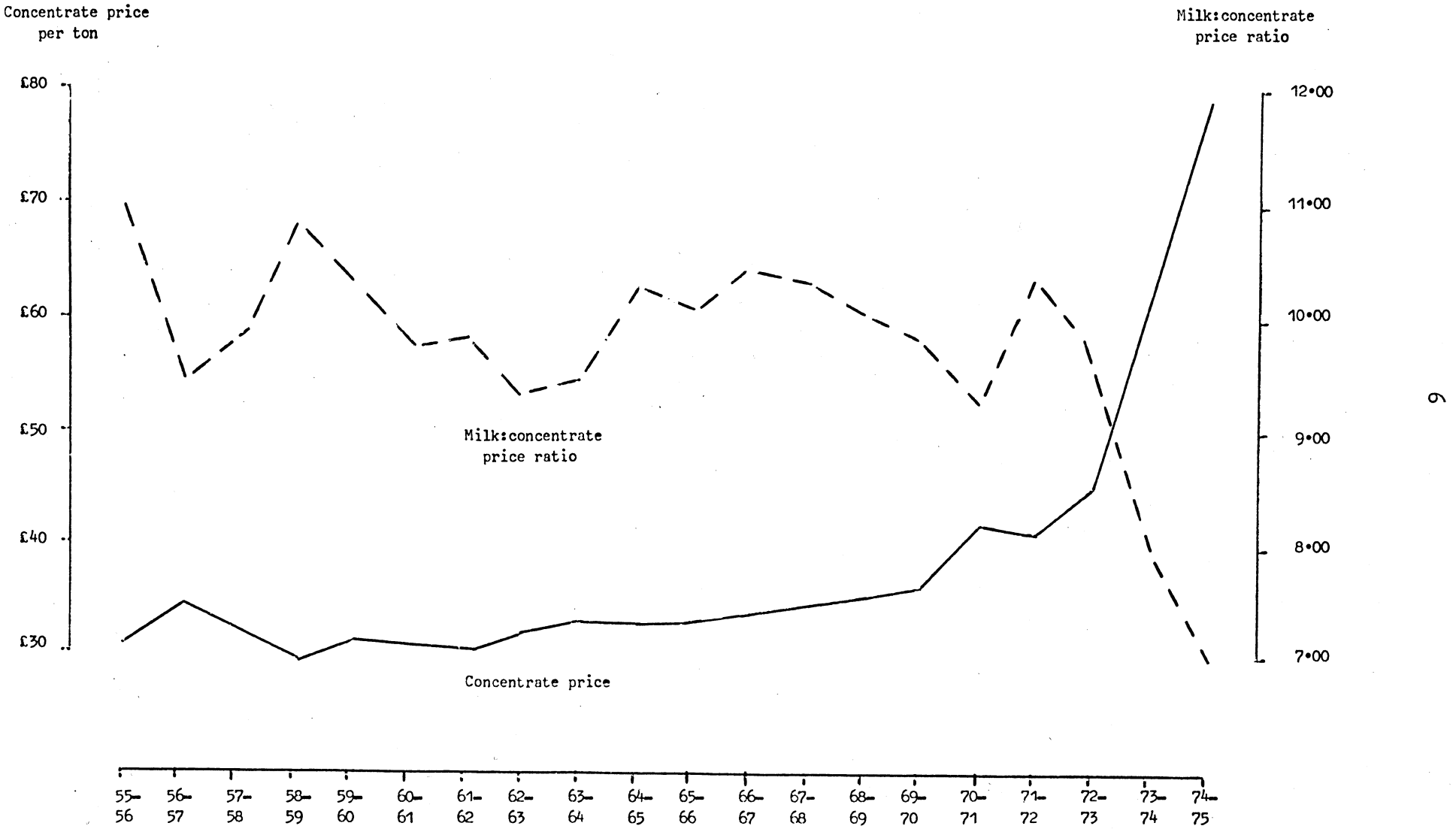


Diagram 1•2

Milk and concentrate price ratio and concentrate price 1955-56 - 1974-75



In Appendix table 1·4 the monthly gallonages sold in the Far West Region are expressed as indices with 1963-64 represented by one hundred. These indices show that the winter milk sales have increased rather faster than summer sales, taking the April to September six months as summer production. They also confirm that in March and April production has increased fastest percentage wise with a slower rate of increase throughout the remaining summer and early autumn months. The figures suggest that milk producers generally have not shifted their production schedules towards the summer months in spite of the advantages claimed for summer production.

1·4 Trends in prices

Milk prices Monthly milk price data are set out for the ten year period 1963-64 to 1972-73 in Appendix tables 1·5, 1·6, 1·7 and 1·8. In table 1·5 the basic monthly prices are given and from these the indices in table 1·6 have been constructed. The 1963-64 monthly prices are used as a base in table 1·6, these being represented by one hundred. The indices show clearly that prices for the summer months have risen at a faster rate than those for the winter months, thus moving the price advantage towards summer production. It will be noted that the greatest increases have been in the early summer months, May and June, these prices rising particularly steeply towards the end of the period. Late and cold springs experienced in recent years have tended to reduce early summer peak production and may be a factor in the relatively greater price increases.

In tables 1·7 and 1·8 each monthly price has been expressed as a percentage of the annual price, thus giving the seasonal price pattern for each year for England and Wales and the Far West Region. In most years June is the month of lowest prices and in the remaining years May, but the prices are very similar in the two months. In each year the peak monthly prices have been indicated. For the Far West Region in 1963-64 and 1964-65 prices were highest in February and March. For the next three years the highest prices were received in January, but in the last five years of this period the peak prices were again in either February or March. The high prices in late winter and the sharp fall in May and June prices are a good reason for advancing calving dates as some summer producers have done. Apart from the timing of peak and trough prices, tables 1·7 and 1·8 also illustrate the differential between winter and summer prices. In 1963-64 the highest winter month price was some 50 points greater than the lowest summer month price, but by 1972-73 the difference was only 27 points in favour of the highest winter price. While the 1972-73 situation was somewhat exceptional due to the very cold and wet

early summer which tended to curtail supplies and maintain summer prices and thus considerably reduce the differential between winter and summer prices, the overall picture over the ten year period is one of improving summer prices relative to winter prices. Under these circumstances a shift in the seasonal pattern towards greater summer production would be expected. The figures relating to production in Appendix tables 1•1 to 1•4 already examined, do not confirm this, and in fact winter production has increased faster than summer production.

It is necessary therefore to examine other output and input prices in order to discover any factors which tend to neutralise the effect of the trend towards the relatively more favourable summer prices.

Calf prices On the output side, with the increase in calf prices, calves have assumed a greater importance in the output of the dairy herd and similarly the value of culled cows has attained greater significance. The seasonal pattern of first quality Friesian bull calves is shown for the ten year period in Appendix table 1•9. In each year the April price is represented by 100 and the highest and lowest monthly figures are indicated. Over much of the period May and June appear to have the highest calf prices, but by 1971-72 and 1972-73 January and February prices were the highest. The latter two years are in a period of rapidly rising calf prices due to the high demand for calves for beef production which might well have affected the seasonal price pattern. The pattern in 1967-68 was most probably distorted by the Foot and Mouth epidemic. There seems to be no regular pattern in the occurrence of the lowest prices.

An analysis of the calving pattern for the 34 summer herds in the study shows that some 71% of the calves were born during the period from January to April with the bulk of calf sales in February, March and April. From the random sample milk cost investigation peak sales were in September, October and November, some 33% of calves being produced during this period. The high May and June prices over the greatest part of the period are too late in the year to influence the producers in the summer milk sample and are too early for the autumn calving herds. Average prices for Friesian bull calves are given for February to April and September to November in Appendix table 1•10. Up to 1970 there would appear to be little advantage in calf prices for either summer or winter milk producers. In 1971, largely because of sharply rising prices the balance was in favour of autumn born calves and winter milk producers. In 1973 calf prices fell, reversing the position. Over the ten year period, the seasonal pattern of calf prices would not seem to favour either winter or

summer producers significantly. Recent changes in systems of producing beef from dairy calves have influenced the pattern of demand for calves; for instance for the 18 month beef system there has been a tendency to favour calves born in July and August rather than in September-October, which again suits neither summer nor winter milk producers.

Culled cow prices Indices of barren cow prices, with April as the base of 100 are given in Appendix table 1·11. Except for 1963-64 the lowest prices were received consistently in October and November, the period during which the summer producers would be most likely to dispose of their culled cows at the end of the lactation. The highest prices were generally recorded during March, April, May and June which would be of little use to the summer producers but more important to the autumn calvers.

With increasing beef prices the demand and prices for culled cows have increased recently so that the value of culled cows has become a significant item in this output of the dairy herd. The monthly price indices for barren cows in Appendix table 1·11 with April as the base month show that the lowest prices were, with the exception of the first year, in October and November when summer producers would be expected to cull their herd. On the other hand the highest prices were recorded during March, April and May which would favour herds with a proportion of early autumn calves. From the view point of cull cow prices it would appear that over the last ten years summer milk producers have been at a disadvantage. In Appendix table 1·12 average barren cow prices are given for the two periods, May, June and July when autumn calvers would be expected to be culled and October, November and December for culls from summer producing herds. There is a considerable price advantage for culls from winter producing herds. Thus while the seasonal pattern of milk prices has moved considerably in favour of summer production, the prices of secondary products, calves and cull cows, have remained generally more favourable to winter producers.

Replacement prices For producers relying on bought-in replacements the purchase price of cows is an important factor; some summer producers resort to buying replacements to maintain their seasonal production schedule; similarly some winter producers might be expected to buy replacements. For both types of producer purchased replacements would be relied on when for reasons of farm size restriction, it is desired to maintain the largest possible milking herd. The seasonal price indices for first quality Friesian cows set out in Appendix table 1·13 clearly show that cow prices have tended to be highest during late winter and early spring when summer producers would require replacements.

Feed and fertiliser prices One of the main advantages claimed for summer milk production is the ability to make the maximum use of grass and minimise the dependence on expensive purchased concentrate feed. The movement of feed prices relative to summer and winter milk prices would therefore be expected to be of importance in the relative profitability of summer and winter milk production. As successful summer milk production is dependent on good grassland management fertilisers are an important element in grass production. In diagram 1•2 average annual milk prices are related to the average prices of a selected group of dairy concentrate feeds. The price of concentrates rose from just over £30 per ton in 1955-56 to approximately £65 in 1973-74 with an estimated £80 per ton in 1975. On the graph is also plotted the milk price and concentrate price ratio, the right hand scale showing the number of pounds of concentrate which can be bought with the price of one gallon of milk. This has fallen from 11 lb in 1955-56 to approximately 8•5 lb in 1972-73 and to an estimated 7 lb in 1974-75. Since winter milk production is more heavily dependent on concentrate feed than summer milk production the falling purchasing power of milk in terms of feedingstuffs reacts relatively in favour of summer production over the period under consideration. Also over this period the differential between winter and summer milk prices has narrowed considerably, this factor operating in the same direction thus decreasing the relative disadvantage of summer milk production in terms of prices received and the cost of feedingstuffs. Summer and winter prices for milk and a selection of feedingstuffs are set out in Appendix table 1•14 for the ten year period 1964-65 to 1973-74. Milk feed price ratios and indices are given in Appendix table 1•15.

Fertiliser prices have moved in a similar way to feed prices. Summer milk production relies heavily on grass production which in turn requires heavy fertiliser applications as compared with average winter production. Rising fertiliser prices would therefore be relatively disadvantageous to summer milk production, but the improvement in summer milk prices relative to winter prices would tend to counteract this factor.

To sum up the movement of prices of the main products and inputs of milk production, while the seasonal pattern of milk prices has moved considerably in favour of summer production over the period reviewed, the pattern of production has not moved towards the summer period, there being a marginal relative increase in winter production. While increasing feed prices have been disadvantageous to both summer and winter production, the effect is relatively less severe on summer production but the increase in fertiliser prices would tend to act in the opposite direction. There would appear to have been no

relative advantage to either system in the movement of calf prices. The changes in the price pattern for cull cows would seem to be of some advantage to winter producers with late summer and early autumn calving cows. If a producer relied heavily on purchased replacements, then late winter and early spring calving cows have been more expensive than cows for the winter producing herds. However, it is unlikely that these price factors are of sufficient importance to explain why summer milk production has not increased relative to winter production in view of the marked movement of summer prices in favour of summer production.

II. THE ECONOMIC SURVEY 1970-71 TO 1972-73

2•1 Obtaining the survey sample

As the main objective of the survey was the study of the viability of summer milk production, it was important to identify a sample of milk producers who had a deliberate policy of summer production. A summer producer was defined as producing 63% or more of his total annual milk output during the six-month period April to September inclusive. In order to eliminate accidental summer producers, farms with a consistent summer pattern of production were required. The Milk Marketing Board co-operated in supplying lists of farms from the central register of producers. To obtain the sample for the 1970-71 costing year, a total list of 234 farms was considered. It was decided to exclude herds with less than 20 cows, the intention being to study full time commercial milk production or substantial dairy units on mixed farms.

After eliminating 104 herds, mainly because of small herd size, 130 farms were visited from which 39 farmers agreed to co-operate in the study and completed the first year of recording. Of the 130 farmers contacted, 56 (43%) claimed to be intentional summer producers, while 74 (57%) said that they were not intentional summer producers or were changing their system. The reasons for following a summer production pattern were given by the 56 intentional summer producers as summarised in table 2•1, as also are those for a further sample of 23 farmers visited in 1971 when additional co-operators were needed to strengthen the sample and provide replacements for those who had dropped out.

Of the intentional summer producers visited in 1970, 35 (60%) considered summer milk to be a profitable system either directly or because of low costs. A further nine (16%) thought that it fitted their particular farming system and presumably benefited the profitability of the whole farm. Three farmers mentioned good calf prices during the spring, but this is not borne out by the monthly indices of calf prices over the ten year period 1963-64 to 1972-73, already discussed.

The 74 unintentional summer producers were also questioned about their policy as also were the 38 unintentional producers drawn from the Milk Marketing Board second list and visited in 1971. The observations concerning seasonality of production for these producers are summarised in table 2•2.

As already noted, of the total of 130 farmers contacted in 1970, less than one-half (43%) were intentional summer producers and therefore possible co-operators

in the summer milk study. Of the 74 unintentional summer producers in 1970, 33 claimed to aim at an all the year round calving pattern. Although some did not regard themselves as summer producers, they expressed the desire for a level income from milk, which would require a greater gallonage being produced during the summer months when milk prices are low. Breeding troubles were the explanation given by 18 farmers for their summer pattern and another 17 were changing to more autumn and winter calving.

As a result of the contacts made on the initial farm visits, 45 farmers agreed to co-operate in the study and recording commenced on these farms as from 1st April 1970. Completed records for the 1970-71 costing year were obtained from 39 farms; 3 of the 45, having changed their minds, did not start recording. A further two failed to complete the records for the year and another sold his herd during the year. Concerning the 11 intentional summer producers who did not agree to co-operate, various reasons were given for not doing so. The reasons were mainly concerned with complications which would make recording difficult for them or not worthwhile, such as intention to give up milk production, changing pattern of production and unwillingness to become involved.

At the end of the first year of recording, 1970-71, a further ten farmers did not wish to continue in the scheme, two of whom having decided to sell their herds soon after the end of the year. A further four were unwilling to continue and four more were found to be unsuitable either for recording reasons or because of increasing winter production. There remained 29 farmers who agreed to continue for 1971-72 and these were augmented by a further 16 co-operators, 13 from the second list provided by the Milk Marketing Board and three from co-operators in the Low Cost Production Scheme run by the Milk Marketing Board. One farmer died during 1971-72 and 44 completed records for the year. In order to recruit the 13 additional co-operators for 1971-72, a total of 61 farmers (from the Milk Marketing Board second list) were visited, 23 (38%) of whom proved to be intentional summer producers and 38 (62%) non-intentional or changing to winter production. Again, of the 23 intentional producers over 60% thought that summer production was either a low cost or profitable system; the remainder giving reasons for their preference much as those of the 56 from the first list in table 2•1. The 38 unintentional producers from the second list included 20 (53%) who were intending to give up milk production. A further nine claimed to aim at an all the year round calving pattern, a similar proportion to that in the first sample interviewed (table 2•2) and again a substantial number, five (13%) were moving towards a winter production pattern. Thus the experience of the two main canvassing attempts during the three year recording period illustrates the difficulties in obtaining a

sample of intentional summer producers who maintain their production pattern over time and are prepared to continue recording.

Table 2•1 Reasons for choice of summer production pattern

Intentional summer producers - 56 farmers 1970-71 and 23 farmers 1971-72

	1970-71		1971-72		All farms	
	No. of farmers	%	No. of farmers	%	No.	%
Profitable system	19	33•9	4	17•4	23	29•1
Low cost system	16	28•7	11	47•8	27	34•2
Fits in with farming system	9	16•0	3	13•0	12	15•2
Farm unsuitable for winter milk production	3	5•3	1	4•4	4	5•1
Good calf prices in spring	3	5•3	-	-	3	3•8
Bought cows in spring	2	3•6	-	-	2	2•5
Retail milk round in holiday area	2	3•6	-	-	2	2•5
Personal reasons	2	3•6	3	13•0	5	6•3
Spring easiest time for calving	-	-	1	4•4	1	1•3
	56	100•0	23	100•0	79	100•0

Table 2•2 Observations on seasonality of production

Unintentional summer producers - 74 farmers 1970-71 and 38 farmers 1971-72

	1970-71		1971-72		All farms	
	No. of farmers	%	No. of farmers	%	No.	%
Aim at all year round calving	33	44•6	9	23•7	42	37•5
Changing to winter production	17	22•9	5	13•2	22	19•6
Breeding troubles	18	24•3	1	2•6	19	17•0
Giving up milk production	3	4•0	20	52•6	23	20•5
Buildings unsuitable for winter production	1	1•4	2	5•3	3	2•7
Disease problems	1	1•4	-	-	1	0•9
Dealer - large fluctuation in numbers milked	1	1•4	1	2•6	2	1•8
	74	100•0	38	100•0	112	100•0

For the final recording year 1972-73, 35 of those in the 1971-72 sample continued and six new recruits were added, two from the national milk cost investigation sample, three through personal recommendation and another from the second

Milk Marketing Board list of the previous year. A total of nine dropped out after 1971-72, including two who discontinued milk production, two who turned to winter production and five who did not wish to continue with recording. Completed records for 37 farms were obtained for 1972-73, four farmers having dropped out during the year, of whom two suffered outbreaks of brucellosis. The reasons given by co-operators for dropping out of the scheme over the three year period are summarised in table 2·3.

Table 2·3 Reasons for not continuing in survey

	During and at the end of 1970-71	During and at the end of 1971-72	During 1972-73
Agreed to co-operate but			
Failed to start	3	-	-
Unwilling to continue recording	5	5	-
Sold cows/farm	3	2	-
*Records unsuitable	5	2	4**
Deaths	-	1	-
	16	10	4

* Incomplete records or changing production emphasis
** Brucellosis outbreaks on two farms

2·2 Cropping and stocking

General details of cropping and stocking for the full sample in each of the three years are given in table 2·4. On average, the farms are predominantly in grass with just over 10% in cereals and a small acreage devoted to fodder crops. Grazing accounted for approximately 55% of the total crops and grass area, with, on average, around 30% under conservation, nearly half the conserved area being silage in the latter two years. As already noted, the composition of the total samples changed somewhat over the three year period, and the differences do not therefore indicate trends.

The livestock statistics indicate the relative importance of the dairy herd in the farming system, particularly in 1971-72 and 1972-73. In 1970-71 the sample included rather more mixed farms with a greater emphasis on sheep and pigs, but in the main, the farms are predominantly grass dairy farms with this specialisation rather more marked in the 1971-72 and 1972-73 samples.

Table 2•4 Cropping and stocking - All South West summer milk farms
1970-71 to 1972-73
Per 100 acres

		1970-71	1971-72	1972-73
No. of farms		38	42	34
Average size of farm (acres)		115	101	95
Range (acres)		28-376	27-234	27-170
Cropping				
Cereals		11•4	10•3	12•5
Potatoes		0•6	0•8	0•2
Vegetables		0•4	0•2	1•3
	Total	12•4	11•3	14•0
Forage crops:				
Kale		1•1	0•9	1•0
Mangolds		0•1	-	-
Swedes		1•4	0•2	0•1
	Total forage crops	2•6	1•1	1•1
	Total tillage	15•0	12•4	15•1
Grazing		54•7	53•5	55•1
Hay		23•8	18•5	16•6
Silage		6•5	15•6	13•2
	Total crops and grass	100•0	100•0	100•0
Livestock				
Dairy cows		32•8	42•7	47•0
Other cattle:	over 2 years	7•6	6•2	4•6
	1 - 2 years	10•1	10•1	11•4
	Under 1 year	15•8	16•1	13•9
	Total cattle	66•3	75•1	76•9
Sheep:	ewes and rams	27•9	10•1	8•3
	others	7•3	2•7	13•6
	Total sheep	35•2	12•8	21•9
Pigs:	sows	2•6	2•8	2•4
	others	22•2	9•9	8•9
	Total pigs	24•8	12•7	11•3
Forage acres per L.S.U.		1•45	1•41	1•23
U.S.E. per acre grass (cwt.)		18•6	20•7	22•2

Table 2·5 Cropping and stocking - Identical sample South West summer milk farms 1970-71 to 1972-73

Per 100 acres

		1970-71	1971-72	1972-73
No. of farms		15	15	15
Average size of farm (acres)		105	105	105
Range (acres)		28-170	28-170	28-170
Cropping				
Cereals		5·1	6·0	9·1
Potatoes		1·2	1·3	-
Vegetables		1·1	0·5	2·8
	Total	7·4	7·8	11·9
Forage crops:				
Kale		0·7	0·4	0·5
Mangolds		0·1	0·1	0·1
Swedes		0·4	0·5	0·2
	Total forage crops	1·2	1·0	0·8
	Total tillage	8·6	8·8	12·7
Grazing		60·5	59·6	58·4
Hay		20·3	22·6	20·3
Silage		10·6	9·0	8·6
	Total crops and grass	100·0	100·0	100·0
Livestock				
Dairy cows		40·8	42·0	40·6
Other cattle:	over 2 years	9·2	9·2	3·4
	1 - 2 years	12·5	10·6	11·6
	under 1 year	20·1	21·9	16·4
	Total cattle	82·6	83·7	72·0
Sheep:	ewes and rams	10·0	13·9	13·9
	others	5·1	3·6	14·4
	Total sheep	15·1	17·5	28·3
Pigs:	sows	4·9	3·7	3·7
	others	12·7	12·9	2·9
	Total pigs	17·6	16·6	6·6
Forage acres per L.S.U.		1·32	1·31	1·42
U.S.E. per acre grass (cwt.)		19·6	21·5	20·8

The cropping and stocking statistics are set out on a similar basis for the identical sample of 15 farms in table 2·5. There is some indication of an increase in cereal growing, possibly in anticipation of rising purchased feed prices, but the negligible forage acreage declined. On average over the period tillage was about 10% of the crops and grass acreage, with 90% under grass. Approximately two-thirds of the grass area was grazed and of the conserved area, hay accounted for two-thirds and silage one-third. Haymaking remains an important method of conservation, perhaps surprisingly in view of the advantages claimed for silage, particularly in relation to grazing management and sward recovery after conservation. While some summer producers claim that the provision of high quality conserved forage is of less importance for a spring calving herd than for an autumn calving one, the tendency for summer milk producers to calve earlier, i.e. in January and February, would indicate the need for a winter type of feed regime for approximately three months, based on high quality conserved forage if maximum output of milk from conserved grass and grazing is to be achieved. With increasing concentrate feed prices, this aspect will become increasingly important.

The stocking and cropping figures for the identical sample confirm that the hard core of the summer producers studied over the three year period are predominantly specialist grassland milk producers; other grazing livestock being insignificant with only small supplementary pig enterprises. The dairy herd remained stable at around 41 cows throughout the period but there was some reduction in followers between 1971-72 and 1972-73.

2·3 Trends in summer milk production 1970-71 to 1972-73

The costing survey was carried out over a period of three years covering the April/March years 1970-71 to 1972-73 and including the 1970, 1971 and 1972 summers. For the analysis in this section the number of herds included are 38, 42 and 34 respectively for the three years, one rather exceptionally large herd being excluded from the analysis. Over the three year period an identical sample of 15 herds is available and a separate analysis of these has been made.

The results for the full sample of farms for the three years are set out in the Appendix but for the purposes of describing the changes over the period the identical sample of 15 farms has been used, the data being presented in table 2·6. As already indicated, the all herds sample changed appreciably from year to year because of the necessity to bring in replacements, but the overall results for each of the years do not differ greatly between the all herds and the identical samples. The identical sample tends to include the hard core of dedicated summer

Table 2•6 South West summer milk herds

Identical sample, 1970-71 to 1972-73

Returns, costs, margins and physical data

	1970-71	1971-72	1972-73
No. of herds	15	15	15
Per cow (£)			
Returns - milk	133•83	158•18	173•96
- calves	14•95	22•38	36•55
Total	148•78	180•56	210•51
Costs - concentrates	34•53	33•16	45•04
- bulk and grazing	23•00	25•09	28•25
- total feed	57•53	58•25	73•29
- direct labour	22•59	24•11	26•35
- miscellaneous	26•89	29•99	34•51
- herd depreciation	5•43	6•54	8•69
Total	112•44	118•89	142•84
Margin	36•34	61•67	67•67
Margin per forage acre (£)	24•61	45•76	49•35
Size of farm (acres)	105	105	105
Size of herd (cows)	37•4	39•1	41•6
Yield per cow (galls.)	784	829	873
Per cent summer milk	65•7	65•9	63•1
Average milk price (p per gall.)	17•06	19•07	19•93
Direct labour per cow (hrs.)	56	51	48
Fertilisers per acre/grassland (£)	4•07	6•19	7•31
Forage acres per cow	1•48	1•35	1•37
U.S.E. per acre grass (cwt.)	19•6	21•5	20•8
Concentrates and corn per cow (cwt.)	19•24	18•51	21•13
Concentrates and corn per gall. (lb.)	2•75	2•50	2•71
No. of farms feeding:			
Hay only	10	10	9
Silage only	1	1	2
Hay and silage	4	4	4

producers, while in the third year some of the new recruits had a good stocking rate and a higher margin per forage acre than the third year identical sample.

The identical sample farms maintained their seasonality pattern at over 65% summer production over the first two years but dropped back to 63·1% in 1972-73. Size of herd increased on average by about four cows and yields from 784 to 873 gallons per cow. There was a reduction in direct labour of eight hours per cow; stocking rate improved with a reduction of 0·11 forage acres per cow, (7·4%), but was accompanied by an increased expenditure on fertilisers by more than can be attributed to price increases. Although concentrate feeding fell in the second year, it was nearly two hundredweights per cow higher in 1972-73 than in 1970-71. Grazing conditions varied considerably over the three years and late springs were a feature of the period. In 1970-71 a cold wet spring was followed by near drought conditions in May and June but the autumn was exceptionally fine with good grass growth which could be effectively utilised. In 1971 a comparatively warm summer followed the late spring and there was a good autumn and a mild winter, this being probably the best grazing season. The 1972 grazing season was difficult, when again near drought conditions during August and September followed very wet and cold conditions in June and July after a late spring. Conserved forage was generally low in quality, but fortunately the 1972-73 winter was mild, giving way to an early spring in 1973. The weather during the grazing season could very well be the explanation of the variation in concentrate feeding and in the utilised starch equivalent. In spite of the variable physical conditions there was a steady improvement in milk yields and stocking rate, as already noted, and these are reflected in the financial results. The returns for milk rose appreciably and the returns for calves more than doubled, reflecting the increased prices paid for calves for beef production. Overall returns per cow rose from £148·78 to £210·51. Against this, concentrate costs were £10·51 per cow higher and bulk feed £5·25 per cow higher in 1972-73 than in 1970-71 with little increase between 1970-71 and 1971-72. Although the big increases in feed prices during the early spring of 1973 would have had little effect on the 1972-73 results, the increase in concentrate feed costs was due more to price increases than to additional quantities fed. While direct labour hours per cow fell, wage rates increased and labour costs per cow rose by £3·75 and there was an increase in miscellaneous costs of £7·62 per cow by 1972-73. The result of these changes in individual items was an increase in total costs of £30·40 per cow against a rise of £61·73 in total returns, leaving a net gain of £31·33 in margin per cow. The margin per forage acre also improved, in fact doubling to a level of £49·35.

The period under review was one of increasing profitability in milk production generally, as indicated by results for dairy farms in the Farm Management Survey. Unfortunately, costings data are not available for the national milk costs sample for 1970-71 or 1971-72 so direct comparisons cannot be made with general samples of milk producers, as was done for the one year 1972-73. However, the summer producers achieved a high rate of improvement in margins over this period, benefiting from rising yields and milk and calf prices and perhaps to some extent being less affected by rising feed prices. Milk prices have also moved relatively in favour of summer producers.

2·4 Comparative data: South West summer milk and milk cost herds 1972-73

Returns, costs and margins 1972-73

For 1972-73, 34 summer producing herds are analysed and for comparative purposes 41 herds from the South West milk cost investigation(1) have been used. The milk cost investigation coincided with the summer milk study in 1972-73 only. The full sample for the national investigation was a random one. In order to achieve a similar size of herd distribution for comparison with the summer sample, most of the small herds of under 20 cows, and the large over 100 cow herds were excluded as well as any summer producers in the milk costs sample. The comparative results are given in tables 2·7 and 2·8 for all herds in each sample, and also for three size of herd groups. Using April to September as the summer period, the summer sample averaged 64·5% production in this period, thus conforming to a highly summer seasonal pattern. The average for the 41 farms from the milk cost sample was 53·1%.

In other respects, e.g. size of herd, average yield, stocking rate and conservation policies the sample averages are very similar. A noticeable difference is in the labour input, the summer producers on average using 42 hours of direct labour per cow compared with 55 for the non-summer sample, a difference of 13 hours per cow or approximately 25% less. Bearing in mind that great trouble was taken to ensure the same standards and methods of recording on the two samples this is a considerable margin in favour of summer production. However the summer sample includes a number of farmers with particularly good labour organisation and low labour inputs. It is likely that this factor explains part of the difference, although it is claimed that a summer production pattern is relatively efficient in labour use, the peak labour requirement occurring when weather conditions are good.

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(1) For comparison with the summer herds comparable herds from Cornwall and Devon only in the South West milk cost sample have been used.

Table 2·7 South West summer milk herds

Herd size groups and all herds 1972-73*

Returns, costs, margins and physical data

	Under 40 cows	40-59 cows	60-99 cows	All herds
No. of herds	15	10	9	34
Per cow (£)				
Returns - milk	174·72	158·03	177·02	170·33
- calves	33·64	31·02	39·11	35·11
Total	208·36	189·05	216·13	205·44
Costs - concentrates	35·64	35·50	47·21	40·49
- bulk and grazing	31·54	28·68	27·04	28·72
- total feed	67·18	64·18	74·25	69·21
- direct labour	30·21	24·26	18·37	23·29
- miscellaneous	32·20	32·47	35·03	33·48
- herd depreciation	9·09	11·35	9·19	9·86
Total	138·68	132·26	136·84	135·84
Margin	69·68	56·79	79·29	69·60
Margin per forage acre (£)	41·80	45·54	71·43	53·68
Size of farm (acres)	73	104	121	95
Size of herd (cows)	26·1	49·0	71·7	44·9
Yield per cow (galls.)	881	795	889	857
Per cent summer milk	63·8	65·4	64·4	64·5
Average milk price (p per gall.)	19·84	19·89	19·91	19·88
Direct labour per cow (hrs.)	56	42	34	42
Fertilisers per acre/grassland (£)	5·22	8·84	9·59	7·78
Forage acres per cow	1·67	1·25	1·11	1·30
U.S.E. per acre grass (cwt.)	18·7	22·9	24·8	22·2
Concentrates and corn per cow (cwt.)	17·68	17·31	23·91	20·20
Concentrates and corn per gall. (lb)	2·25	2·44	3·01	2·64
No. of farms feeding:				
Hay only	9	4	3	16
Silage only	1	1	2	4
Hay and silage	5	5	4	14

* Excludes one herd over 100 cows

Table 2·8 South West milk cost herds

Herd size groups and all herds 1972-73*

Returns, costs, margins and physical data

	Under 40 cows	40-59 cows	60-99 cows	All herds
No. of herds	23	10	8	41
Per cow (£)				
Returns - milk	161·64	184·38	201·99	182·30
- calves	36·68	37·81	39·02	37·82
Total	198·32	222·19	241·01	220·12
Costs - concentrates	47·97	52·02	53·96	51·23
- bulk and grazing	27·37	28·41	28·90	28·20
- total feed	75·34	80·43	82·86	79·43
- direct labour	39·87	25·05	20·61	28·87
- miscellaneous	33·42	36·24	39·48	36·35
- herd depreciation	6·22	6·97	11·11	8·14
Total	154·85	148·69	154·06	152·79
Margin	43·47	73·50	86·95	67·33
Margin per forage acre (£)	28·80	54·41	63·70	47·64
Size of farm (acres)	86	110	194	113
Size of herd (cows)	27·0	49·5	74·9	41·8
Yield per cow (galls.)	812	901	976	896
Per cent summer milk	57·2	53·9	49·0	53·1
Average milk price (p per gall.)	19·90	20·46	20·66	20·36
Direct labour per cow (hrs.)	76	46	39	55
Fertilisers per acre/grassland (£)	4·55	7·16	7·71	6·09
Forage acres per cow	1·51	1·35	1·37	1·41
U.S.E. per acre grass (cwt.)	17·8	20·0	21·2	19·5
Concentrates and corn per cow (cwt.)	22·56	25·79	26·29	24·79
Concentrates and corn per gall. (lb.)	3·11	3·21	3·01	3·10
No. of farms feeding:				
Hay only	14	5	3	22
Silage only	-	1	2	3
Hay and silage	9	4	3	16

* Excludes most small herds, under 20 cows, and herds over 100 cows

Table 2•9 South West summer milk and South West milk cost herds 1972-73
Distribution of herds according to milk quality grades

	Quality grades										No. of herds	Average grade
	1-2	3-4	5-6	7-8	9-10	11-12	13-14	15-16	17-18	19-20		
	Number of herds											
South West summer milk herds	1	-	5	13	6	5	3	1	-	-	34	9
South West milk cost herds	1	3	8	12	9	3	2	2	-	1	41	8
	Per cent of herds											
	%	%	%	%	%	%	%	%	%	%	%	%
South West summer milk herds	2•9	-	14•7	38•3	17•7	14•7	8•8	2•9	-	-	100•0	-
South West milk cost herds	2•4	7•3	19•5	29•3	22•0	7•3	4•9	4•9	-	2•4	100•0	-

Summer milk herds - 26•4% were in grade 11 or higher
Milk cost herds - 19•5% were in grade 11 or higher (includes 3 Channel Island herds).

With yields of 857 and 896 gallons per cow respectively for the two samples, the summer producers used 4•59 cwt. less concentrates per cow, 20•20 cwt. compared with 24•79 cwt. The average price per cwt. was £2•00 for the summer producers and £2•07 for the others. In terms of concentrates per gallon, the summer producers were feeding 2•64 lb. compared with 3•10 lb., just under ½ lb. less. Theoretically it would be expected that intentional summer producers, who are also good grassland managers, would require appreciably less concentrates per cow and would also feed a higher proportion of cereals in their rations thus obtaining a cheaper ration. The summer producers on average used less acreage per cow, 1•30 compared with 1•41 acres. Thus the summer producers are achieving a rather lower yield per cow on a smaller acreage with a reduced concentrate feed level. Per acre the summer sample averaged 659 gallons compared with 635 in the milk cost sample, an advantage of 24 gallons in favour of the summer producers.

The physical factors show a close similarity between the summer sample and the milk cost sample, the main differences being labour requirements and the level of concentrate feeding, which will influence the financial result. Because of lower

milk yields and a smaller return for calves the returns per cow are nearly £15 per cow lower for the summer sample. While the milk cost sample, with approximately 47% winter production, is not heavily winter biased, the difference in the average price per gallon realised for the two samples was surprisingly small, 20•36p for the milk cost sample and 19•88p for the summer producers. An analysis of the milk grades obtained, table 2•9, shows that on average, the summer producers achieved one grade higher, 9 compared with 8, which partially explains the small price per gallon difference between the two samples. There were no Channel Island herds in the summer sample. Another factor is the relatively high proportion of the milk produced during March and April by the summer producers when prices were still relatively high compared with the later summer months. A tendency for earlier calving in the summer sample, as compared with traditional summer milk production, has already been noted. The returns for calves were also higher for the milk cost sample by nearly £3 per cow. The price indices for calves already discussed suggest that the earlier calving summer herds would obtain no advantage over winter herds. For the 18 month beef system a late summer or early autumn born calf is preferred. Overall, the returns per cow for milk and calves were just under £15 lower for the summer producers in 1972-73. However, total costs were also lower in the summer sample by nearly £17 per cow which gave a margin of £2•27 per cow and £6•04 per forage acre higher for summer production. This resulted from lower concentrate feed costs, approximately £11 per cow, and £5•58 less labour per cow. Bulk feed and grazing costs were only fractionally higher on the summer sample, although more fertiliser was used.

The results from the sample of summer producers studied show that summer milk production carried out intentionally, with earlier calving than traditionally practised, compares in profitability very favourably with the average pattern of milk production as illustrated by the random sample of milk producers in the South West.

Concentrate feeding

Apart from the lower direct labour requirement for summer production, the main difference between the two samples was in the input of concentrate feed. This difference would appear to be of sufficient magnitude to warrant further attention. Data relating to concentrate usage are summarised in table 2•10, together with stocking density, utilised starch equivalent, milk yields and margins per cow and per forage acre. The modal feeding level was between 15 and 20 cwt. per cow with 13 farms averaging 17•41 cwt. per cow. A further eight farms used on average 11•71 cwt. per cow so that 21 out of the total of 34 used less than 20 cwt.

per cow. One farm fed over 30 cwt. (35•26), a very intensively stocked small farm on which no conservation is practised, all bulk feed being purchased.

Table 2•10 South West summer milk herds 1972-73
Analysis according to level of concentrate feeding, margin per cow and per forage acre and various physical factors

	Concentrates per cow - cwt.				
	Under 15	15 and under 20	20 and under 25	25 and under 30	30 and over
No. of herds	8	13	5	7	1
Average concs. per cow (cwt.)	11•71	17•41	21•43	27•01	35•26
Average price per cwt. (£)	1•91	2•06	2•11	1•92	1•89
Forage acres per cow	1•48	1•38	1•32*	1•12	0•73
U.S.E. per acre grass (cwt.)	21•0	22•4	21•1**	23•4	29•9
Gallons per cow	734	855	863	915	996
Gallons per acre	496	622	652+	819	1358
Margin per cow (£)	48•47	70•74	63•87	83•50	94•63
Margin per acre (£)	32•76	51•44	48•26ø	74•72	129•02
Size of herd	30•3	44•3	62•6	46•3	70•9
Size of farm (acres)	81	104	128	77	59
Forage acres for dairy herd	45	61	83	52	52

* 1•9 if herd (a) using 3•13 acres per cow is excluded.
** 23•8 if herd (a) is excluded.
\+ 728 if herd (a) is excluded.
ø 57•16 if herd (a) is excluded.

Farm (a) is understocked for various reasons unconnected with seasonality of production.

There is a strong tendency for stocking rate to increase with increasing concentrate feeding. The utilised starch equivalent per acre of grass also tends to increase with higher concentrate feeding and greater stocking density. Bearing in mind the residual nature of the utilised starch equivalent calculation and the smallness of the sample the figures indicate the importance of these factors related to margin per acre. The regression of concentrates per cow on stocking rate in diagram 2•1 does not show a strong relationship, only 9•56% of the variation being explained.

If farmers were using purchased concentrates merely to increase their volume of output, the higher rates of concentrate feeding would be expected to be found

Diagram 2·1

South West summer milk herds 1972-73

Concentrates per cow and stocking rate

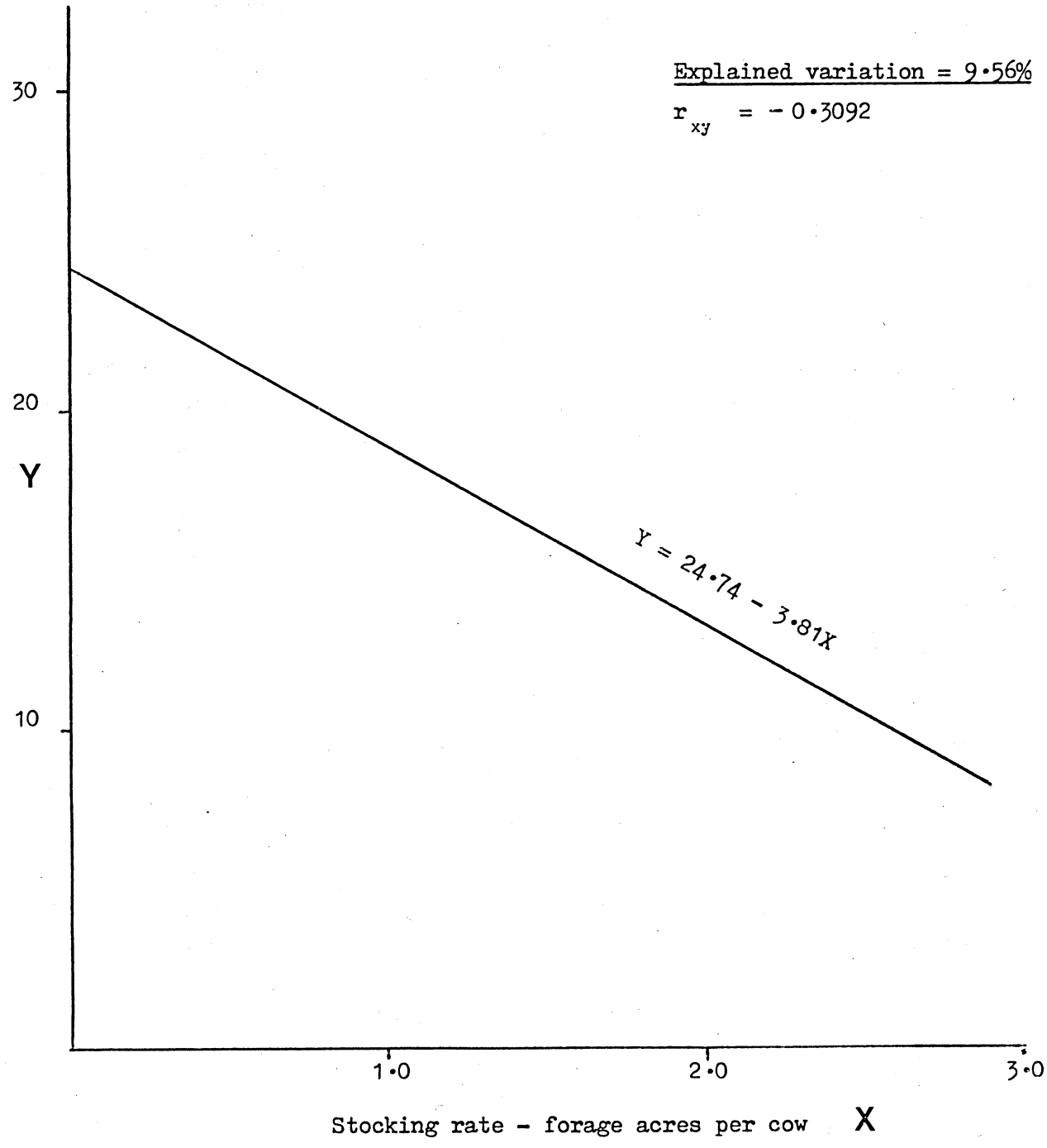
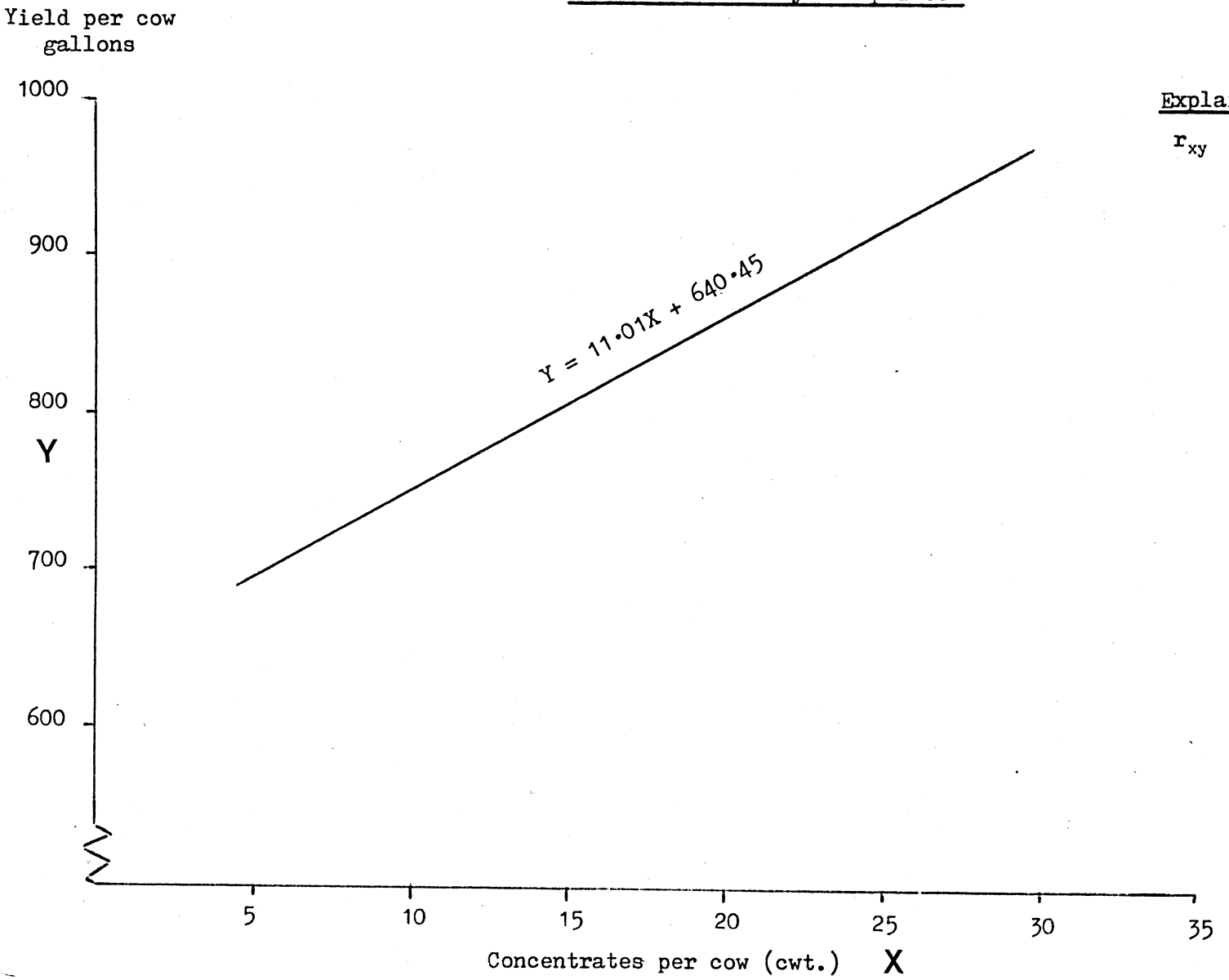


Diagram 2·2

South West summer milk herds 1972-73

Concentrates and yield per cow



Explained variation = 26·66%

r_{xy} = 0·5259

on the smaller dairy enterprises, but the figures for herd size, farm size and acreage used by the dairy herd do not suggest this and in fact, the lowest level of feeding is in the group with the smallest average herd size, and concentrate feeding levels tend to be higher in the groups with larger average herd sizes. On the other hand, it is probable that using purchased concentrates and in some instances, purchased fodder, has enabled some of the summer producers to achieve higher stocking rates and output per cow. Yield per cow rises appreciably with increased concentrate feeding (diagram 2•2) and because of the marked reduction in forage acres per cow, gallons produced per forage acre rise very substantially as the level of concentrate feeding increases. This trend appears also to be reflected in the margin per cow and much more strongly in the margin per forage acre. In the 15-25 cwt. feed range group, there is one farm which for reasons having no connection with seasonality of production, is under stocked. Averages for forage acres per cow, gallons per acre and margin per acre when this farm is excluded are given in the footnotes to table 2•10. Excluding this farm improves the trends.

In table 2•11 the analysis according to level of concentrate feeding is repeated for the 41 farms in the South West milk cost sample. Whereas the distribution of farms in the summer milk sample is skewed to the right, the distribution for the milk cost farms tends to be skewed to the left indicating a heavier use of concentrates. Generally trends are in a similar direction for the two samples but less pronounced in the milk cost sample. Stocking density increases with increased concentrate feeding as also does milk produced per acre. There is a tendency for margin per cow to fall off above the 25 cwt. per cow feeding level and margin per acre above 30 cwt. per cow. The lower levels of feeding again seem to be in the smaller herds.

2•5 Returns, costs and margins; South West summer milk and selected England and Wales milk cost summer and winter herds 1972-73.

The results for 1972-73 for the 34 intentional summer producers in Cornwall and Devon are tabulated in table 2•12 together with those for two groups of summer and two groups of winter producers drawn from the national milk costs investigation. The four groups of farms from the national sample are selected according to the proportion of milk produced during the April - September period and were drawn randomly from the universe of milk producers. They therefore represent the general run of summer and winter producers and were not selected as being purposive or intentional summer or winter producers as in the case of the South West summer sample. The first group of summer producers in the national sample show a high degree of concentration on summer production with 67•8% of the milk produced between April and September. The second group is also very specialised

with 62·5% of milk produced during the summer. Apart from the difference in the seasonal pattern of production, both summer groups show very similar characteristics. The herds on average tend to be rather small, with lower average yields than in either the winter groups or in the South West sample. Returns therefore tend to be low but with relatively high costs, due mainly to the high labour input which seems to be a feature of the smaller herds. The resultant margin per cow is low in both the national summer groups and compares poorly with the margin in the South West purposive summer sample.

Table 2·11 South West milk cost herds 1972-73*
Analysis according to level of concentrate feeding,
margin per cow and per forage acre and various physical factors

	Concentrates per cow - cwt.				
	Under 15	15 and under 20	20 and under 25	25 and under 30	30 and over
No. of herds	4	8	10	9	10
Average concs. per cow (cwt.)	8·51	18·04	22·97	26·77	33·47
Average price per cwt. (£)	2·41	2·13	2·08	1·92	2·13
Forage acres per cow	1·62	1·49	1·44	1·40	1·29
U.S.E. per acre grass (cwt.)	18·3	19·7	20·6	19·1	18·9
Gallons per cow	542	796	921	918	1000
Gallons per acre	335	536	638	656	774
Margin per cow (£)	- 10·26	55·93	79·55	78·34	70·11
Margin per acre (£)	- 6·35	37·64	55·10	55·98	54·24
Size of herd	27·6	34·5	48·5	46·2	42·8
Size of farm (acres)	60	103	142	151	96
Forage acres for dairy herd	45	51	70	65	55

* Excludes most herds under 20 cows and herds over 100 cows.

Because of the relatively low density of stocking in the national summer samples, the margin per forage acre compares even less favourably than the margin per cow with both the winter samples and the South West summer sample. This comparison tends to confirm the findings of a previous study(3) in which it was stated "It therefore appears that when summer milk is produced very efficiently

3. Hodges, John and Coward, Norman. Grass, Cows, Milk and Money. Journal of the British Grassland Society. Vol. 22, No. 1, March 1967.

Table 2•12 South West summer milk and England and Wales milk cost summer and winter herds 1972-73
Returns, costs, margins and physical data

	South West summer milk herds	England and Wales milk cost herds			
		Summer herds		Winter herds	
		Seasonality - per cent summer milk			
		Over 64	60•1-64	40•1-44	Under 40
No. of herds	34	32	51	29	17
Per cow (£)					
Returns - milk	170•33	147•51	155•37	207•53	203•93
- calves	35•11	34•15	34•35	32•53	33•31
Total	205•44	181•66	189•72	240•06	237•24
Costs - feed	69•21	64•10	69•64	89•19	98•66
- direct labour	23•29	50•80	44•17	25•83	32•08
- miscellaneous	33•48	34•34	33•50	40•62	39•74
- herd depreciation	9•86	5•67	5•80	3•95	4•80
Total	135•84	154•91	153•11	159•59	175•26
Margin	69•60	26•75	36•61	80•47	61•98
Margin per forage acre (£)	53•68	14•97	24•50	63•24	43•38
Size of farm (acres)	95	75	95	154	285
Size of herd (cows)	45	21	29	50	61
Yield per cow (galls.)	857	743	783	982	946
Per cent summer milk	64•5	67•8	62•5	42•6	37•1
Av. milk price (p per gall.)	19•88	19•84	19•84	21•13	21•56
Direct labour per cow (hrs)	42	91	81	46	53
Forage acres per cow	1•30	1•79	1•49	1•27	1•43
U.S.E. per acre grass (cwt.)	22•2	n.a.	n.a.	n.a.	n.a.
Concs. per cow (cwt.)	20•2	16•1	20•5	33•9	31•0
Concs. per gallon (lb.)	2•6	2•4	2•9	3•9	3•7

it is more profitable than winter milk production. On the other hand, it is evident that, on average, summer milk production is less profitable than winter milk production, probably because the least efficient of all milk producers are those in the bottom 10% of the summer milk producing herds". In 1972-73 the average results for the summer milk producing herds in the national sample did not compare at all well with the winter milk producers. On the other hand, the South West purposive summer milk producers achieved an average of £53·68 margin per forage acre compared with £43·38 for the 17 highly specialised winter producers (62·9% winter production) and £63·24 for the 29 winter producers with on average 57·4% winter production. In the national sample, the winter milk producing herds are larger than the summer milk producing herds and their yields and stocking rates are also higher. The labour economy is better and in labour use and stocking rate the winter milk producing herds are on average very similar to the South West summer sample. The conclusion from this comparison must be that on average, summer milk production nationally is less profitable than winter milk production, when comparing the extremes of both systems from the national random sample, but the results from the South West purposive summer milk sample compare on average very well with the two groups of winter milk producers, occupying an intermediate position between the two in margin per forage acre.

2·6 High and low margin per acre South West summer milk herds 1972-73

Returns, costs and margins

The results for 1972-73 for the eight herds with the highest and lowest margins per forage acre are set out in table 2·13 together with the average results for all herds for comparison. The difference in margin per cow is very considerable between the high and low margin herds, with £101·91 per cow for the former and £33·54 for the latter, compared with the overall average of £69·60. With a milk yield of 974 gallons per cow in the high margin group, returns per cow were £197·62 compared with 731 gallons per cow and £142·89 for the low margin group. There is also a marked difference in the returns for calves, £44·58 as against £25·10. The higher yield and better calf returns result in total returns of £242·20 and £167·99 respectively for the high and low margin groups, a difference of £74·21 per cow. This very large advantage in returns on the high margin herds was achieved with very little extra total cost, in fact only £5·84 per cow. There was a higher level of concentrate feeding on the high margin herds, 25·29 cwt. per cow costing £46·90 compared with 17·47 cwt. per cow at a cost of £37·49 on the low margin herds, an additional cost of £9·41 per cow, but, when the yield is taken into account, there is only a small difference in concentrates fed per gallon, 2·91 lb. in the high margin herds compared with 2·67 lb. in the low margin

Table 2•13 South West summer milk herds

High and low margin per acre and all herds 1972-73

Returns, costs, margins and physical data

	High margin herds	Low margin herds	All herds
No. of herds	8	8	34
Per cow (£)			
Returns - milk	197•62	142•89	170•33
- calves	44•58	25•10	35•11
Total	242•20	167•99	205•44
Costs - concentrates	46•90	37•49	40•49
- bulk and grazing	27•94	27•75	28•72
- total feed	74•84	65•24	69•21
- direct labour	22•08	31•01	23•29
- miscellaneous	34•63	26•80	33•48
- herd depreciation	8•74	11•40	9•86
Total	140•29	134•45	135•84
Margin	101•91	33•54	69•60
Margin per forage acre (£)	88•57	19•66	53•68
Size of farm (acres)	78	84	95
Size of herd (cows)	50•4	26•0	44•9
Yield per cow (galls.)	974	731	857
Per cent summer milk	63•8	64•2	64•5
Average milk price (p. per gall.)	20•29	19•54	19•88
Direct labour per cow (hrs.)	40	56	42
Fertilisers per acre/grassland (£)	8•07	3•43	7•78
Forage acres per cow	1•15	1•71	1•30
U.S.E. per acre grass (cwt.)	25•3	15•9	22•2
Concentrates and corn per cow (cwt.)	25•29	17•47	20•20
Concentrates and corn per gall. (lb.)	2•91	2•67	2•64
No. of farms feeding:			
Hay only	3	6	16
Silage only	1	-	4
Hay and silage	4	2	14

group. However, the high margin herds on average used a cheaper ration, costing £1•85 per cwt. compared with £2•15, the net result being a lower cost per gallon for concentrates, 4•81 p for the high margin herds compared with 5•13 p for the low margin herds. Bulk food and grazing costs per cow were identical for both groups, but on the high margin herds fertiliser expenditure per acre was more than double that in the low margin group, £8•07 as against £3•43 related to stocking densities of 1•15 and 1•71 forage acres per cow respectively.

When yield per cow, concentrate usage, fertiliser usage and stocking density are taken into consideration, it would appear that the high margin herds achieved a much higher level of production from grass and forage, in fact in terms of production per forage acre, the high margin group produced 847 gallons and the low margin group 427 gallons, with an additional concentrate feed input of only £9•41 per cow and, because of a higher yield, a lower concentrate cost per gallon. Total costs per cow are less than £6 higher in the high margin group. The additional feed cost is just about balanced out by lower labour costs with a labour input of 40 hours direct labour per cow in the high margin herds compared with 56 hours per cow for the low margin herds. Miscellaneous costs are approximately £8 per cow higher for the high margin herds, but depreciation per cow is rather less. The advantage in total returns per cow of £74•21 already noted in the high margin group was achieved with only small additional cost, less than £6 per cow. When the better stocking rate of the high margin herds is taken into account, the margin per forage acre is nearly four and a half times as high in these herds as in the low margin group, compared with three times for margin per cow. It will be noted that the average size of herd, 50•4 cows in the high margin group, is nearly double that in the low margin group, with an average of 26 cows, although the average farm size is similar in both groups. Only two herds in the low margin group were fed silage whereas five herds in the high margin group received silage, an indication again of better grassland utilisation.

The monthly calving pattern for the high and low margin herds is shown in table 2•14. In the high margin herds there is a marked concentration of calvings in January and February; in fact the whole calving pattern is much more concentrated.

The high margin herds comprise an interesting group, but even within this comparatively small group, the range in results is very considerable. In order to illustrate this range, the individual results for the eight farms are set out in descending order of margin per forage acre in Appendix table 2•5. Returns per cow ranged from £289•08 down to £203•42 while for total costs, the range was

from £164·22 down to £120·08, the herd with the highest returns having the highest costs and the herd with the lowest returns also having the lowest costs. It is also interesting to note that the herd with both the highest returns and costs per cow, No. 3, achieved the highest margin per cow, and the one with the lowest returns and costs, No. 4, also had the lowest margin per cow. The herd with the highest margin per acre, No. 1, is a low cost herd with also relatively low returns, but with the highest stocking density. Stocking density falls, (forage acres per cow rise) as the margin per acre declines, with the exception of the last herd. Concentrates fed per cow tend to be higher on the densely stocked

Table 2·14 South West summer milk herds
High and low margin per acre and all herds 1972-73
Monthly distribution of calvings

	High margin herds		Low margin herds		All herds	
No.of herds	8		8		34	
	Per cent of calvings					
April	8·6		12·2		10·8	
May	1·4		12·7		5·0	
June	1·2		10·6		4·1	
July	1·4		7·9		4·1	
August	0·9		4·8		3·1	
September	3·9		3·7		3·3	
October	1·6		3·7		2·8	
November	0·5		6·3		2·3	
December	4·7		4·2		3·9	
January	28·6)		5·3)		19·8)	
February	31·2)	75·8	11·1)	33·9	22·5)	60·6
March	16·0)		17·5)		18·3)	
Year	100·0		100·0		100·0	

high margin per acre farms. With limited acreage for milk production, margin per acre is crucial in achieving a given level of income from the farm as a whole and stocking density appears to be an important factor in determining margin per acre. A high stocking rate appears to be associated with a comparatively high level of concentrate feeding on the eight farms in so far as the herds with the

highest margins per acre tended to be among the heavier concentrate feeders. With the exception of one herd with a peak calving period of March/April, January and February are the months of peak calving for most of the herds, which is considerably earlier than traditionally associated with summer milk production.

2•7 High margin per acre herds. South West summer milk, South West milk costs and England and Wales milk cost winter herds, 1972-73

In table 2•15 the results from the top eight herds (margin per forage acre) in each of the South West summer milk, the South West milk cost and the England and Wales milk cost winter group (40•1 - 44% summer milk) are compared. It will be seen that the top eight summer milk producers in the South West achieve a higher margin per acre than the top eight in the South West milk sample, but not such a good margin as the top eight winter herds in the national sample. The respective margins per acre are £88•57, £87•17 and £109•69.

There is a remarkable similarity between the results of the top eight summer producers in the South West and the top eight in the South West milk cost investigation, giving almost identical margins per cow and per forage acre. The top eight farms in the national sample winter producers 40•1 - 44% summer milk group show a higher margin per cow. The higher returns for milk due to the better milk yield and higher milk price are largely offset by lower returns for calves and greater cost of the feed input. There is, however, an advantage of approximately £8 per cow in herd depreciation in favour of the top eight winter herds in the national sample, which would account for the difference in margin per cow. This difference may in part at least, be due to differences in accounting and valuation methods in which absolute uniformity is difficult to attain on a national scale. If this is so, then the differences in margin per cow between the three groups may indeed be very small. However, the eight top farms in the national winter group had a better stocking rate which would still give them an advantage in margin per acre.

The position in 1972-73 would therefore appear to be that efficient summer milk production in the South West is at least as profitable as in the most efficient herds in the South West milk cost sample, but there are more profitable herds among the extreme winter milk producing herds in the national sample.

2•8 Analysis according to month of peak calving, South West summer milk herds 1972-73

The 34 summer milk producers in the survey sample have been grouped according to the month in which peak calving occurred and the results are presented in

Table 2·15 High margin per acre herds

South West summer milk, South West milk cost and England and Wales milk cost winter herds 1972-73

Returns, costs, margins and physical data

	South West summer milk herds	South West milk cost herds	England and Wales milk cost winter herds
No. of herds	8	8	8
Per cow (£)			
Returns - milk	197·62	207·90	228·37
- calves	44·58	38·00	33·14
Total	242·20	245·90	261·51
Costs - concentrates	46·90	51·03	63·06
- bulk and grazing	27·94	25·28	23·99
- total feed	74·84	76·31	87·05
- direct labour	22·08	19·55	20·15
- miscellaneous	34·63	36·03	39·89
- herd depreciation	8·74	9·52	1·56
Total	140·29	141·41	148·65
Margin	101·91	104·49	112·86
Margin per forage acre (£)	88·57	87·17	109·69
Size of farm (acres)	78	151	205
Size of herd (cows)	50·4	55·5	71·2
Yield per cow (galls.)	974	1015	1068
Per cent summer milk	63·8	50·6	42·2
Average milk price (p per gall.)	20·29	20·48	21·49
Direct labour per cow (hrs.)	40	36	36
Fertilisers per acre/grassland (£)	8·07	7·09	6·00
Forage acres per cow	1·15	1·20	1·03
U.S.E. per acre grass (cwt.)	25·3	24·4	25·5
Concentrates and corn per cow (cwt.)	25·29	26·20	32·60
Concentrates and corn per gall. (lb)	2·91	2·89	3·42
No. of farms feeding:			
Hay only	3	4	4
Silage only	1	1	2
Hay and silage	4	3	2

table 2•16 and diagrams 2•3 and 2•4. Herds were only included in the three groups, January, February and March, if their calvings showed a definite peak in the respective months. The remaining farms with no pronounced peak or peaking outside the three months have been placed in a fourth group in which there will be a wider range of calving dates. When the farms are grouped according to peak calving date, the earlier calving herds show a substantial advantage both in margin per cow and margin per forage acre, but calving date may not be the only factor giving rise to the differences and it would appear that the better managed herds tend to be in the earlier calving groups. However, it does seem that calving date has some influence on profitability with the earlier calving herds achieving on average better performances. It is interesting to note that of the eight high margin herds already discussed, four fall in the January peak calving group, three in the February and one in the March group. The difference in margin per cow arises mainly from better returns for both milk and calves in the earlier calving groups, there being less variation in the level of total costs between the groups, although the March group has a somewhat lower level of costs, mainly because of lower feed costs. Yield per cow declines as calving dates become later, but it is likely that date of calving is not the only explanation for the yield differences. According to a Milk Marketing Board analysis of seasonality[4] of a Low Cost Production sample in South West England in 1967-68, a January calver would have a yield advantage of + 5•5%, a February calver + 1•5% and a March calver a disadvantage of - 1•4%. Applying these differentials to samples in table 2•16 would indicate that approximately 50 gallons of the 939 average for the January peak calving herds is due to seasonality and some 13 gallons of the 862 gallons in the February group. The March group would have suffered a disadvantage of approximately 11 gallons because of their date of calving. The adjusted yields for these groups, after allowing for seasonality effect would be 890, 849 and 819 for the January, February and March groups respectively. It would appear then, apart from the seasonality factor, that the higher yielding herds are in the earlier calving group. The difference in returns for calves can be partly explained by falling prices during the period January to March 1973 and by the incidence of one Ayrshire herd and one herd with a high rate of purchased replacements and a low number of calf sales in the March calving group. The price received per gallon of milk tends to favour the earlier calvers, as the seasonal price schedule would suggest, but the differences are complicated by quality grades and premiums. The earlier calving herds tend to use less labour, the January calving group spending nearly £5 per cow less on labour than the

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4. Report of the Breeding and Production Organisation. Milk Marketing Board. No. 19. 1968-69, p. 109.

Diagram 2.3

South West summer herds 1972-73. Calving patterns

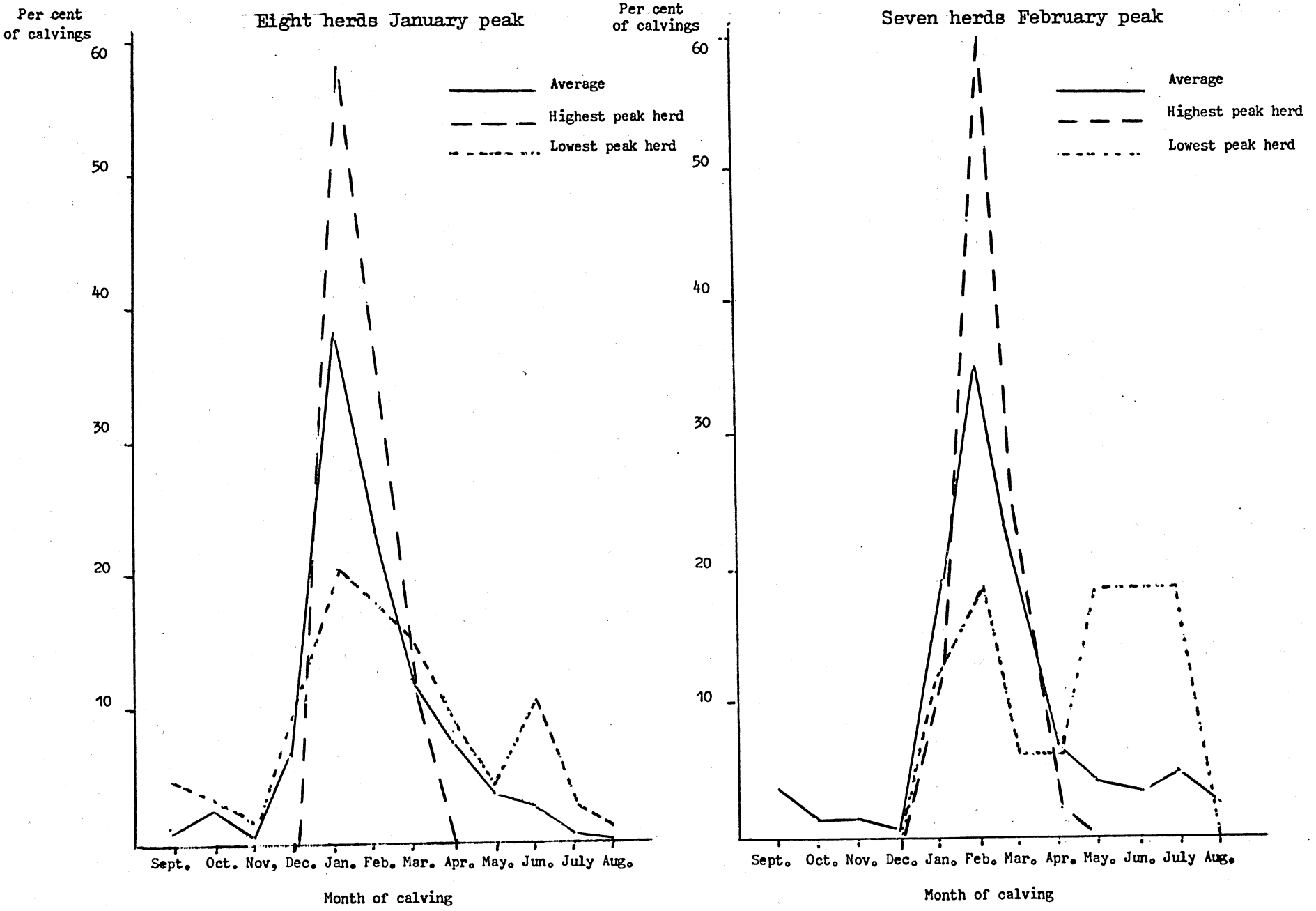
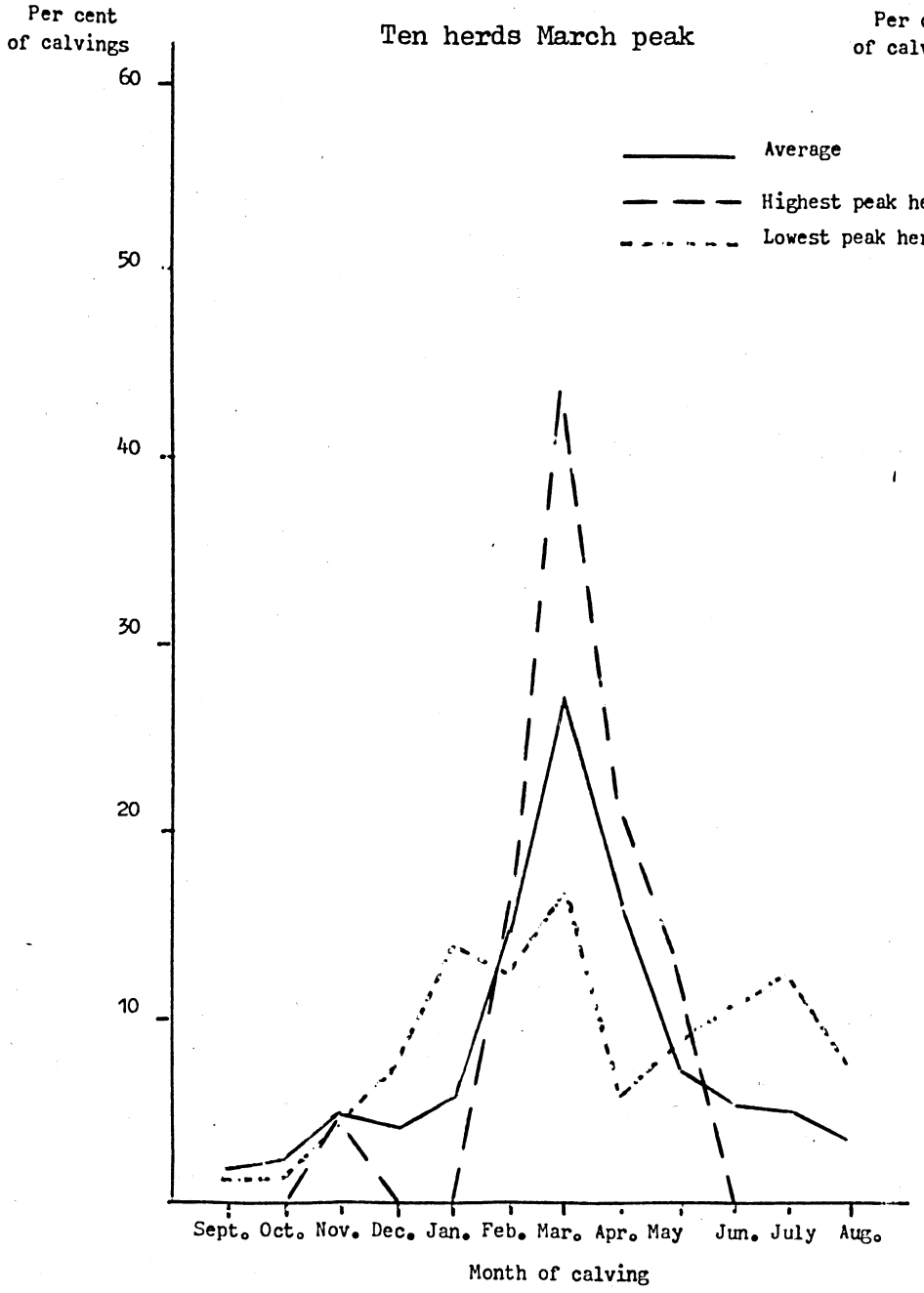


Diagram 2·4

South West summer herds 1972-73. Calving patterns



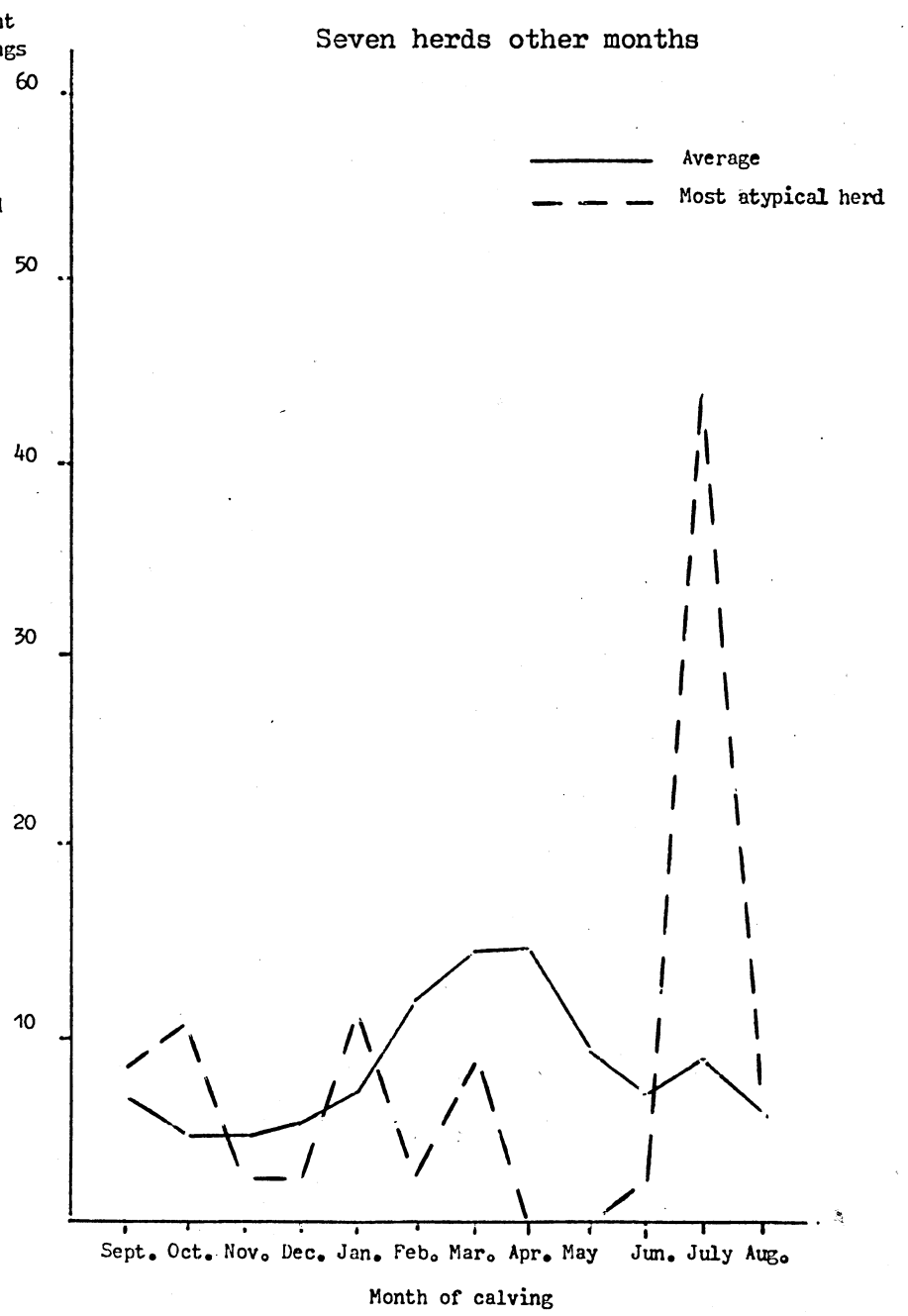


Table 2•16 Analysis by month of peak calving
South West summer milk herds 1972-73
Returns, costs, margins and physical data

	Peak calving month			
	January	February	March	Others
No. of herds	8	7	10	9
Per cow (£)				
Returns - milk	187•52	174•48	158•31	158•36
- calves	40•29	42•33	30•63	26•64
Total	227•81	216•81	188•94	185•00
Costs - concentrates	40•51	42•48	37•28	42•32
- bulk and grazing	30•68	29•03	25•65	29•52
- total feed	71•19	71•51	62•93	71•84
- direct labour	19•85	23•39	24•41	26•31
- miscellaneous	35•87	30•87	36•41	29•48
- herd depreciation	10•69	10•54	7•52	10•91
Total	137•60	136•31	131•27	138•54
Margin	90•21	80•50	57•67	46•46
Margin per forage acre (£)	79•86	62•90	41•96	32•34
Size of farm (acres)	102	105	94	82
Size of herd (cows)	55•2	48•0	40•7	38•0
Yield per cow (galls.)	939	862	808	802
Per cent summer milk	64•0	65•4	66•5	62•1
Average milk price (p per gall.)	19•97	20•23	19•59	19•74
Direct labour per cow (hrs.)	36	41	46	48
Fertilisers per acre/grassland (£)	9•88	8•25	6•82	6•52
Forage acres per cow	1•13	1•28	1•37	1•44
U.S.E. per acre grass (cwt.)	26•9	22•3	21•5	18•4
Concentrates and corn per cow (cwt.)	21•09	22•24	17•94	19•72
Concentrates and corn per gall. (lb.)	2•51	2•89	2•49	2•75
No. of farms feeding:				
Hay only	-	6	7	4
Silage only	2	-	1	1
Hay and silage	6	1	2	4

March group, for an input of 10 hours less per cow. Stocking rate falls with later calving as also does expenditure on fertilisers. The better stocking rate for the earlier calving herds increases their advantage in margin per forage acre. The preponderance of silage in the January calving group should be noted. Considering the yield differences, the earlier calving herds would appear to be using concentrates at least as efficiently as the later calving herds which in theory should be able to use less. The conclusion from this analysis is that the earlier calving herds, after making some allowance for possible higher standards of management, benefit from the earlier calving pattern. Selection of the farms with a definite calving peak for the respective months also implies a tighter calving schedule.

III. THE SUPPLEMENTARY SURVEY 1973

3·1 Introduction

In addition to the economic survey of summer milk production over the three year period 1970-71 to 1972-73, an opinions survey was carried out in 1973 involving mainly the 1972-73 South West summer milk herds. A similar survey was also made of a number of the South West milk cost herds for comparative purposes, including a Likert type of survey in an attempt to compare the managerial aptitudes and risk taking propensities of the summer milk producers as compared with the randomly selected milk cost producers. The survey of the summer milk producers included three sections covering firstly the motivation and commitment of summer producers, secondly their opinions on and attitudes to critical factors in summer milk production and thirdly, the Likert type survey. The survey of the farmers in the milk cost investigation was in two parts: an attitude survey and the Likert type survey.

3·2 Motivation and commitment of summer milk producers

The first question was related to the length of time over which participants had been summer milk producers and they were asked if they had been so from the time when they started farming. Of the total of 33 who replied to this question, 19 said yes, 13 no and one was non-committal but probably no, having drifted into summer production. The distribution of the 33 farmers according to the number of years of summer milk production is set out in table 3·1.

Table 3·1 Distribution of producers according to the number of years in summer milk production

No.of years producing summer milk	Producing summer milk from starting farming	Changed to summer production	All producers
	No. of producers		
3 - 5	5	4	9
6 - 10	5	4	9
11 - 15	4	4	8
16 - 20	3	0	3
over 20	2	1	3
Total	19	13	32
Average no.of years summer milk	12	9	11

Rather more than a quarter of the farmers had taken up summer milk production within the past five years and a similar proportion between six and ten years ago, the remainder, rather less than one half, had been summer milk producers for over ten years. Thus the experience of summer milk production for the whole sample is considerable and on average amounted to 11 years. For the 13 farmers who changed to a summer production pattern, information regarding their previous production pattern, method of achieving a spring calving herd and the length of time taken to do so was collected. In ten cases the previous pattern was year round calving and for the remaining three, autumn calving. In order to achieve a spring calving pattern, three farmers bought spring calving replacements, two gradually culled autumn calvers and six allowed their herds to slip around to spring calving through a longer calving index. The remaining two used a combination of methods. By 1973 12 of the 13 farmers had achieved a predominantly spring calving herd, the remaining farmer not having done so after a period of four years. On average it took just over three years for the 12 farmers to achieve their objective, six of whom chose the longer calving index method taking on average three and a half years and ranging from two to five years to reach a predominantly spring calving pattern. Data relating to changeover to summer production are summarised in tables 3•2 and 3•3.

Table 3•2 Distribution of herds according to method of changing to spring calving pattern

	No.of herds	Range in time taken - years
Buying spring calving replacements	3	2 - 4
Culling autumn calvers	2	1 - 2
Allowing longer calving index	6	2 - 5
Combination of above methods	2*	3 - 4+
All herds	13	1 - 5+

* One farm not reached objective after four years. Average time taken by 12 farmers three years.

Table 3•3 Distribution of herds according to time taken to achieve a predominantly spring calving pattern

Time taken	No.of herds
1 year	1
2 years	4
3 years	2
4 years	3
5 years	2
Change not completed	1
All herds	13

3•3 Important factors in decision to produce summer milk

In the second question the farmers were asked what factors were most important in their decision to produce summer milk or to have a spring calving herd. They were asked to give their reasons spontaneously and were then prompted with the factors given in table 3•4.

Table 3•4 Important factors in decision to produce summer milk

Factor	Factor spontaneously mentioned	After prompting, factor considered		Total
		Important	Unimportant	
	Number of farmers			
Expected profit level	5	7	21	33
Low capital requirements	4	5	24	33
Break in labour required in winter	6	7	20	33
Fit of labour demand with other enterprises	2	2	29	33
Better use of grass	23	8	2	33
Increase in stocking density	1	2	30	33

The importance attached to the belief that they could make better use of grass through summer milk production is illustrated by the fact that 23 farmers

mentioned this factor spontaneously and a further eight considered it important after prompting, only two thinking it unimportant. Related to grassland utilisation only one farmer, and two others after prompting, thought increasing stocking density was important. Only five, and a further seven after prompting, considered expected profit level to be important, 21 or approximately two thirds thinking this factor unimportant. Four farmers thought the low capital requirement in summer milk production important and when prompted, a further five thought similarly. There were two questions concerned with labour; 13 producers thought the winter break in labour requirement important, seven of them after being prompted. Only four considered the way that the labour requirement for summer milk fitted in with the demand of other enterprises important, but as already seen, the farms in the sample are largely specialist dairy farms. Other factors mentioned by farmers were recorded and although a question on concentrate feed use was not included in the questionnaire, six farmers mentioned that in their opinion, the lower concentrate input required in summer production is important. Other aspects concerning labour use were mentioned such as the lower work load because a summer producing herd was outwintered and two thought the system made batch management easier. In fact labour requirements in the South West summer herds were lower than in the milk cost sample. Another preferred the heavier work load in summer in the better weather. Three farmers gave reasons for adopting summer milk production related to the nature of their farms, one the unsuitability of buildings for winter production and in two cases, the land was not considered suitable for growing fodder crops for winter feed. Herd health was thought to be important by one farmer who considered that summer mastitis was less of a problem in summer production. Another thought that spring born calves gave better returns, although the price indices over recent years would not support this contention and yet another preferred spring born calves for his own beef enterprise. There were a number of other factors given which influenced decisions in adopting a summer milk system, some personal, for example, the health of the farmer (one case), and others of an external nature such as professional advice received, particular instances being advice from the National Agricultural Advisory Service (now A.D.A.S.) and an I.C.I. adviser. In one case, the farmer took over his farm in the spring and bought spring calving cows, another followed his father's system, being influenced in his decision by the success of other farmers in summer milk production. Having had considerable experience of summer milk production in New Zealand and knowing no other system, one farmer adcpted a summer system on settling on a farm in Devon. Apart from the overwhelming importance attached to grassland management considerations in relation to summer milk production, farmers gave many and varied reasons why they had

adopted their particular systems.

3·4 Level of satisfaction or dissatisfaction with summer milk production system in 1973

Having tried to discover the main reasons for practising a summer system of production from the farmers questioned an attempt was made to record their present level of satisfaction with their systems and if not satisfied, to discover the particular aspects causing dissatisfaction. On questioning, 11 farmers claimed to be satisfied, leaving 22 who were dissatisfied with one or more aspects of their systems. The replies given regarding nine aspects causing dissatisfaction are summarised in table 3·5.

Table 3·5 Aspects of summer milk production giving cause for dissatisfaction, 33 South West summer milk producers 1973

	No.of producers
Dissatisfied with:	
Time of calving	9
Size of herd	9
Milk yield	6
Herd health	5
Labour hours	4
Level of concentrate feeding	4
Conservation system	3
Gross output	0
Total costs	0
Not dissatisfied	11

Twenty-two farmers were dissatisfied with one or more aspects of their system. Time of calving was cited by nine farmers as a problem, being too late in six cases and not sufficiently concentrated in three others. In one case the calving pattern was disrupted by fertility problems and in another there was difficulty in getting heifer replacements to calve down at two years of age. In order to overcome these problems three intended to advance calving dates and another to attempt to achieve a shorter calving period. Two intended to cull late calvers, one to improve management and another to improve herd health. One farmer was considering changing to autumn calving. Nine farmers were dissatisfied with their herd size, all of whom were planning an increase, four giving definite targets and one planning

to achieve the increase at the expense of followers. Milk yield was a cause for concern on the part of six farmers, ways of improvement being given as better management, culling low yielders and better breeding through nominated sires. Although these farmers were dissatisfied with herd size and yield levels, they evidently did not connect these factors with level of gross output as none expressed dissatisfaction on this score.

Herd health was mentioned as a cause for dissatisfaction by five farmers, four of whom had a brucellosis problem and one milk fever which was thought to be linked with fertiliser application after grazing. To combat the brucellosis problem two were vaccinating with 45/20 and another was culling reactors.

The labour economy of the dairy herd troubled four producers, one of whom hoped to improve management by increasing herd size to 70 cows with one cowman and another was planning to cut down on maintenance work to reduce the peak labour demand.

Only four farmers thought level of concentrate feeding was a problem but they did not connect this with the level of total costs, none being concerned with this aspect. One proposed to cut out concentrate feeding towards the end of the season, and another to grow barley, presumably to cheapen the ration. The remaining two did not offer a possible solution. Regarding bulk feed, three farmers were concerned over their conservation policy mainly with regard to quality. To improve silage quality, one intended to try wilting, another to change to a two sward system with straight RVP ryegrass for conservation and a third to change from hay to silage, because of weather and labour difficulties in haymaking.

3.5 Planned changes in milk production system

Co-operators were asked what changes in their milk production system, if any, they were contemplating which would have a bearing on the proportion of summer milk produced. Out of the 32 who replied to this question, 19 had no changes planned, five were planning to increase summer production proportionately while eight were thinking of increasing their emphasis on winter production. Among the eight who were intending to change to more winter production, two were installing bulk tanks and wished to make fuller use of them through a more level production pattern. Two more were investing in improved dairy building layouts and milking parlours which they thought would be more economically used by a more even production pattern. One farmer was increasing his herd in a way which would lead to a greater emphasis on winter production and another was going out of milk production. Two farmers were intending to calve earlier, calving to start in

December, thus moving towards increased winter production, but still retaining a summer bias in their system.

Five producers expressed an intention to intensify their summer production pattern while at the same time increasing the size of their herds. None were thinking of increasing their labour force, decreasing their herd size or increasing other enterprises.

It is interesting to note that in four cases where a change to a greater winter emphasis was contemplated, there had been substantial capital investment in buildings and bulk tanks, and although these farmers were confirmed summer producers, the need to make full use of the additional capital assets had caused them to reassess their seasonality policy and change their emphasis towards an increased winter production pattern.

3·6 Factors considered to be of critical importance in the successful management of a summer milk producing herd

In this question co-operators were asked how they would advise a summer producer and which factors they would stress as being of critical importance. Their spontaneous replies were first recorded and then they were prompted with factors not mentioned. The replies are summarised in table 3·6.

Table 3·6 Factors of critical importance in successful summer milk production

Factor	Mentioned spontaneously	After prompting considered		
		Very important	Important	Not important
	No. of farmers			
Maintenance of calving index	5	7	6	15
Achieving desired calving pattern	14	7	2	10
Conc. feed control - summer	3	8	11	11
Grazing management	24	7	1	1
Production of conserved fodder	1	2	12	18
Calf mortality	1	4	3	25
Herd longevity	0	0	1	32
Production of spring calving replacements	1	8	3	21
Others	8	-	-	-

The importance of grassland management again emerges as the most critical factor in successful summer milk production, 24 farmers mentioning it spontaneously with eight considering it very important after prompting and another important leaving only one farmer considering it not to be of importance. Next to this factor came achieving the desired calving pattern with 14 spontaneous mentions, seven very important and two important after prompting, totalling 23 in all. Having achieved the desired calving pattern, then to repeat it, it is important to maintain the average calving index of the herd, but even after prompting 15 farmers did not consider this factor of importance and only five mentioned it spontaneously.

Only three mentioned control of summer concentrate feeding spontaneously but on prompting eight others thought it to be very important and a further eleven important, leaving eleven who thought this factor unimportant. Concerning production of conserved fodder, only one spontaneously thought it of critical importance, two very important and 12 important after prompting, leaving 18 who considered it of no importance. Calf mortality and herd longevity do not appear to have been thought important but 12 farmers attached varying degrees of importance to the production of spring calving replacements. Other factors mentioned were the need for a good stockman, high concentrate feeding before turning out to grass and feeding well in winter. The need for good cows and good husbandry, pregnancy diagnosis by a veterinary surgeon and a large bulk milk tank to cope with peak production were mentioned. It was thought by one producer important to invest surplus cash in livestock and by another to be aware of the high peak requirement for labour. Concerning factors outside the control of the farmer or manager having the greatest effect on the profitability of their summer milk enterprises, 14 selected concentrate feed price, ten calf prices, seven the milk price and five summer milk price. Culled cow prices, heifer prices, labour cost, the price of replacements and brucellosis were also mentioned.

Co-operators were asked for their opinions on the future of summer milk production under European Economic Community conditions. Fourteen thought that summer milk production would expand, two thought that it would contract and ten that it would remain unchanged, while seven said they did not know.

3.7 Management policies and practices in 33 South West summer milk herds, 1973

Calving policy

In maintaining a summer production pattern the average calving date of the herd is important and also the concentration of calving around the preferred date. Farmers were asked which eight week calving period they considered would give the

highest margin per cow, if they tried to get their herds to calve within this period and what steps they took to achieve their objective. If they did not aim to calve their herds within the specified eight week period, they were asked the reasons for not doing so. In table 3·7 the farms are distributed according to the preferred eight week calving period. It will be noted that the most popular period is January and February, with the mid-January to mid-March and the February and March periods being equally but less preferred. The March and April eight week period is only a little less popular than the previous two periods.

Table 3·7 Distribution of herds according to the most preferred eight week calving period. 33 South West summer milk herds 1973

Eight week calving period	No.of herds
July 1st - August 31st	1
October 1st - November 30th	1
October 15th - December 15th	1
November 1st - December 31st	1
December 1st - January 31st	2
December 15th - February 15th	1
January 1st - February 28th	8
January 15th - March 15th	5
February 1st - March 31st	5
February 15th - April 15th	1
March 1st - April 30th	4
April 1st - May 31st	2
Don't know	1
All herds	33

Although one farmer considered that the July and August period was the most profitable one, in practice he did not adhere to this calving policy; in fact only 23 out of the 33 farmers aimed at calving their herds in the period they thought preferable, and of those who did so, 11 culled according to calving date in order to achieve their preferred calving pattern. Among the reasons given for not culling and allowing the cows to calve outside the preferred period were difficulty in getting cows in calf, not a sufficiently keen stockman, allowing calvings to slip around, not worried and didn't know, all admissions of failings in management. Others gave more positive reasons such as the need for spring calves for beef production, desire to increase herd size (four cases), wish not to lose milk production by waiting or missing services to bring cows around to spring calving, and because cows are expensive, to try again to get them in calf after failing to hold to service. Seven farmers used a bull to maintain their preferred calving pattern, the remaining 26 relying on A.I.

Replacement policy

Obtaining home reared heifer replacements to calve at the proper time for summer milk production can be a problem. If the heifers are home reared from the spring calving cows, then the heifers must be calved down at either two or three years of age to maintain the calving pattern of the herd. The farmers were questioned on their herd replacement policies and practices. Eighteen reared all their own replacements, another eight reared some of their requirements and seven relied solely on purchases. Data relating to preferred age of first calving were collected from the 26 farmers who reared replacements. The distribution of herds according to age of first calvings is set out in table 3·8. It will be noted that one half of the farmers (13) preferred their heifers to calve at two years and three at three years with three at 2¼ years and five at 2½ years, with a total of 21 at 2½ years or younger. It was possible to analyse actual calving ages for 20 of these herds for 1972-73. In 11 herds the two year calving age was achieved and in a further seven cases the average was 2¼ years, in two 2½ years and in one three years.

Table 3·8 Distribution of herds according to preferred calving age of home reared heifer replacements

Preferred calving age	No.of herds
2 or 3 years	1
2 years	13
2 years 3 months	3
2 years 6 months	5
3 years	3
No policy	1
All herds	26

Information was also sought on the preferred calving period for first calving heifers and the data are summarised in table 3·9, which shows that farmers tended to prefer that heifers should calve early, the most popular periods being January/February and February/March. One farmer preferred a long first lactation to allow the heifers to grow and another calved during April or May for the first lactation and then pushed the calving date forward. While most farmers achieved their targets for calving age the actual dates of first calvings did not in practice closely follow the expressed desired dates.

Table 3·9 Distribution of herds according to preferred period of first calvings for home reared heifers

Preferred calving period	No.of herds
January - February	8
February - March	6
March - April	4
April - May	2
August - September	3
No policy or not known	3
All herds	26

Heifer rearing management practices

The enquiry concerning rearing practices was concentrated on 14 herds, in 13 of which calving at two years was aimed at and one in which calving was at either two years or three years of age. In only two cases were calves allowed to suckle for seven days or longer, leaving 12 herds in which the calves were not left on the dam. In three herds calves were reared on cows' milk only, in nine on milk substitute only and in two on both. In four herds calves were turned out to grass at two months or younger, in five between two and three months and in three between three and four months. In two herds calves were not allowed grazing in their first year. It was considered necessary to inwinter spring born calves during their first winter in eleven out of the 14 herds. Separate grazing areas from the cows were provided for the yearling heifers in their second summer in ten cases and some form of controlled grazing was practised by seven of the farmers.

Heifers were artificially inseminated on ten farms and served by a bull on the remaining four farms. They were brought into the dairy herd before calving in ten cases and not in the remaining four herds. The period spent in the dairy herd by heifers before calving varied from under two to nine months, with two to three months being the most popular period.

Purchased replacements policy

On 15 farms all or some replacements were purchased, but for one herd in which there was a brucellosis outbreak the information is not complete. Of the 14 herds for which data were available, six preferred to buy in calf heifers, four in calf cows and four in milk cows. As with the home reared replacements farmers generally

preferred early calving, with the February/March period being the most popular. Twelve farmers reported no difficulty in obtaining purchased replacements but two experienced difficulty, in each case in obtaining in calf heifers.

Dairy herd feeding policy

Co-operators were questioned on their policies with regard to concentrate feeding of the spring calved cow up to the point of peak production. Seventeen farmers fed concentrates at a set rate according to the gallons of milk produced and 12 fed in advance of yield in order to stimulate production. The remaining four had no definite policy. On turning the dairy herd out to grass, 16 of the total of 33 farmers claimed that their policy was to stop concentrate feeding completely. The policies of the 17 who continued feeding concentrates after turn out were varied, three having no particular policy; three fed sufficient concentrates to keep the cows quiet, one of which specified 1½ lb. a cow per day. Other specific quantities stated were 1 lb. per gallon, 1½ lb. a cow per day and 2 lb. magnesium nuts per cow per day. Two farmers reckoned to get maintenance + 3 and maintenance + 3½ gallons respectively from grass and another two thirds of the milk off grass. Other policies given were: reducing protein and feeding for condition, concentrates fed in April and May only, according to grass, barley to high yielders and for all gallons above estimated production from grass. In none of these cases were specific quantities stated.

In addition to the question relating to considered concentrate feeding policy to cows at grass, co-operators were asked to specify how much milk they assumed would be produced daily from grass during each of the months from May to October inclusive. Seven farmers either made no assumption or did not know, one tried to get "as much as possible" from grass, one based his feed policy on an M.M.B. graph, one fed unspecified quantities of concentrates partly to conserve grass for autumn feed and another relied on grass except for feeding some barley to high yielders. The answers from 22 farmers who were able to give specific quantities for each month are tabulated in table 3·10.

The figures in table 3·10 are in effect the farmers' estimates of the value of grass for maintenance and milk production in each of the six months. They ranged from maintenance plus 3¼ to M + 6 in May and from maintenance only to M + 2 in October. The average for all farms ranged from maintenance plus 4½ gallons in May to M + ¾ in October, declining fairly steadily over the six month period. It is not possible to check the actual performance for individual farms against these estimates because it is unlikely that all cows in the herds would be giving enough milk to realise the estimated potential. Individual cow records would be

necessary in order to check the assumptions with actual performance. However it is interesting to note that 16 of the farmers with firm ideas about the potential of grass appearing in tables 3•10 actually stopped feeding concentrates on turning out to grass. Four farmers considered that by September grass would only provide for maintenance and a further 11 thought this stage would be reached by the first of October. On being asked whether concentrate feeding in the autumn to maintain the level of milk production as long as possible was worthwhile eight said "yes" and 25 "no". Twelve farmers thought that potentially high yielding cows calving in spring could be expected to achieve their potential yield from grass and 21 thought not. In the last column of table 3•10 the estimated utilised starch equivalent per acre of grazing is given for each farm. There is little apparent relationship between U.S.E. achieved and assumed daily production from grass.

Table 3•10. Assumed daily milk production from grass and estimated utilised starch equivalent from grazing.
Gallons per cow per day, May to October. Normal season.
22 South West summer milk producers

Farm no.	May	June	July	August	Sept.	October	U.S.E from grazing cwt/acre
	Gallons per cow per day						
1	3	3	3	3	2	2	21•7
2	5	5	3	3	2	2	38•5
3	5	4¼	3½	2¾	2¼	2	22•3
4	4	4	2	2	2	0	18•6
5	4½	4½	2½	2½	0	0	21•8
6	3½	3½	2½	2½	2	2	19•3
7	5	5	3½	2	2	1	19•1
8	3½	3	2½	2	0	0	18•2
9	5½	4	4	4	0	0	24•1
10	5	5	3½	3½	0	0	24•1
11	6	5	4	4	2	0	14•9
12	3¼	3¼	3¼	3¼	3¼	0	16•9
13	5	5	4	2	2	0	22•0
14	5	5	4	3	2	1	12•9
15	4	3	3	2	2	0	17•6
16	5	4	3	2	1	1	41•8
17	5	4	3	3	2	1	26•0
18	4	4	4	3½	2½	2	12•6
19	4	4	3	2	2	2	15•1
20	5	5	4	3	3	0	25•2
21	4	4	3	2	1	0	22•6
22	4½	4	4	3	2½	2	12•7
Average	4½	4	3¼	2¾	1¾	¾	21•3

Grassland management

Because of the key importance of grassland management in summer milk production it was hoped that additional data would be collected after the end of the costing period during the summer of 1973. Unfortunately this was not possible. However limited information was obtained during the investigation.

Information on the use of nitrogen was collected on 33 farms and for 16 of these the actual quantities applied were obtained. On average 215 units of nitrogen per acre were used, two farmers using under 100 units, six between 100 and 200 units, six between 200 and 300 units and two applying over 300 units. On seven farms the quantities were not known or there was no definite policy and one applied nitrogen when he thought it was needed. The remaining nine farmers had well defined policies, two applying nitrogen regularly each month, at the rate of 2 - 3 cwt. and 35 units respectively. Two farmers applied a large initial dressing followed by a smaller application after each grazing, one 70 units initially followed by 40 after each grazing and the other 34 units per grazing after an initial 140 units. One farmer based his nitrogen use on one unit per grazing day and four on a fixed quantity per grazing, varying between farms from 30 to 50 units.

Nearly all farmers, 29 out of the 33, employed some system of grazing control, mainly paddock and strip grazing methods. An analysis relating utilised starch equivalent per acre grazed (Y) to total fertiliser input in £ per acre (X) on 33 farms gave the following equation:-

$Y = 16{\cdot}0 + 0{\cdot}73\ X$ with the value of r of 0·5157 and an explained variation of 26·60%. However a similar analysis relating utilised starch equivalent per acre grazed to units of nitrogen applied on the 16 farms with sufficiently detailed fertiliser data showed no such relationship.

Nitrogen use data on the conservation areawere available on 20 farms, the average use being 113 units per acre, eight farmers using less than 100 units, 11 between 100 and 200 and one over 200 units. No data were available on 12 farms and one farmer used farmyard manure only.

Co-operators were asked if they could increase the carrying capacity of their grassland without increasing purchased feed and five thought they had already reached the limit. Twenty-eight thought that more cows could be carried but two made reservations, one considering that his calves would have to be housed and the other that the young stock grazing area would have to be restricted.

3.8 Opinions survey, 26 South West milk cost herds

The sttitude survey, with certain modifications, was repeated on 26 of the random sample milk cost farms in 1973, in order to probe producers' thinking on seasonality problems and to give comparative data with the selected summer producers sample.

Most profitable calving period

Concerning the considered most profitable calving period, 11 out of the 26 selected winter and spring, five in the November-January, five in the February-April and one in the May-July periods. Thus six were spring calving orientated and a further five winter calving, some of which would be calving in the late winter and veering towards a summer production pattern. When asked for their reasons, seven gave yield, four milk price and three concentrate cost. However, only four farmers tried to calve their cows within the period they thought most profitable but did not cull cows which failed to conform to the selected calving pattern. Those who allowed their cows to calve outside the preferred period gave a number of reasons for so doing, including three who had labour difficulties and five who thought that a regular cash flow was more important than maximum profit. Other reasons given were availability of replacements, limited milking facilities to deal with peak production, maintaining all year round calving pattern, increasing herd size, need to fill bulk milk tank and need for steady supply of calves for beef production. Thus there are numerous reasons given for not attempting to follow a strict seasonality pattern by the run of the mill milk producers in Cornwall and Devon. These give some indication why farmers do not adopt a highly seasonal production pattern and why there are not more farmers who have concentrated on a summer pattern of production, given the advantages which have been claimed for it, the narrowing price differential between winter and summer milk prices and the undoubted profitability of a well managed summer herd. Of the 19 farmers who said that they did not try to calve all their cows in a tight pattern around the most profitable month, ten said there were periods during the year during which they did not allow cows to calve, six in June and July, one in September and October and three in the May to August period, while the remaining nine did not restrict calving.

Changes in system of milk production

In reply to a question concerning contemplated changes in their system of milk production, 13 out of the 26 were planning to expand their herd and 13 had no plans for expansion. Ten farmers were planning to increase investment in capital equipment of whom seven were buying new milking equipment, one cow housing and two

fodder storage. As seen in the summer producers' sample, investment in fixed equipment is often a reason for departing from a summer production pattern towards a year round or winter emphasis in order to make fuller use of the new investment.

With regard to proposed changes in seasonal calving pattern, it is interesting to note that three were increasing their emphasis on autumn calving, four on spring calving and one aiming at a level calving pattern, while 18 were planning no change. The reasons given for increasing the number of spring calving cows were more milk from grass - two farmers, avoiding calvings at Christmas time - one farmer, and one gave no reason. Nine farmers intended to reduce their levels of concentrate feeding, eight because of rising concentrate prices and one who thought he was using too much.

When confronted with the proposition that under the conditions of E.E.C. membership there would be scope for a significant increase in milk production from grass rather than from concentrates, 12 agreed that this would be so but ten disagreed. Among the 12 who agreed, 11 thought that increases in concentrate feed costs would be important in influencing farmers to produce more milk from grass and one thought static or declining milk prices. Three who disagreed did so because of difficulties in producing milk from grass and one because of increasing fertiliser prices. Other reasons given were problems of batch calving, the need to maximise returns to utilise fully the increasing volume of capital required in milk production, nervous of change because summer milk could be 'overdone' and doubts about the saving in concentrate use because it was thought the spring calvers would need concentrate feeding particularly before calving.

In the event of a significant change in conditions favouring summer milk production, 19 farmers thought they could change their system to produce more milk from grass, but seven did not think they could, four because of present high stocking density, two for fear of summer drought, and one because of the cost of changeover. Of the 19 farmers who thought they would be able to increase milk production from grass, 13 would achieve this through increasing the number of spring calving cows and six by increasing milk output from conserved forage at the expense of concentrate feeding.

The survey of the 26 randomly selected co-operators in the milk cost investigation in Cornwall and Devon showed little interest in summer milk production in 1973, with only four planning to change their emphasis to spring calving. However, 19 said that they would be able to change to a system of producing more milk from grass, should conditions become sufficiently attractive and 13 (50% of the

sample) would do this by increasing the number of spring calving cows.

3·9 Attitudes towards security and managerial efficiency

The study of summer milk production in Cornwall and Devon was based on a sample of 34 producers selected because they were believed to be purposive summer producers, i.e. engaged in a summer milk production system by design rather than by accident. As a control sample 41 producers from the South West milk cost random sample in Cornwall and Devon have been used, the 41 farms being approximately matched on a herd size basis. This sample can be regarded as representing the average of milk production in the two counties. As the summer milk sample is a highly selected one from the view point of seasonality, it was thought that it would be useful to find some objective means of comparing the two samples of farmers from the general managerial standpoint. G.F.C. Mitchell(5/6) described the construction of a Likert type scale and its application in a study of the acceptance of approved practices in pig keeping. The method has been applied in an attempt to compare certain managerial attributes of the producers in the summer milk and milk cost samples.

The attributes chosen were attitudes towards security or willingness to take risks and towards practices thought to be indicative of high managerial quality. For each attribute, security and managerial quality, ten statements were made to the co-operators and their reactions recorded and graded into five categories on a scale ranging from strong agreement through uncertainty to strong disagreement. The responses were then given a score ranging from one to five and the mean score for each individual and for each of the samples computed. The sample averages were then compared using the t-test.

Security or willingness to take risks

On attitudes to security the mean total scores on the ten statements were 27·15 for the summer milk sample and 23·15 for the milk cost sample, the higher score indicating a greater willingness to take risks. This difference is significant beyond the ·001 level and is therefore highly significant, from which it can be concluded that on average, the co-operators in the summer milk sample would be

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(5) Mitchell, G.F.C., B.Sc. Application of a Likert type scale to the measurement of the Degree of Farmers' Subscription to Certain Goals or Values. University of Bristol, Department of Economics.

(6) Mitchell, G.F.C., B.Sc. Farmers' Factual Beliefs and Values Related to the Acceptance of Approved Practices in Pig Keeping. University of Bristol, Department of Economics, 1970.

more likely to take risks in their business decision-making.

Managerial efficiency

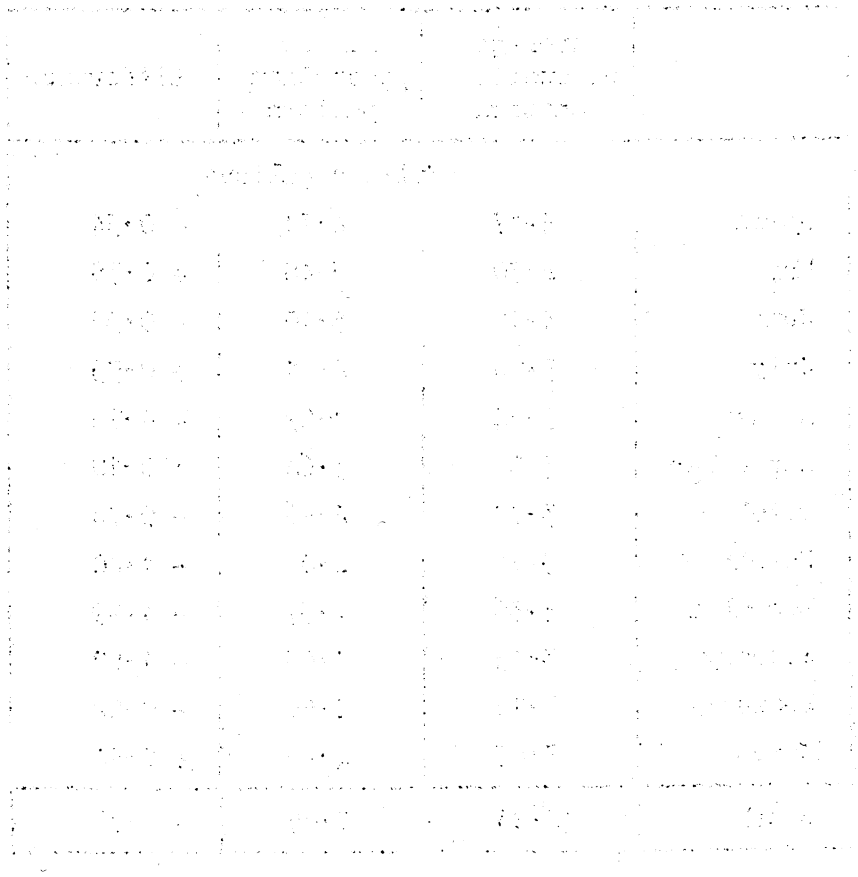
Regarding attitudes to managerial efficiency the mean scores were 26•67 for the summer milk sample and 25•12 for the milk cost sample, in this case the lower score indicating the higher level of managerial efficiency. Assuming that the responses to the statements on attitudes towards factors associated with managerial ability are indicative of efficiency, it would seem that the co-operators in the milk cost sample are marginally more efficiency minded than the summer milk producers. However, the difference was significant at between the •20 and •10 levels only, and, for practical purposes, it can be concluded that there was very little difference on average between the two samples on the score of attitudes to managerial efficiency.

Summary

The decision to attempt a Likert scale type of enquiry was supplementary to the main summer milk investigation taken on the grounds that it looked interesting and could throw some light on aspects of management. Having carried out the assessment, interpretation is required both of the results from the two samples and the value of the technique. It would appear that the statements relating to security clearly differentiated the two samples and that the summer milk producers are significantly greater risk takers. While summer milk production may or may not be a riskier enterprise than other systems of milk production, the 34 producers in the summer sample have definitely opted for a highly seasonal summer production pattern and in a sense, have taken a gamble on that system, whereas the producers in the milk cost sample have not as a group followed one closely defined system, but rather a variety of systems. On the other hand, each individual may be equally dedicated to his own particular system, but the summer producers were selected on the basis that they were purposive or intentional summer producers. Purposive summer producers, however, could have arrived at their present position by two routes; firstly, after a considered assessment of the advantages and disadvantages of the summer system and then deciding, as a number did; secondly, after having arrived at a summer production pattern more or less by chance at the outset and then discovering that they liked the system in their particular situation, some producers have become convinced of the merits of summer production and hence purposive summer producers. If it is considered that being prepared to back a judgement after consideration of all the known factors is synonomous with risk taking, then the former category of producers would be expected to appear as significant risk takers in this analysis. It depends how clear cut the advantages of

summer milk production appeared in producers' individual assessments, but considering the complexities of the appraisal of summer production as against other systems, there must be room for considerable doubt and hence a degree of risk in definitely opting for summer production. It may be, therefore, that the results of the comparison of the two samples on attitudes to security are as would be expected.

The results of the analyses regarding attitudes to managerial efficiency are not easily explained. The summer milk sample on first impressions would appear to be more efficiency minded, particularly regarding those who had opted for summer production after a careful analysis of the situation, but there are those who arrived at their system by the other route already discussed and these would not necessarily rank as above average in attitudes to managerial efficiency. On the other hand, while the summer producers are mainly specialised dairy farmers, the producers in the milk costs sample cover a wider range of farming types with possibly a more difficult set of management problems. Apart from the validity of the statements regarding attitudes to managerial efficiency in measuring actual managerial efficiency, the question is, would the summer sample, highly selected on the basis of seasonality of production, be expected to show superior management characteristics as compared with the random sample of milk producers? The results of the analysis show that they do not, but do not really answer the question posed. The survey into attitudes towards security and managerial efficiency is an interesting excursion into an important field which needs further study.



IV. CHANGING THE SEASONAL PATTERN OF MILK PRODUCTION AND PROSPECTS FOR SUMMER MILK

4•1 Introduction

In this section of the report assumptions are made firstly in respect of the effect on supplies of milk and resources used in milk production of switching a given number of dairy cows from the present average seasonal pattern of production to a summer pattern. Secondly, the effect of some assumed changes in the prices of milk, feed and fertilisers on the various seasonality groups represented in the available samples and thirdly, some thoughts concerning the prospects for summer milk production.

4•2 Transferring cows to summer production

If the necessary incentive to change to a summer production pattern should materialise, it is likely that herds with a year round calving pattern or herds with an average seasonal pattern would be the first to make the change, as it would be a more difficult operation for extreme winter producers to change over.

Table 4•1 Seasonal production of milk from 50,000 cows, (a) at average performance of milk cost sample and (b) at average performance of summer milk sample

	Average production pattern	Summer production pattern	Difference
	Million gallons		
April	4•17	4•71	+ 0•54
May	4•70	5•48	+ 0•78
June	4•12	5•10	+ 0•98
July	3•76	4•71	+ 0•95
August	3•54	4•29	+ 0•75
September	3•54	3•64	+ 0•10
October	3•72	2•96	- 0•76
November	3•41	2•01	- 1•40
December	3•36	1•37	- 1•99
January	3•45	1•63	- 1•82
February	3•18	2•66	- 0•52
March	3•85	4•29	+ 0•44
Total	44•80	42•85	- 1•95

For this reason it is justifiable to measure the effect of transferring herds with an average production pattern to summer production and to base the estimates on the results of the random sample milk costs group in Cornwall and Devon and the sample of summer producers. The assumption is that the average herds transferred will attain the performance of the average of the summer milk group and 50,000 cows will be transferred. Fifty thousand cows producing at the level of the average of the 41 milk cost herds with an average yield of 896 gallons a cow would produce 44,800,000 gallons of milk. If these cows were transferred to summer production and performed at the level of the average of the summer milk sample with a yield of 857 gallons a cow, the total production would be 42,850,000 gallons, a reduction of nearly two million gallons. The seasonal production for the 50,000 cows under the two systems is set out in table 4·1.

Monthly milk production and utilisation for England and Wales are set out in table 4·2 in which supplies are segregated into the liquid, cream and manufacturing markets. The estimated change in supplies resulting from the transfer of 50,000 average cows to a summer production pattern is also given, showing the effect on monthly manufacturing supplies.

Table 4·2 Seasonal production and utilisation of milk, England and Wales 1972-73, and the effect on supplies of transferring 50,000 'average' cows to summer production

Month	Liquid supplies	Cream manufacture	Other manufacturing	Total	Effect of transferring 50,000 cows
	Million gallons				
April	118·5	12·5	86·3	217·3	+ 0·54
May	122·9	15·0	112·9	250·8	+ 0·78
June	118·8	14·9	98·0	231·7	+ 0·98
July	122·3	17·2	75·5	215·0	+ 0·95
August	118·1	14·4	70·7	203·2	+ 0·75
September	120·6	12·1	63·7	196·4	+ 0·10
October	124·8	12·5	68·3	205·6	- 0·76
November	122·0	11·8	57·7	191·5	- 1·40
December	123·0	17·3	53·8	194·1	- 1·99
January	123·6	12·5	59·4	195·5	- 1·82
February	114·0	11·8	54·5	180·3	- 0·52
March	127·0	13·9	70·0	210·9	+ 0·44
Total	1455·6	165·9	870·8	2492·3	- 1·95

Switching 50,000 'average' cows to summer production on the assumptions made would increase milk supplies by approximately one million gallons a month in June and July with approximately three quarters of a million gallons in May. May is the month of peak manufacturing when manufacturing plant is working at full capacity to deal with the existing peak so any considerable transfer to summer production would aggravate the situation, posing problems in the economy of manufacturing by increasing the May peak in production. The trough in supplies for manufacturing occurs in the December to January period, the lowest point being in December when the demand for cream reaches its winter peak level which equalled the July peak in 1972-73. The transfer of 50,000 average cows to summer production would reduce manufacturing supplies by very nearly two million gallons in December, when the manufacturing surplus is approximately 54 million gallons for the month, or less than two million gallons a day. The manufacturing surplus is also a reserve for the priority liquid and cream markets; therefore, any considerable shift to summer production would reduce the reserve to a critical level.

The labour, land and concentrate feed resource requirements per cow for the summer milk herds and the South West milk cost herds are summarised in table 4•3.

Table 4•3 Labour, land and concentrate feed requirements.
South West summer milk and milk cost herds 1972-73

	South West summer milk herds	South West milk cost herds	Difference
Size of herd (cows)	44•9	41•8	-
Direct labour per cow (hours)	42	55	13
Forage acres per cow	1•30	1•41	0•11
Concentrates per cow (cwt.)	20•20	24•79	4•59

Assuming that the performance of the 50,000 cows would on average equal the average performance in the summer milk sample then the transfer of 50,000 cows to summer milk production would result in a considerable saving in resources. In the interpretation of the figures which follows it should be borne in mind that the comparisons made are between the average results of a random sample of milk producers in the South West and the specially selected intentional summer producers, which are likely to be superior in performance to the average of all summer producers. Although the Likert type analysis failed to establish that the summer producers were better managers than the average milk producer in the South West the

distinct possibility remains that they may be so particularly in respect to labour use, stocking rate and concentrate usage. The two groups, as already indicated, are matched for herd size which should eliminate the effect of scale, especially in respect of labour use. With regard to labour economy, although a detailed study of milking and housing arrangements was not made, the opinion of the field investigators is that the summer producers had little advantage over the average producer in this respect but that less direct labour is required for summer herds during the difficult winter period which is not completely offset in the summer herds by higher labour requirements during the summer months when working conditions are better.

On the evidence of these somewhat limited samples and bearing in mind the qualifications concerning the South West summer milk sample the transfer of 50,000 'average' cows to intentional summer production would release 650,000 labour hours, equivalent to over 80,000 standard man days or nearly 300 man equivalents. Some summer producers use contract labour for conservation and fertiliser spreading, for example, in order to cope with these labour peaks. It maybe that this is more prevalent in summer milk production and this would offset to some extent the direct labour saving. The saving in forage acreage would amount to 5,500 acres and in concentrate feed to some 11,500 tons, the homegrown portion of which would also represent a substantial acreage saving. These resources could be used in increasing the dairy herd or for other enterprises. The forage acreage released would allow an increase of approximately 8·5% in the number of dairy cows, while the labour and concentrates would both allow a greater increase, the land being the limiting factor. Such an increase in cow numbers would more than offset the less in total milk production from transferring 50,000 cows.

4·3 Price changes and summer milk production

Since the data for 1972-73 were collected there have been rapid increases in the price of inputs, particularly for feedingstuffs and fertilisers, important inputs in milk production. In table 4·4 the effect on margin per forage acre of certain assumed price changes is set out for summer production, average production (South West milk cost herds) and a group of winter producers from the England and Wales milk cost sample. The average margin for each group in 1972-73 is given as a reference base.

The first calculation shows the effect of levelling out the seasonal price schedule, the milk being priced at a flat rate of 20·36 p per gallon, i.e. the average price received by the South West milk cost sample. Assuming the levels of production achieved in these samples, levelling the price schedule would increase

the advantage of the summer group by £3•14 per forage acre compared with the average for the South West milk cost sample. The margin for the winter group would be reduced by £5•85 per acre.

Table 4•4 Margins per forage acre after allowing for certain assumed price changes. Summer, average and winter production. Base 1972-73 actual results

	South West summer milk herds	South West milk cost herds	England & Wales milk cost winter herds 40•1 - 44% summer milk
Number of herds	34	41	29
	£	£	£
Margin per forage acre 1972-73	53•68	47•64	63•24
Margin after levelling seasonal milk price	56•82	47•64	57•39
change in margin	+ 3•14	No change	- 5•85
Margin after increasing concentrate feed prices			
a) by 50%	37•97	29•59	n.a.
change in margin	-15•71	-18•05	n.a.
b) by 75%	30•18	20•50	n.a.
change in margin	-23•50	-27•14	n.a.
Margin after increasing fertiliser prices			
by 50%	49•65	44•70	n.a.
change in margin	- 4•03	- 2•94	n.a.

The second calculation is based on two levels of concentrate feedingstuffs price increases, 50% and 75%. Because the summer producers use less concentrates they would suffer relatively less than the average and winter producers. A 75% increase in the concentrate feed price would reduce margins by £23•50 and £27•14 respectively for the summer producers and the average producers, leaving margins of £30•18 and £20•50 for the respective groups, the return for milk and calves and other costs being assumed to remain unchanged.

Increasing fertiliser prices by 50% would increase costs and reduce margins by £4•03 in the summer group and £2•94 in the average group, a small disadvantage to the summer producers who use rather more fertiliser. However, the differential effect is small because the fertiliser input is of relatively less importance

than concentrate feed in both groups.

4·4 Prospects for summer milk production

Rapidly changing prices and costs of farming enterprises and the uncertainty concerning future trends make forecasting profit margins extremely difficult. In the grazing livestock sector in the South West milk production has increased its importance and is now the largest single enterprise. Expansion of the dairy herd and improved efficiency over the past two decades have been major factors in the improvement of farm incomes. Rising costs have been absorbed while increases in the price of milk have been restrained. Dairy farm profits on South West farms were low in the early sixties but improved steadily reaching a peak in 1972-73 after which the present imbalance between prices and costs developed. Compared with the beef cattle and sheep enterprises, dairying, in spite of periods of flagging profits, has offered better income prospects for the majority of South West grassland farms. However, if the present inflationary tendencies continue, then increases in the price of milk must be expected. Given realistic adjustments in the price of milk, it is probable that dairying still offers the most stable prospects for the majority of West Country mainly grass farms. If grain prices remain high, then an increase in cereal production can be expected on farms where conditions are suitable in an attempt to reduce the cost of feeding the dairy herd. The commitment of capital to dairying in terms of livestock and equipment is such that it would be difficult for many farmers to change from milk production to other grazing livestock enterprises, and at the moment it is doubtful whether such alternative enterprises offer any better or even as good prospects as dairying. Given that dairying would appear to hold as good prospects as other forms of livestock production for many West Country farms and the level of involvement in milk production, it is unlikely that dairying will decline substantially. Even so, it will still be necessary to improve efficiency within the enterprise in order to combat rising costs, particularly those imposed from without the enterprise. In the context of this report the question is whether summer milk production offers an economic alternative to winter and year round production as a means of improving profitability, at least on some farms.

There are two major groups of influences which affect the relative profitability of summer and winter milk production, price factors and husbandry factors. The price factors include the relative prices of milk, and its joint products, calves and culled cows and the prices of inputs, particularly feed. In comparing winter and summer milk production the seasonal milk price schedule is of great importance and changes in this schedule will affect the relative profitabilities of summer and winter milk. Technical and husbandry factors include the productivity of grassland which depends on levels of fertiliser use, control of grazing,

systems of conservation and density of stocking. Density of stocking depends not only on the production and conservation of grass but also on supplementation with purchased concentrates and forage. Date of calving and maintaining the calving schedule to give the desired seasonal production pattern are also of the greatest importance. Milk yield is important in all systems of milk production and while it was thought that an autumn calving herd had a natural yield advantage, recent analysis of lactation curves suggests that this is not so except in the case of first calving heifers.(7)

The present study has shown that intentional or purposive summer milk production was capable of producing very good profits comparing favourably with year round and winter biased production in the South West under the conditions prevailing in 1972-73. Only in the England and Wales milk cost sample is a group of more profitable winter herds found. It also confirmed that the least profitable herds are likely to be those in which production has drifted aimlessly into a summer pattern. Therefore, in general, summer milk production has to be intentional to be successful.

Given a positive approach to summer milk production with an intentional summer production pattern, while under present conditions of price uncertainty it is difficult to budget precisely the relative future profitability of winter and summer milk production, it may be useful to speculate on the movement of the major factors already mentioned.

Changes in the seasonal price schedule are of first importance. The retrospective price adjustment in 1974 improved winter relative to summer prices for the 1973-74 production period, increasing the differential in favour of winter production. It is doubtful whether future price increases will be distributed in this manner and under E.E.C. conditions it may be difficult to maintain the existing seasonal price schedule because of a declining liquid milk sales premium. Changes in the seasonal price schedule could therefore be to the relative disadvantage of winter producers and on balance are likely to be marginally in favour of summer producers. However, the price schedules may be adjusted within the winter and summer periods to stimulate changes in the production pattern, but these adjustments would be unlikely to affect either extreme summer or extreme winter producers significantly. Analysis of the South West summer herds in 1972-73

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(7) Brooke, M.D. A Case for Spring Calving the Dairy Herd. N.A.A.S. Quarterly Review. No. 82. Winter 1968. Ministry of Agriculture, Fisheries and Food.

according to calving dates shows the earlier calving herds to be more profitable than later calving herds, even after allowing for yield differences. In these herds calving dates have been moved forward to take advantage of comparatively high February and March milk prices. These herds still produced a large quantity of milk off grass during early summer and also took advantage of the comparatively cheap concentrate feed prices which then existed. There is then some room for manoeuvre in changing the calving pattern within the summer system to meet changes in the seasonal milk price schedule and also changes in feedingstuffs prices. As already discussed there seems little advantage to either summer or winter producers in the recent seasonal calf price patterns, at least as far as the early spring calving herds are concerned, but there could be some advantage to later summer calving herds.

Future concentrate feed prices have an important bearing on the prospects for milk production. As winter producers generally rely more heavily on the input of concentrates, high feed prices should have relatively greater effect on their profit margins, but the average winter producer achieves higher yields than the average summer producer which to a considerable extent reduces the relative disadvantage. However, the study shows that intentional summer producers are also capable of producing good yields, but they also feed more concentrates than the average summer producer. The differential effect of high feed prices between efficient summer and winter producers is therefore likely to be less pronounced than the average situation would suggest. The level of the feed input has also an indirect effect through the stocking density factor. There is little doubt that the higher winter milk prices allow the profitable use of greater quantities of concentrate feed and hence a higher stocking rate than a summer producer would achieve on similar land, because the summer producer will use a higher proportion of his grass output for production rather than maintenance. On the other hand, a summer producer using a greater proportion of his grass as grazing will incur less loss through conservation than a winter producer who would tend to conserve a higher proportion of his grass with the object of achieving some production from conserved grass. Whatever the level of feed prices, the higher winter milk prices will allow a winter producer to use a greater concentrate feed input and, other things being equal, to achieve a higher stocking rate. If, however, the seasonal milk price differential narrows then the advantage in stocking rate to the winter producer will tend to diminish because it will become relatively less profitable for him to use concentrates. A narrowing of the seasonal milk price differential will therefore tend to favour the summer producer directly through the price and also indirectly through stocking density.

Stocking density is closely related to grassland productivity and the summer milk study shows that the high margin summer producers achieve a high stocking rate, though lower than some high margin winter herds from the England and Wales milk cost sample. However the advantage achieved by these winter producers probably results mainly from the high feed input factor, rather than from differences in the actual level of grassland management. In so far as high stocking rates depend on the level of fertiliser input, the differential effect of rising fertiliser prices is likely to be small. If stocking density depends on the level of feed input, then it does not follow that high stocking density winter producers changing to a summer system will necessarily achieve the same stocking rate.

Maintaining a seasonal calving pattern and the calving index are problems in both summer and winter production and are of great importance in both systems. The successful summer producers studied seem to have controlled their calving patterns and there is no evidence to show that a summer pattern is any more difficult to maintain than a winter pattern, but the more extreme the pattern, then the more difficult is it to maintain.

A comparison of the summer milk and the milk cost herds shows a tendency for summer producers to use less direct labour on milk production and some argue that the heaviest labour demands are during the summer when working conditions are much pleasanter. There would, therefore, seem to be some advantage to summer production in labour use which with rising wage rates will assume increasing importance. On a specialised grass dairy farm there is a danger that the peak demand for labour for milking will clash with labour demands for conservation which might impose some constraint on extreme summer production. However the use of contractors for conservation is a possible solution. A summer system is unlikely to fit in well on arable farms because of the seasonal nature of the labour requirement but is more likely to have a future on farms specialising in winter crop production such as winter cauliflower in West Cornwall.

Little information is available on capital requirements for summer as opposed to winter milk production. It has been suggested that less elaborate winter housing is necessary for summer milk production and outwintering may be possible in favourable areas. There would appear to be scope for detailed studies of capital requirements in summer production which were beyond the resources of this study.

The success of summer milk production is without doubt highly dependent on grassland management. Again the detailed recording necessary in this field was beyond the resources of the present study and further study might well be rewarding.

Improvements in grass production and utilisation applied to milk production are likely to act differentially in favour of summer production.

To sum up prospects for summer milk production in the South West in relation to the overall prospects for the dairy enterprise within the area, it would appear that the major factors, the seasonal milk price schedule and the price of purchased concentrates are likely to move in a direction which is relatively favourable to summer production. Under the 1972-73 conditions efficient summer producers with well managed grassland achieved results comparable with winter producers. However, many of these producers have advanced their calving dates to gain some advantage from the seasonal milk price schedule. It should be emphasised, however, that the top summer producers were extremely efficient. A group of winter producers drawn from the national milk cost records showed even better results by virtue of their higher yields and stocking rates. Because of their high yields, the higher price received for their milk because of their heavy winter bias and overall efficiency, they have been able to absorb more easily the rising costs of feedingstuffs. Should these producers turn to summer milk production, could they continue the high rate of concentrate feeding and maintain their yields and stocking rate without reducing profit margins? The answer is most likely that they could not. There is some evidence of reduced labour requirements in a summer system but the extent of this cannot be estimated reliably from the limited data available.

V. SUMMARY AND CONCLUSIONS

5•1 The study of summer milk production in Cornwall and Devon is a continuation of earlier work in this field by the Agricultural Economics Unit of the University of Exeter. In addition to the importance of the problems of seasonality of milk production nationally, the subject has special relevance to South West England particularly in relation to the efficient use of grassland.

5•2 The main objective of the study was to obtain empirical data relating to summer milk production in order to establish the viability of a summer system compared with alternative seasonality patterns.

5•3 With assistance from the Milk Marketing Board, a sample of intentional summer producers was obtained and full costing and other relevant data were obtained for the three year period 1970-71 to 1972-73. In 1972-73 comparative full costing data were also available for the national investigation into the economics of milk production random sample for the South West and for England and Wales.

5•4 Much has been written in recent years claiming advantages for systems of summer milk production. However, analysis of the trends in the seasonality pattern over the 20 year period up to 1972-73 shows that there has not been a relative increase in summer production, in fact there has been a marginal decline.

5•5 The fact that summer milk production has not increased relative to winter production is surprising in view of the rather marked improvement of summer milk prices relative to winter prices and the considerable narrowing of the seasonal differential.

5•6 An examination of trends in calf and culled cow prices and of certain input prices did not reveal any changes which would be of particular advantage to either system and sufficient to outweigh the relative increase in summer milk prices.

5•7 While the narrowing in the differential between the winter and summer milk prices would lead to the expectation that summer production would increase relatively and the other price factors appear broadly neutral in their effect, the reasons for the lack of response to improved summer prices must be sought elsewhere. The purpose of the study is to look at the problem from the production end in order to assess the viability of summer production and its economic potential.

5•8 A sample of intentional summer producers was required to meet these objectives. The problems met in identifying intentional summer producers have been discussed.

Samples of 38, 42 and 34 were obtained for the 1970-71, 1971-72 and 1972-73 years respectively and these included 15 farms for which records were available for the whole of the three year period. In the course of canvassing the samples many non-intentional summer producers were visited and their opinions noted. The final samples were of intentional summer producers with well defined systems but displaying a wide range in results. The sample on the whole tended to comprise mainly of specialised grass dairy farms.

5•9 Trends in summer milk production returns, costs, margins and physical factors over the period of three years are illustrated by the analysis of the results for the identical sample of 15 herds. In a period of increasing profitability in milk production, the summer producers showed a high rate of increase in margins benefiting from rising yields, improving milk prices, both in absolute terms and relative to winter milk prices, and higher calf prices. Rising feed prices would tend to be less disadvantageous to the summer producers, but the large increase in feed prices only began to occur towards the end of the three year period of the investigation. The period was marked by a succession of difficult grazing seasons.

5•10 In comparison with the average performance of the random sample of milk cost investigation farms in the South West, the sample of intentional summer producers showed a very similar margin per cow, £69•60 as against £67•33, but a rather better margin per forage acre, £53•68 and £47•64 respectively, because of the better stocking density. The summer producers tended to have a lower returns and costs situation compared with the average, the economies arising from lower inputs of concentrate feed and labour and the better stocking rates. The difference in returns resulted from a lower milk yield and a lower price per gallon. The difference in price per gallon was smaller than might have been expected because of the earlier peak calving pattern than traditionally associated with summer milk production and a differential of one quality grade in favour of the summer producers.

5•11 The average results from the two samples show that summer milk production carried out intentionally, with an earlier peak calving pattern than traditionally practised, compares favourably in profitability with average production in the South West.

5•12 Comparison with results from the national investigation into the economics of milk production shows that the South West sample of intentional summer producers was much more profitable than the generality of summer producers in the random sample. They compare favourably with two groups of highly winter biased producers, their average margin per acre occupying an intermediate position between the two winter groups.

5•13 The analysis of the summer milk herds into high and low margin per acre groups shows that the top eight groups secured on average an extremely good profit level of the order of £101•91 per cow and £88•57 per acre. The main features of this group being a high average yield and return per cow, with only slightly higher costs than the low margin herds. Higher fertiliser usage was associated with a better stocking rate and although a greater quantity of concentrates was fed per cow, the ration was cheaper and the cost per gallon was lower. The highly successful results point to efficient grass production and utilisation as a key factor.

5•14 Even within this small group of eight farms, the range in margins is very great, from £132•95 to £63•98 per acre. The individual results in Appendix II for the eight herds highlight the salient features for each herd and the variety of ways in which the particular results were achieved.

5•15 The results of the top eight herds in the South West summer group and in the South West milk cost sample are almost identical in terms of margin per acre. The top eight herds in the profitable winter biased group in the national sample, however, averaged some £20 higher margin per acre than both the high margin South West summer milk and milk cost groups.

5•16 Analysis of the summer milk producing herds according to peak calving dates indicates that the early calving herds with a January calving peak are the most profitable. The early calving herds achieved higher yields, a better labour economy and a higher stocking density with a broadly similar concentrate feed input. The analysis of the calving patterns suggests that the early calving herds succeeded in obtaining a tighter calving pattern. Some of the yield advantage was probably due to factors other than seasonality.

5•17 The supplementary survey of summer and milk cost sample producers in Cornwall and Devon was designed to explore farmers' attitudes, commitment, opinions and motivation in relation to summer milk production.

5•18 The summer milk sample represents a considerable amount of experience, the average number of years in summer production being 11.

5•19 More than half the farmers in the summer sample had been summer producers from the time they started farming. The summer pattern of production was arrived at in a variety of ways by those who changed over to summer production and it took on average over three years to achieve a spring calving herd.

5·20 Nearly all of the summer producers gave better use of grass as an important factor in their decision to produce summer milk. Expected profit level, labour and capital considerations were mentioned by relatively few farmers.

5·21 Summer producers were dissatisfied with many aspects of their systems, time of calving and size of herd being most frequently mentioned followed by milk yield and herd health.

5·22 More than half the summer producers had no planned changes in their systen, five were intending to increase their emphasis on summer production while eight (one quarter) were planning an increased emphasis on winter production. Investment in bulk milk tanks, milking layouts and buildings were given as reasons for reassessing production policy to make fuller use of the additional capital investment.

5·23 Nearly all farmers in the summer sample, 32 out of 33 thought grazing management either very important or important in successful summer milk production. This was followed by achieving the desired calving pattern, 23 farmers, and control of summer concentrate feeding, 22 farmers, mostly after prompting.

5·24 Nearly half of the farmers, 14, thought summer milk production would expand under the European Economic Community conditions, while two thought it would contract.

5·25 January 1st to February 28th was the most preferred eight week calving period followed equally by mid January to mid March and February 1st to March 31st. Only 23 out of the 33 farmers aimed to calve their cows during the period they thought preferable and only 11 of these culled according to calving date.

5·26 Twenty-six of the summer producers reared all or some of their replacements and 13 of them preferred heifers to calve at two years of age. Fourteen out of the 26 preferred the January-March eight week period for calving heifers.

5·27 Heifer rearing management practices were obtained for 14 herds, in 13 of which two year calving was aimed at. In the majority of cases heifers were reared on milk substitute rather than cow's milk. The majority considered inwintering of spring born calves necessary for their first winter and provided separate grazing areas for them in their second summer.

5·28 Fifteen farmers bought some or all replacements required, six preferring in calf heifers, four in calf cows and four in milk cows.

5•29 The analysis of the replies to questions on feeding policy is difficult to summarise briefly. Seventeen farmers adopted a set rate of concentrate feeding according to milk yield and 12 fed in advance of yield, the remaining four having no definite policy.

5•30 Sixteen out of 33 summer producers said their policy was to stop concentrate feeding completely on turning out to grass. The remaining 17 adopted a variety of policies.

5•31 Farmers' assumptions relating to milk production from grass averaged maintenance plus 4½ gallons during May down to maintenance plus ¾ gallon for October. In May the range was from maintenance plus six gallons down to maintenance plus three gallons. Twelve out of the 33 farmers thought that high yielding cows could be expected to reach their potential yield from grass.

5•32 Policy with respect to nitrogen use was collected on 33 farms, actual quantities being obtained for 16 on which the average annual application was 215 units, two applying more than 300 units. A further nine farmers had well defined policies of regular application. Seven farmers were not precise about their policies. The majority of farmers had a policy of regular nitrogen applications, some giving a heavy initial application. Nitrogen use on the conservation area averaged 113 units on 20 farms with available data.

5•33 Twenty-eight out of the 33 farmers thought they could increase the carrying capacity of their grassland without increasing the purchased feed input. The remaining five thought they had already reached the limit.

5•34 The co-operators in the randomly selected milk cost sample in the South West showed little interest in summer milk production in 1973, only four indicating plans to change to spring calving, but given sufficient incentive 19 said they would be able to change to a system of producing more milk from grass.

5•35 In comparing the South West summer milk and milk cost samples using the Likert type technique, it was found that the summer producers appeared to be greater risk takers but in attitudes towards managerial efficiency, there was little difference between the two samples.

5•36 Estimates of the effect on milk supplies of transferring 50,000 average cows (South West milk cost sample) to a summer production pattern (average of South West summer milk sample) suggest that December and January supplies would each be

reduced by nearly two million gallons and the peak May supplies increased by just over three quarters of a million gallons when manufacturing resources are already fully utilised.

5•37 On the evidence of the samples the transfer of 50,000 cows to summer production would release some 300 man equivalents, 5,500 forage acres and 11,500 tons of concentrate feed, the homegrown portion of which would also represent a substantial saving in acreage. The release of these resources would allow an increase of some 8•5% in the dairy herd or some other form of production.

5•38 Levelling the seasonal milk price schedule on the 1972-73 results would benefit the summer milk producers to the extent of £3•14 on their margin per acre, while the average producer in the South West milk cost sample would not be affected. The high margin group of winter producers in the England and Wales sample would suffer a reduction of £5•85 in margin per acre.

5•39 Because concentrate feed inputs are lower in summer production, increasing feed prices will have a relatively less severe effect on summer producers. A 75% increase in the price of concentrates would reduce summer producers' margins on average by £23•50 per acre compared with £27•14 for the average producer in the South West. With improved grassland management the scope for reducing concentrate use on summer milk producing farms may be greater than these figures suggest.

5•40 Increased fertiliser prices would be relatively of greater disadvantage to summer producers, reducing margins by £4•03 per acre compared with £2•94 for the average producer, the relative difference being just over £1 per acre.

5•41 Prospects for summer milk production in the South West will depend mainly on changes in the seasonal milk price schedule and prices of feedingstuffs. A narrowing of the differential between winter and summer milk prices and continuing high feedingstuffs prices will tend to favour summer relative to winter production. Improvements in grass production and conservation will also affect the situation in a similar way.

5•42 The general conclusion from the study of summer milk production in the South West is that it offers a viable alternative to winter or year round production under the conditions which prevailed and with efficient management of an intentional summer system, high margins were achieved in spite of the relatively unfavourable seasonal milk price structure for summer production.

5·43 The shrinking price differential between winter and summer prices over the ten year period studied has not brought the expected transfer to summer production although a good deal of publicity has been given to the advantages of summer production. This raises the question of definition of summer production. For the purposes of the study and drawing the sample, the summer period was taken to be April to September inclusive and a summer producer defined as producing 63% of his milk during this period.

5·44 The evidence from the survey would suggest that there has been a change in ideas concerning summer production in the South West, the main criterion being efficient milk production from grass and to achieve this, producers have advanced their calving dates, often to reach peak calving for their herds as early as January compared with the traditional practice of peak calving during April/May to coincide with the spring flush of grass. The advantages of earlier calving result from the comparatively high milk prices in the late winter and early spring period making the feeding of relatively cheap concentrates up to 1972-73 attractive. Improvements in grassland management, particularly in conservation and the production of early bite, have also favoured earlier calving in an area which normally has an advantage in earliness due to geographical factors. In this respect, it should be noted that the study coincided with the incidence of a period of late cold springs.

5·45 While the survey sample included a number of herds with January peak calvings, and this group of herds proved on average to be the most profitable, these early calving herds naturally do not have an extreme summer production pattern based on the April-September definition. It is very likely that the use of the April to September period and the stipulation of 63% of milk production during this period excluded many efficient earlier calving herds producing milk from conserved grass and grazing.

5·46 In the event of further work being undertaken concerning seasonality of production, it may well be of advantage to place the emphasis on milk production from grass, both conserved and grazed. The current survey suggests that a peak January/February calving period provided the most efficient production pattern in the light of the price/cost relationships which existed in 1972-73.

5·47 Much will depend on future concentrate feed prices and the cost of producing and conserving grass or alternative forage crops, and the seasonal milk price schedule. Under 1972-73 conditions the early calving herds made good use of grass and grass products and comparatively cheap concentrates while minimising the unfavourable effect of the seasonal milk price schedule.

5·48 The earlier calving pattern tends to minimise the May peak in production when manufacturing facilities are in danger of being overloaded but the January calving cows would be dry during December when the level of supplies could become critical in relation to the requirements of the liquid and cream markets. April/May calving cows, on the other hand, would add to the May peak but make a small contribution to December supplies. Any major shift to late spring calving could pose serious problems in the manufacturing sector, but could offer economies in production to be weighed against the disadvantages of a highly seasonal summer supply pattern for manufacturing. The sample did not include a sufficient number of late calving herds to allow this aspect to be followed up.

5·49 In general, climatic conditions in the South West of England are favourable for early grass production and an early spring calving herd. On the other hand, there are considerable areas within the South West peninsula, e.g. the higher ground and the Culm Measures, which are later and which would be better suited to a later calving pattern for summer production. The original objectives of the study sought to relate the geophysical factors to seasonality of milk production, but the extreme range of micro-climatic conditions, even in a relatively small area such as the South West, the limited size of the sample and the distribution of the farms did not allow any useful conclusions to be drawn.

VI. APPENDICES

Appendix I	Production and price data
Appendix II	Supplementary economic survey data. Individual farm results
Appendix III	Trading accounts South West summer and South West milk cost herds
Appendix IV	Accounting methods and definitions

APPENDIX I

Table 1·1 Total milk sales off farms and the percentage summer milk for England and Wales and the Far West Region 1953-54 to 1973-74

April-March year

Year	England and Wales		Far West	
	Million gallons	% summer	Million gallons	% summer
1953-54	1,655	51·4	122·6	53·6
1954-55	1,653	52·9	120·8	54·8
1955-56	1,670	51·5	123·7	52·6
1956-57	1,813	51·6	143·0	52·0
1957-58	1,878	52·3	151·1	53·3
1958-59	1,765	54·4	146·2	55·2
1959-60	1,798	51·8	148·6	52·9
1960-61	1,951	52·3	167·2	52·9
1961-62	2,052	52·1	176·5	52·6
1962-63	2,072	52·9	182·2	53·5
1963-64	2,000	53·4	178·4	55·2
1964-65	1,990	53·5	179·1	54·0
1965-66	2,068	53·7	192·8	54·4
1966-67	2,040	53·5	197·4	53·4
1967-68	2,141	53·2	216·0	53·2
1968-69	2,163	53·7	221·2	54·7
1969-70	2,205	52·8	232·1	53·2
1970-71	2,257	52·4	237·5	53·5
1971-72	2,336	52·5	247·2	53·5
1972-73	2,492	52·7	266·3	54·4
1973-74	2,479	54·5	269·0	55·8

Table 1·2 Seasonal indices of sales off farms - 3 year averages

(a) England and Wales

	1950-53	1960-63	1970-73
April	107·2	110·1	106·4
May	121·4	120·8	120·9
June	118·3	112·8	113·6
July	99·2	99·4	101·6
August	88·7	95·3	96·7
September	86·9	94·4	97·0
October	90·9	95·4	97·7
November	93·7	93·5	93·7
December	94·2	91·9	90·8
January	97·7	92·2	90·9
February	98·5	95·8	92·5
March	100·6	100·8	96·2

(b) Far West Region

	1950-53	1960-63	1970-73
April	101·9	109·8	110·3
May	124·6	123·0	124·8
June	124·2	114·1	114·3
July	106·0	99·6	102·9
August	97·5	97·5	99·0
September	97·9	98·1	98·6
October	97·9	97·8	97·2
November	93·1	93·9	91·3
December	89·1	90·2	87·1
January	88·8	88·9	87·6
February	88·3	92·1	89·5
March	90·0	97·2	95·2

Table 1·3 Monthly distribution of milk sales Far West Region 1963-64 to 1972-73

Per cent of gallons

	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73
April	8·6	8·6	8·9	8·7	8·7	9·1	8·3	8·7	8·9	9·2
May	10·6	10·6	10·5	10·3	10·2	10·6	10·1	10·5	10·5	10·4
June	9·9	9·5	9·5	9·3	9·1	9·5	9·3	9·2	9·3	9·5
	29·1	28·7	28·9	28·3	28·0	29·2	27·7	28·4	28·7	29·1
July	9·2	8·9	8·9	8·7	8·6	8·8	8·8	8·6	8·5	8·9
August	8·7	8·5	8·6	8·3	8·4	8·5	8·5	8·3	8·3	8·4
September	8·2 (26·1)	7·9 (25·3	8·0 (25·5)	8·1 (25·1)	8·2 (25·2)	8·2 (25·5)	8·2 (25·5)	8·2 (25·1)	8·0 (24·8)	8·0 (25·3)
Summer	55·2	54·0	54·4	53·4	53·2	54·7	53·2	53·5	53·5	54·4
October	8·3	7·9	8·2	8·4	8·4	8·4	8·5	8·6	8·0	8·1
November	7·3	7·5	7·7	7·6	7·6	7·7	8·0	7·7	7·6	7·4
December	7·1	7·7	7·4	7·5	7·6	7·3	7·6	7·5	7·6	7·4
	22·7	23·1	23·3	23·5	23·6	23·4	24·1	23·8	23·2	22·9
January	7·3	7·7	7·3	7·6	7·6	7·3	7·6	7·6	7·6	7·5
February	7·0	7·1	6·8	7·1	7·3	6·8	7·0	7·0	7·3	6·9
March	7·8 (22·1)	8·1 (22·9)	8·2 (22·3)	8·4 (23·1)	8·3 (23·2)	7·8 (21·9)	8·1 (22·7)	8·1 (22·7)	8·4 (23·3)	8·3 (22·7)
Winter	44·8	46·0	45·6	46·6	46·8	45·3	46·8	46·5	46·5	45·6
Year	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0

Table 1·4 Total sales of milk off farms Far West Region 1963-64 to 1972-73

1963-64 = 100 (gallons)

	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73
April	100·0	100·3	111·8	111·4	122·1	130·2	124·9	133·4	142·7	158·8
May	100·0	99·7	106·3	107·2	115·8	123·3	123·5	131·5	136·5	146·3
June	100·0	96·5	103·6	104·0	111·8	119·8	122·1	123·9	130·0	143·5
July	100·0	97·8	105·3	105·1	114·0	118·8	125·1	125·4	128·9	144·5
August	100·0	98·5	106·1	105·0	116·2	121·2	127·2	127·5	131·8	144·1
September	100·0	96·4	105·6	109·5	121·2	124·7	129·7	132·2	134·7	145·5
Summer	100·0	98·2	106·4	106·9	116·6	122·9	125·2	128·9	134·1	147·0
October	100·0	95·6	106·4	111·9	122·1	125·4	133·7	137·2	134·2	145·6
November	100·0	102·9	113·9	116·1	126·5	130·9	142·4	141·8	144·4	151·9
December	100·0	107·6	111·9	116·3	128·3	127·0	139·0	140·6	146·8	154·6
January	100·0	105·5	108·6	114·7	126·4	124·6	135·1	137·5	144·6	152·3
February	100·0	102·1	105·6	112·3	126·8	120·0	130·8	133·4	145·4	148·0
March	100·0	105·3	114·1	120·0	129·1	124·0	135·7	139·2	150·4	160·0
Winter	100·0	103·0	110·1	115·2	126·5	125·4	136·1	138·3	144·1	152·0
Year	100·0	100·4	108·0	110·6	121·0	124·0	130·1	133·1	138·6	149·2

Table 1•5

Basic monthly prices Far West Region

Pence per gallon

	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73
April	13•74	15•21	14•98	15•41	15•79	15•75	15•69	16•47	18•01	19•69
May	10•17	11•29	11•46	11•79	12•12	12•05	12•02	12•83	14•04	15•64
June	9•95	10•98	11•41	11•48	12•18	11•96	11•84	12•55	14•24	15•53
July	11•95	12•98	13•15	13•25	13•86	13•65	13•42	14•58	16•36	17•09
August	13•60	14•96	14•89	15•45	15•82	15•63	15•57	16•39	18•26	18•88
September	15•04	16•39	16•18	16•68	16•95	16•79	16•70	17•36	19•87	20•43
October	15•38	17•03	16•55	16•77	17•11	17•16	17•05	18•85	20•18	20•51
November	16•19	16•90	16•33	17•25	17•13	17•44	16•80	18•69	20•93	20•76
December	16•60	16•97	17•04	17•63	17•30	17•60	17•37	19•41	20•93	20•82
January	16•82	17•12	17•17*	17•88*	17•43*	17•88	17•63	19•09	20•90	20•68
February	16•61	17•42*	17•00	17•38	17•16	17•43	17•66*	19•24	21•30*	20•84*
March	16•92*	17•32	17•03	17•27	17•36	17•94*	17•59	19•46*	20•81	20•54

\- lowest monthly prices
* highest monthly prices

Table 1·6 Indices of monthly milk prices Far West Region 1963-64 to 1972-73

1963-64 = 100

	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73
April	100·0	110·7	109·0	112·2	114·9	114·6	114·2	119·9	131·0	143·3
May	100·0	111·0	112·7	115·9	119·2	118·5	118·2	126·2	138·1	153·8
June	100·0	110·4	114·7	115·4	122·4	120·2	119·0	126·1	143·1	156·1
July	100·0	108·6	110·0	110·9	116·0	114·2	112·3	122·0	136·9	143·0
August	100·0	110·0	109·5	113·6	116·3	114·9	114·5	120·5	134·3	138·8
September	100·0	109·0	107·6	110·9	112·7	111·6	111·0	115·4	132·1	135·8
October	100·0	110·7	107·6	109·0	111·2	111·6	110·9	122·6	131·2	133·4
November	100·0	104·4	100·9	106·5	105·8	107·7	103·8	115·4	129·3	128·2
December	100·0	102·2	102·7	106·2	104·2	106·0	104·6	116·9	126·1	125·4
January	100·0	101·8	102·1	106·3	103·6	106·3	104·8	113·5	124·3	122·9
February	100·0	104·9	102·3	104·6	103·3	104·9	106·3	115·8	128·2	125·5
March	100·0	102·4	100·7	102·1	102·6	106·0	104·0	115·0	123·0	121·4

Table 1·7 Monthly milk price as a percentage of annual average

England and Wales

	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73
April	97	100	99	100	101	100	101	97	97	102
May	72	74	76	77	78	77	77	76	76	82
June	71	73	77	75	79	77	77	75	77	82
July	85	85	88	86	89	87	86	86	88	90
August	96	98	99	100	101	99	100	97	98	99
September	106	108	107	108	108	107	107	102	106	106
October	109	111	109	108	109	109	109	110	108	107
November	115	113	109	111	109	111	108	110	112	108
December	117	113	113*	114	110*	112	111	114	112	109*
January	118	113	113*	115*	110*	113*	112*	113	112	108
February	117	115*	112	112	109	110	112*	114	114*	109*
March	119*	115*	112	112	110*	113*	112*	116*	112	107
Year	100	100	100	100	100	100	100	100	100	100

- lowest monthly prices
* highest monthly prices

Table 1.8 Monthly milk price as a percentage of annual average

Far West Region

	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73
April	98	98	100	99	101	100	101	97	97	102
May	73	74	78	78	78	78	78	77	76	82
June	71	75	77	76	79	78	77	75	77	82
July	85	86	88	86	89	88	87	87	88	90
August	97	98	99	100	101	99	100	97	98	99
September	108	108	107	107	107	106	107	102	107	107
October	110	109	109	108	108	109	109	110	108	107
November	116	111	108	110	109	110	107	110	112	109*
December	119	114	113*	113	110*	111	110	114	112	109*
January	120	115	113*	115*	110*	113*	112*	114	112	108
February	119	116	112	112	109	110	112*	114	114*	109*
March	121*	117*	112	111	110*	113*	112*	116*	112	108
Year	100	100	100	100	100	100	100	100	100	100

- lowest monthly prices
* highest monthly prices

Table 1•9 Indices of prices for 1st quality Friesian bull calves

April = 100

	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73
April	100•0	100•0	100•0	100•0	100•0	100•0	100•0	100•0	100•0	100•0
May	108•2	106•8	107•7	109•1*	110•5	111•5*	108•6	108•6*	108•8	113•6
June	106•5	121•9*	109•9*	108•8	110•3	101•0	110•6	108•6*	116•9	124•2
July	103•9	113•9	106•9	100•0	100•5	99•8	107•7	105•0	117•2	122•1
August	100•8	108•3	102•0	88•9	96•4	95•9	117•2*	102•4	115•8	118•3
September	93•2	107•2	96•5	76•5	98•9	98•7	116•0	98•0	117•8	117•5
October	97•6	108•1	93•1	79•8	96•9	99•3	109•1	94•3	122•7	118•0
November	98•3	110•5	90•4	77•4	91•2	101•0	109•8	94•6	122•6	122•8
December	96•1	112•5	83•9	100•7	-	101•1	108•9	91•9	124•7	132•9
January	111•1*	109•2	88•3	76•3	105•9	104•2	111•4	96•6	144•3	145•7*
February	99•7	107•8	88•3	75•4	106•9	99•6	111•3	101•4	152•8*	139•6
March	105•2	102•8	85•3	71•9	115•6*	96•8	110•1	100•9	146•2	129•7

- lowest monthly prices
* highest monthly prices

Table 1•10

Average prices for Friesian bull calves

£ p.

	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
February, March, April	19•58	21•25	19•36	14•82	17•85	19•57	22•82	24•30	38•41	52•10
September, October, November	21•50	20•60	15•43	14•64	19•47	22•72	22•39	30•91	46•45	45•64

Table 1·11

Indices of prices for 1st quality barren cows

April = 100

	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73
April	100·0	100·0	100·0	100·0	100·0	100·0*	100·0	100·0	100·0	100·0
May	104·0	108·0*	101·5	101·8*	102·8	98·2	106·6	108·2*	102·8	103·9
June	108·7	107·6	102·6*	98·2	98·9	93·2	108·2*	105·2	104·2	104·4
July	110·5	104·2	99·9	95·8	85·1	89·6	103·8	104·1	100·3	99·4
August	112·4	101·3	98·8	85·9	84·4	86·5	98·9	103·6	100·3	101·0
September	110·4	96·6	96·9	78·8	82·1	87·2	96·7	98·1	99·8	100·9
October	107·7	93·3	91·8	70·7	78·6	81·7	94·0	95·9	97·8	96·6
November	106·4	92·0	88·6	66·6	85·7	82·5	93·3	91·0	99·6	99·2
December	114·3	98·1	88·5	70·1	97·7	84·9	93·9	94·5	101·2	111·9
January	114·9	100·7	93·3	77·9	110·1	88·1	96·3	98·2	105·3	121·0
February	132·6	103·2	92·9	83·4	111·9	91·6	98·9	104·2	112·5	128·6
March	137·8*	105·1	97·6	89·0	114·3*	91·8	102·1	110·0	117·9*	130·3*

- lowest monthly prices
* highest monthly prices

Table 1·12 Average prices for 1st quality barren cows

£ p.

	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
May, June, July	80·80	83·55	81·23	73·87	81·97	89·54	94·98	107·14	137·93	177·54
October, November, December	71·48	73·91	56·83	67·47	72·68	79·04	84·16	104·10	137·87	144·91

Table 1·13 Indices of prices for in milk cows - 1st quality Friesians

April = 100

	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73
April	100·0	100·0	100·0	100·0	100·0	100·0*	100·0	100·0	100·0	100·0
May	102·2	105·5	104·9	101·2	102·6	96·1	100·6	102·9	102·3	106·3
June	101·2	102·0	104·9	98·0	98·3	90·6	97·0	98·3	103·5	106·3
July	102·7	100·9	103·0	96·4	94·2	91·2	95·9	98·0	102·9	105·3
August	104·5	101·2	103·4	94·3	95·8	91·0	96·6	99·3	106·4	104·1
September	105·9	102·0	103·1	93·5	99·0	91·9	100·4	98·2	108·5	105·1
October	111·8	107·5	103·9	99·0	102·2	93·7	101·9	99·3	113·6	106·9
November	117·2	113·7	105·7	101·5	101·6	94·0	106·0	102·1	121·5	115·7
December	114·5	112·1	106·6*	101·2	-	93·6	106·3*	103·8	126·4	124·5
January	117·4	114·9*	105·0	101·6*	111·2	92·7	105·5	105·9	132·3	128·4
February	117·9*	112·6	101·7	99·5	110·4	90·2	103·9	103·5*	135·6*	128·7*
March	116·6	108·3	103·1	94·9	114·8*	88·5	101·1	107·6	130·9	124·2

- lowest monthly prices
* highest monthly prices

Table 1•14

Producer milk prices and concentrate prices

1964-65 to 1973-74

	1964-65		1965-66		1966-67		1967-68		1968-69	
	Summer price	Winter price	Summer price	Winter price	Summer price	Winter price	Summer price	Winter price	Summer price	Winter price
Compounds (£/ton)	33•24	33•68	34•38	34•42	24•44	33•98	34•57	35•12	36•29	35•94
Feeding barley (£/ton)	19•17	20•50	21•75	20•58	19•67	20•08	21•25	20•00	19•10	20•35
Milk (ppg)	12•52	17•80	14•23	17•55	14•54	18•04	15•00	17•93	14•83	18•24
	1969-70		1970-71		1971-72		1972-73		1973-74	
	Summer price	Winter price	Summer price	Winter price	Summer price	Winter price	Summer price	Winter price	Summer price	Winter price
Compounds (£/ton)	36•40	36•88	38•80	43•92	43•30	40•53	41•43	47•56	56•89	72•18
Feeding barley (£/ton)	19•69	18•93	22•26	29•27	24•20	22•25	26•43	31•61	37•95	54•31
Milk (ppg)	14•62	17•87	15•40	19•69	17•15	21•36	18•25	21•21	19•85	a) 27•82 b) 24•49

(a) After and (b) Before a lump sum price adjustment winter 1973-74.

Table 1·15

Milk price/concentrate price ratios

	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74
Ratios										
Milk : concentrate prices										
i) Summer prices	8·46	9·30	9·44	9·74	9·15	9·14	8·90	8·89	9·86	·7·81
ii) Winter prices	11·87	11·54	11·87	11·42	11·40	10·83	10·05	11·80	10·00	a) 8·64
										b) 7·61
Milk : feeding barley										
i) Summer prices	14·56	14·67	16·52	15·79	17·45	16·61	15·56	15·88	15·47	11·75
ii) Winter prices	19·35	19·08	20·04	20·15	20·04	21·79	15·03	21·58	15·04	a) 11·50
										b) 10·12
Indices of ratios										
Milk : concentrate prices										
i) Summer prices	100	110	112	115	108	108	105	103	117	92
ii) Winter prices	100	97	100	96	96	91	85	99	84	a) 73
										b) 64
Milk : feeding barley										
i) Summer prices	100	101	113	108	120	114	107	109	106	81
ii) Winter prices	100	99	104	104	104	113	78	112	78	a) 59
										b) 52

(a) After and (b) Before a lump sum price adjustment winter 1973-74.

APPENDIX II

Table 2•1 South West summer milk herds

Herds under 40 cows 1970-71 to 1972-73

Returns, costs, margins and physical data

	1970-71	1971-72	1972-73
No. of herds	26	22	15
Per cow (£)			
Returns - milk	130•20	158•36	174•72
- calves	14•25	22•37	33•64
Total	144•45	180•73	208•36
Costs - concentrates	30•22	32•53	35•64
- bulk and grazing	23•61	27•51	31•54
- total feed	53•83	60•04	67•18
- direct labour	25•36	28•78	30•21
- miscellaneous	23•67	28•22	32•20
- herd depreciation	7•86	8•97	9•09
Total	110•72	126•01	138•68
Margin	33•73	54•72	69•68
Margin per forage acre (£)	18•87	31•70	41•80
Size of farm (acres)	108	90	73
Size of herd (cows)	28•3	27•6	26•1
Yield per cow (galls.)	778	838	881
Per cent summer milk	65•9	64•4	63•8
Average milk price (p per gall.)	16•73	18•89	19•84
Direct labour per cow (hrs.)	64	63	56
Fertilisers per acre/grassland (£)	3•08	4•39	5•22
Forage acres per cow	1•79	1•73	1•67
U.S.E. per acre grass (cwt.)	16•6	17•6	18•7
Concentrates and corn per cow (cwt.)	16•76	17•15	17•68
Concentrates and corn per gall. (lb.)	2•41	2•29	2•25
No. of farms feeding:			
Hay only	21	14	9
Silage only	1	1	1
Hay and silage	4	7	5

Table 2·2 South West summer milk herds

Herds of 40 - 59 cows 1970-71 to 1972-73

Returns, costs, margins and physical data

	1970-71	1971-72	1972-73
No. of herds	7	12	10
Per cow (£)			
Returns - milk	143·86	160·96	158·03
- calves	13·12	20·67	31·02
Total	156·98	181·63	189·05
Costs - concentrates	35·46	30·09	35·50
- bulk and grazing	23·88	27·02	28·68
- total feed	59·34	57·11	64·18
- direct labour	23·89	21·30	24·26
- miscellaneous	28·88	32·18	32·47
- herd depreciation	6·58	9·09	11·35
Total	118·69	119·68	132·26
Margin	38·29	61·95	56·79
Margin per forage acre (£)	27·66	43·80	45·54
Size of farm (acres)	98	113	104
Size of herd (cows)	48·1	48·7	49·0
Yield per cow (galls.)	827	845	795
Percent summer milk	61·9	65·1	65·4
Average milk price (p per gall.)	17·40	19·05	19·89
Direct labour per cow (hrs.)	59	45	42
Fertilisers per acre/grassland (£)	4·95	6·57	8·84
Forage acres per cow	1·38	1·41	1·25
U.S.E. per acre grass (cwt.)	21·9	21·3	22·9
Concentrates and corn per cow (cwt.)	19·02	17·01	17·31
Concentrates and corn per gall. (lb).	2·58	2·26	2·44
No. of farms feeding:			
Hay only	4	3	4
Silage only	1	1	1
Hay and silage	2	8	5

Table 2•3 South West summer milk herds

Herds of 60 - 99 cows 1970-71 to 1972-73

Returns, costs, margins and physical data

	1970-71	1971-72	1972-73
No. of herds	5	8	9
Per cow (£)			
Returns - milk	118•97	151•34	177•02
- calves	14•00	22•86	39•11
Total	132•97	174•20	216•13
Costs - concentrates	26•66	28•83	47•21
- bulk and grazing	20•80	25•00	27•04
- total feed	47•46	53•83	74•25
- direct labour	16•92	16•72	18•37
- miscellaneous	24•15	29•53	35•03
- herd depreciation	3•15	7•96	9•19
Total	91•68	108•04	136•84
Margin	41•29	66•16	79•29
Margin per forage acre (£)	31•06	58•79	71•43
Size of farm (acres)	170	115	121
Size of herd (cows)	70•2	71•2	71•7
Yield per cow (galls.)	698	801	889
Per cent summer milk	66•6	68•4	64•4
Average milk price (p per gall.)	17•04	18•89	19•91
Direct labour per cow (hrs.)	42	39	34
Fertilisers per acre/grassland (£)	4•58	8•74	9•59
Forage acres per cow	1•33	1•13	1•11
U.S.E. per acre grass (cwt.)	21•0	24•7	24•8
Concentrates and corn per cow (cwt.)	15•75	16•58	23•91
Concentrates and corn per gall. (lb.)	2•53	2•32	3•01
No. of farms feeding:			
Hay only	3	3	3
Silage only	2	2	2
Hay and silage	-	3	4

Table 2·4 South West summer milk herds*

All herds 1970-71 to 1972-73

Returns, costs, margins and physical data

	1970-71	1971-72	1972-73
No. of herds	38	42	34
Per cow (£)			
Returns - milk	130·66	156·96	170·33
- calves	13·92	21·96	35·11
Total	144·58	178·92	205·44
Costs - concentrates	30·58	30·53	40·49
- bulk and grazing	22·98	26·53	28·72
- total feed	53·56	57·06	69·21
- direct labour	22·93	22·40	23·29
- miscellaneous	25·02	29·96	33·48
- herd depreciation	6·40	8·68	9·86
Total	107·91	118·10	135·84
Margin	36·67	60·82	69·60
Margin per forage acre (£)	23·22	42·57	53·68
Size of farm (acres)	115	101	95
Size of herd (cows)	37·5	42·0	44·9
Yield per cow (galls.)	770	828	857
Per cent summer milk	65·0	65·9	64·5
Average milk price (p per gall.)	16·97	18·95	19·88
Direct labour per cow (hrs.)	58	49	42
Fertilisers per acre/grassland (£)	3·63	5·96	7·78
Forage acres per cow	1·58	1·43	1·30
U.S.E. per acre grass (cwt.)	18·6	20·7	22·2
Concentrates and corn per cow (cwt.)	17·05	16·92	20·20
Concentrates and corn per gall. (lb.)	2·48	2·29	2·64
No. of farms feeding:			
Hay only	28	20	16
Silage only	4	4	4
Hay and silage	6	18	14

* Excludes one herd over 100 cows

Individual results, eight high margin per acre South West summer milk herds 1972-73

The salient features of the summer production systems for the eight high margin herds are summarised below, giving some additional data to those contained in Appendix table 2•1.

Herd No. 1 This herd is on a specialist dairy farm of 77 acres in North Devon which by March 1973 was carrying over 80 cows and some followers, but relying mostly on purchased replacements. The peak calving month is January with 81% of total calvings concentrated in January, February and March, with some in April and May and a few in October and November. A yield of 913 gallons per cow was achieved from a concentrate input of 26•34 cwt., averaging 3•23 lb. per gallon in 1972-73. Feeding policy is dairy cake and a mixture of homegrown corn and protein supplement in winter and cereal nuts and sugar beet nuts, less than 1 lb. per gallon, during summer. The average cost of the ration in 1972-73 was £1•70 per cwt. During winter, the bulk feed was mostly silage with some hay and straw. Stocking rate under three quarters (0•72) of an acre per cow. In relation to the group, returns, costs and margin per cow were comparatively low but because of the very high stocking rate, this, the largest herd in the group, achieved the highest margin per acre at £132•95. Overall concentrate usage was 3•23 lb. per gallon at a cost of 4•9 p with 1260 gallons produced per acre used by the dairy cows.

Herd No. 2 is on a rather smaller farm of 59 acres in mid-Cornwall, carrying over 70 cows and followers with a stocking rate of 0•73 acres per cow. Peak calving is in February with 89% of calvings in the January to April period and a few in May and June. In order to maintain the high stocking rate, heavy use is made of fertilisers and leys are renewed regularly, and hay and straw are purchased. Concentrate feeding at 35•26 cwt. per cow was the highest in the group, but was mainly cereal mix and sugar beet pulp and nuts, with only small quantities fed during May and June. The average cost of the ration was £1•89 per cwt. and was fed at an overall rate of 3•96 lb. per gallon costing 6•7p. Milk production per acre was 1358 gallons. This was the second largest herd in the group on a rather more limited acreage and compared with herd No. 1, it is a relatively high return/high cost system yielding a similar margin per cow and per forage acre.

Herd No. 3 is found on a similar sized farm in East Cornwall on which the dairy herd has gradually been built up to 35 cows beginning with the first calving during May. Calving dates have been advanced and by 1972-73, 83% of calvings occurred during December to March period, with just over 23% in each of the months of December, January and February which makes it one of the two earliest calving herds. It is a high yielding herd with 1147 gallons per cow from an average of 31·5 cows in 1972-73, achieved with a concentrate feed input of 27·33 cwt. per cow, costing £2·14 per cwt. and comprised of approximately 22 cwt. of dairy cake and 5 cwt. of sugar beet pulp. Concentrate feeding is reduced during late April and May. With a stocking rate of 1·05 acres per cow, 1092 gallons of milk were produced per acre with an overall concentrate input of 2·67 lb. per gallon at a cost of 5·1 p. Winter feeding is based on silage. The system on this farm is one of high yields and returns with high costs yielding the highest margin per cow among the group of eight. Because of the rather lighter stocking density the margin per acre is some £10 and £14 per acre lower respectively than for herds 1 and 2. The first three herds in the group set a very high standard in margin per forage acre with good yields per cow, high stocking rates and judicious use of concentrates.

Herd No. 4 From herd number 3 to herd number 4, there is a drop of over £40 per acre in margin, and although the stocking rate of herd number 4 at 1·07 acres per cow is only fractionally less intensive than that of herd number 3, the margin per cow is again some £40 lower, due mainly to the much lower yield of 808 gallons per cow giving the lowest returns among the eight herds. But costs per cow in this herd are the lowest in the group so herd number 4 represents the lowest returns and lowest costs system in the group. Peak calving occurred in January with 39·7% of the calvings and a further 15·5% in December, making this one of the earliest calving herds. Some 80% of calvings were concentrated into the December-March period but with some spread into April, May and June. Concentrate feeding at an average of 16·67 cwt. per cow costing £1·94 per cwt. was mainly a cereal mix using homegrown and purchased corn. The concentrate input averaged 2·31 lb. per gallon at a cost of 3·99 p. Winter feed consisted of purchased hay, homegrown straw and arable and grass silage. Milk produced averaged 753 gallons per acre and the margin per acre was £77·67.

Herd No. 5 This herd is on a small dairy farm of 28 acres in East Devon, but the farmer also farms another holding which is 10 miles distant and is used for sheep and hay production. The dairy herd uses hay from the second farm, an allowance for which is made in the forage acreage allocated to the cows. A spring calving system of the more traditional pattern has been followed for 20

years on this farm, the peak month of calving being March (40•9%) with a further 27•3% in April. All replacements are purchased and the cows are artificially inseminated using Hereford semen. The feeding policy has been sugar beet pulp/ nuts from October, cutting out concentrates after April, but recently a small quantity of grazing nuts has been fed throughout the grazing period to supply magnesium. The herd average of 1170 gallons per cow, the highest in the group, was obtained with a concentrate feed input of 27•30 cwt. per cow at a cost of only £1•60 per cwt. On average 2•61 lb. per gallon were fed at a cost of 3•73 p per gallon. After allowing for the forage acres used in the form of hay from the off farm milk production averaged 785 gallons per acre. The Hereford cross calves averaged £44 per head in 1972-73.

Herd No. 6 comprises the dairy enterprise on a larger mixed farm of 163 acres in North West Devon with corn and sheep enterprises in addition to the dairy herd which averaged 62•7 cows in 1972-73. Some 72% of the calvings were concentrated in February, March and April, the peak month being February, but a further 20% calved during October. A yield of 1015 gallons per cow was obtained in 1972-73 with a concentrate input of 28 cwt., mostly homegrown corn with a protein supplement, at an average cost of £1•82 per cwt. and 5•02 p per gallon, fed at an average rate of 3•09 lb. per gallon. The winter ration consisted of kale and hay and with a stocking rate of 1•63 forage acres per cow, 623 gallons per acre were produced. Good returns were received for calves, the price of which averaged £45 per head.

Herd No. 7 This herd is the main enterprise on a 48 acre farm in West Devon, the acreage of which is supplemented by the purchase of 30 acres of grass keep which is used for conservation as hay and silage. The herd averaged just over 30 cows in 1972-73, 94% of which calved during the January-April period but peaking in February. Average yield was 935 gallons a cow with concentrate input of 16•65 cwt. at a cost of £1•93 per cwt. and 3•43 p a gallon. The overall concentrate feed level was 1•99 lb. per gallon, consisting of 16% protein dairy cake in winter and cereal nuts in summer, fed at just over 1 lb. per gallon. Good returns for calves with an average price of £51 per head contributed to the above average total returns for this herd and with costs lower than the average for the group of eight, margin per cow at £119•25 was above average. After including the purchased grass keep acreage, stocking rate was at 1•69 forage acres per cow yielding 553 gallons per acre which resulted in a margin per forage acre of £70•51.

Herd No. 8 is in South Cornwall on a farm of 100 acres. The farmer is a firm believer in summer milk production and has achieved the tightest calving pattern

in the group with nearly 60% of the cows calving in January, and 32% in February with the balance in March. There is a rigid culling policy based on calving date so that during one month all cows are dry. With an average herd size of 51•1 cows in 1972-73, yield was 972 gallons per cow with a concentrate input of 18•22 cwt. and 2•10 lb. per gallon. The average cost of the ration was £1•97 per cwt. and 3•69 p per gallon of milk produced. No dairy cake is fed after April apart from magnesium cubes during May. The winter feed policy is based on silage and kale with the addition of a small quantity of purchased hay. With a stocking rate of 1•44 forage acres per cow, 675 gallons per acre were produced, yielding a margin of £63•98 per acre.

Table 2·5 Individual results for eight high margin per acre South West summer milk herds 1972-73

Herd number	1	2	3	4	5	6	7	8
Per cow (£)								
Returns - milk	178·96	213·54	244·67	162·60	223·75	203·94	189·87	194·52
- calves	37·87	38·07	44·41	40·82	37·49	55·65	58·34	49·61
Total	216·83	251·61	289·08	203·42	261·24	259·59	248·21	244·13
Costs - concentrates	44·82	66·70	58·48	32·27	43·71	50·99	32·12	35·89
- bulk and grazing	21·74	27·57	27·33	25·31	33·09	29·73	32·77	33·27
- total feed	66·56	94·27	85·81	57·58	76·80	80·72	64·89	69·16
- direct labour	15·43	15·85	32·35	26·44	33·90	20·21	24·76	24·85
- miscellaneous	25·13	37·10	44·00	31·87	30·04	34·21	36·64	44·52
- herd depreciation	13·34	9·76	2·06	4·19	7·10	8·79	2·67	13·41
Total costs	120·46	156·98	164·22	120·08	147·84	143·93	128·96	151·94
Margin	96·37	94·63	124·86	83·34	113·40	115·66	119·25	92·19
Margin per forage acre (£)	132·95	129·02	118·86	77·67	76·09	71·02	70·51	63·98
Size of farm (acres)	77	59	62	84	28	163	48	100
Size of herd (cows)	78·5	70·9	31·5	52·0	25·9	62·7	30·7	51·1
Yield per cow (galls.)	913	996	1147	808	1170	1015	935	972
Per cent summer milk	60·9	68·7	59·2	60·9	71·5	58·5	66·2	67·3
Direct labour per cow (hrs.)	32	26	58	39	88	36	44	41
Fertilisers per acre grassland (£)	10·79	12·24	8·77	8·49	5·45	6·76	3·26	7·59
Forage acres per cow	0·72	0·73	1·05	1·07	1·49	1·63	1·69	1·44
U.S.E. per acre grass (cwt.)	36·0	29·9	30·6	28·9	21·6	17·1	20·8	23·6
Concentrates and corn per cow (cwt.)	26·34	35·26	27·33	16·67	27·30	28·01	16·65	18·22
Concentrates and corn per gall. (lb.)	3·23	3·96	2·67	2·31	2·61	3·09	1·99	2·10
Price per cwt. (£)	1·70	1·89	2·14	1·94	1·60	1·82	1·93	1·97
Concentrate cost per gall. (p)	4·91	6·70	5·10	3·99	3·73	5·02	3·43	3·69
Gallons per acre	1260	1358	1092	753	785	623	553	675
Calving pattern:	%	%	%	%	%	%	%	%
December	-	-	23·3	15·5	4·6	4·3	-	-
January	42·3	15·1	23·4	39·7	4·6	1·4	27·8	58·7
February	29·5	38·4	23·4	24·1	13·6	38·6	33·3	31·8
March	9·0	23·3	13·3	6·9	40·9	21·4	19·4	9·5
April	6·4	12·3	3·3	5·2	27·3	11·5	13·9	-
Total	87·2	89·1	86·7	91·4	91·0	77·2	94·4	100·0

APPENDIX III

Table 3·1 — Trading Account

34 South West summer milk herds 1972-73

Per herd

No.		Value £		No.			Value £	
43·5	Opening valuation	7054	(162·2)*	47·5	Closing valuation		7732	(162·8)
3·6	Purchases	569	(158·1)	6·4	Sales	- cows	702	(109·7)
8·1	Transfers in	1337	(165·1)	25·6		calves	966	(37·7)
45·8	Births			0·6	Transfers out	- cows	81	(135·0)
				17·2		calves	609	(35·4)
	GROSS OUTPUT (cattle)	1133		3·7	Deaths	0·7 cows	3	(4·3)
						3·0 calves	-	
101·0		10093		101·0			10093	
					Gross output brought down		1133	
	GROSS OUTPUT (dairy herd)	8779			Milk sales		7646	
		8779					8779	

Variable costs

Concentrates	1817	Gross output brought down	8779
Bulk feed	317		
Grazing	488		
Veterinary and medicines, consumable stores	425		
GROSS MARGIN	5732		
	8779		8779

Fixed costs

Labour	1045	Gross margin brought down	5732
Rent	270		
Buildings	298		
Other	994		
Management and investment income	3125		
	5732		5732

* Average values in brackets

Table 3•2 Trading account

41 South West milk cost herds 1972-73

Per herd

No.		Value £	No.		Value £
39•5	Opening valuation	6265 (158•6)*	42•9	Closing valuation	6845 (159•6)
1•2	Purchases	234 (195•0)	5•1	Sales - cows	604 (118•4)
8•7	Transfers in	1409 (162•0)	16•9	- calves	618 (36•6)
42•0	Births		0•7	Transfers out - cows	108 (154•3)
			22•4	- calves	964 (43•0)
	GROSS OUTPUT (cattle)	1242	3•4	Deaths 0•7 cows, 2•7 calves	11 (15•7) -
91•4		9150	91•4		9150
				Gross output brought down	1242
	GROSS OUTPUT (dairy herd)	8868		Milk sales	7626
		8868			8868

Variable costs

Concentrates	2143	Gross output brought down	8868
Bulk feed	244		
Grazing	314		
Veterinary and medicines, consumable stores	450		
GROSS MARGIN	5717		
	8868		8868

Fixed costs

Labour	1208	Gross margin brought down	5717
Rent	268		
Buildings	313		
Other	1112		
Management and investment income	2816		
	5717		5717

* Average values in brackets

APPENDIX IV

Accounting methods and definitions

(a) General

Foods

Purchased foods were entered at delivered cost to the farmer. Homegrown bulk foods and grazing were charged at cost of production on each farm but homegrown cereals were charged at average market prices. No allowance was made for residual manurial values.

Direct labour

This refers to labour spent directly on milk production, including, for example, milking and feeding cows, cleaning utensils and sheds, carting foods from stores, moving electric fences and taking churns to collection points. Paid labour was charged at the actual rate paid by the farmer with adjustments for holidays, sick leave, insurance, etc. Unpaid family labour (including any manual work performed by the farmer and his wife) was charged at the rate for corresponding hired labour.

Miscellaneous expenses

Items under this heading include rental of dairy buildings, share of general overheads, dairy equipment depreciation, milking machine depreciation and running costs, consumable stores, recording fees, veterinary and medicines and service fees. Bull costs have been excluded from the costings, all cows having been assumed to be artificially inseminated and the appropriate services charged at current rates.

Herd replacement

This was based on changes between opening and closing herd valuations, sales and purchases of cows and values of homereared heifers transferred in. Cows were valued on the basis of current market values. Purchased cows were entered at cost and homereared heifers at estimated market value, disregarding any special pedigree value.

Returns for milk

In addition to the value of milk sold wholesale, all milk fed to livestock, sold retail or used for farm manufacture was valued at the appropriate monthly and quality price. Milk sold or given as a perquisite to workers and milk used in the farmhouse was valued at rates recognised in the Wages Orders.

Credit for calves

This was the net value of calves sold within a few days of birth plus the estimated market value, within a few days of birth, of calves kept either for rearing or for sale at a later date.

Margin

Margin in this report is management and investment income, i.e. returns less costs, where the labour charge includes all manual labour (paid or unpaid) including that of farmer and wife.

Yield per cow

This figure represents the annual production of each herd (including wholesale, retail, perquisites, milk used in the farmhouse and fed to livestock) divided by the average number of cows in the herd).

Percentage summer milk

This is calculated by expressing the output in the six months April to September as a percentage of the annual output.

Forage acres

These are farm acres devoted to providing fodder crops such as hay, silage, kale, cabbage, mangolds and grazing but not homegrown cereals. The acreage used by the milking herd was calculated on the basis of the yield of crop and quantities fed to the different classes of stock. For hay and grass silage adjustments were made for aftermath grazing. Acres of grazing for the milking herd were calculated by allocating the grazing available for all classes of grazing stock on a livestock unit (cow equivalent) basis.

(b) Crop costs

Labour

The rate per hour for each class of worker (men, women, youths) was calculated by dividing gross weekly wages by the hours worked and raising the resulting figure to cover overtime, holidays, insurance, etc.

Typical figures were:-

	1970-71	1971-72	1972-73
Men	39 p	44 p	55 p per hour
Women	29 p	35 p	42 p per hour
Youths	20 p	24 p	26 p per hour

Wheeled tractors were charged at:-

	1970-71	1971-72	1972-73
30-40 h.p.	26 p	30 p	32½ p per hour
43-48 h.p.	28 p	32 p	34 p per hour
55-65 h.p.	34 p	38 p	40 p per hour

Depreciation of implements and machinery

A charge of 60% of tractor costs was made.

Fertilisers and manures

Artificial fertilisers and lime were charged at cost delivered to the farm, less subsidies. No value was placed on farmyard manure but a charge was made for carting and spreading.

Sundries

These consisted mainly of sprays, baler cord and silage additives.

Rent

Assessed rents for farmhouse, cottages and buildings were deducted from the total rent or rental value of each farm and the remainder divided by the total acreage of crops and grass to obtain a figure for rent per acre.

Hedging and drainage

A charge of 50 p per acre was made to cover these field upkeep costs.

General overheads

A charge of 15% of direct manual labour costs was made to cover general farm expenses.