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THE WEST OF SCOTLAND AGRICULTURAL COLLEGE



CALVES FROM THE HILLS



A Study of Single Suckling Herds in 1969

by

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*With the Compliments of the
College Economist and Staff*

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Further Investigation

In view of the increased interest being shown at present in modern systems of inwintering, the Economics Department of the College propose to extend their investigations of this particular sector of the hill cattle industry. Any farmer who would be interested in co-operating with us is invited to contact this department.

THE WEST OF SCOTLAND AGRICULTURAL COLLEGE

CALVES FROM THE HILLS

A Study of Single Suckling Herds in 1969

J. B. McCreath

INTRODUCTION

The west of Scotland, as seen from afar, probably invokes a vision of a land flowing with milk if not exactly with honey at present. However, the province is also important for beef and sheep production from the hills and uplands. A glance at a topographical map of Scotland explains why it is predominantly an area of store production rather than of finished animals.

Due to the consistent and increasing State support for beef over the last two decades, particularly "beef" from the hills, there has been a spectacular increase in the number of hill cows both nationally and within the province.

This study collates the results of an enquiry covering 43 herds containing over 2,500 cows, all of which were eligible for the full rate of Hill Cattle Subsidy (£17 5/-) and the £5 per head Winter Keep Supplement.

The report is presented in two sections. The first section deals with the factual data from the present enquiry while the second contains some of the wider implications arising therefrom. Although the latter is more a matter of opinion rather than fact, it is based on work carried out here and elsewhere over the past 20 years.

Details of methodology are given in Appendix D but the following points should be stressed at the outset. The method of costing homegrown fodder in an enterprise study can often give rise to debate: whether to use the estimated full cost of production or the variable costs only. In this enquiry both methods have been used. The variable cost or gross margin approach has been confined to Appendix C solely to avoid confusion. The gross margin approach is correct for farm planning especially where a herd is being increased by a few cows. The margin per cow method is more appropriate for between herd comparisons where some herds are on bought hay.

Margin per Cow and Gross Margin per Cow should not be confused with Profit per Cow although the former lies much nearer to it.

A summary of the results of this enquiry is given at the end of Section I (page 21).

Because of differences in costing method, no comparison with results from other centres has been attempted in this report.

THE SAMPLE

For reasons given in the Methodology Appendix, the sample is not random. Advisers in each of the five areas of the College province were requested to provide a sample - as far as possible of equal numbers - of early and more traditional calving herds of single suckling cows in receipt of the full rate of Hill Cattle Subsidy and preferably on hill farms. In all, some 50 farms were suggested. In the end 40 farms with 43 herds completed the records in the detail required for this study. For those farms where there was both an inwintering and outwintering herd, separate records were kept for each. There were three such farms. The location is given in tabular form below.

Table 1

LOCATION OF HERDS

COUNTIES and AREAS	Inwintered	Outwintered	Total
ARGYLL Area	4	5	9
Stirling	1	3	4
West Perth	4	4	8
CENTRAL Area	5	7	12
Dunbarton	1	2	3
Lanark	4	3	7
CLYDE Area	5	5	10
Dumfries	-	3	3
Kirkcudbright	-	2	2
SOUTHERN Area	-	5	5
Ayr	2	3	5
Wigtown	-	2	2
SOUTH-WESTERN Area	2	5	7
TOTAL HERDS	16	27	43
No. of Cows	765	1747	2512

Again, as was found in the pilot study⁽¹⁾ in Argyllshire in 1966, early calving herds of hill cows are not thick on the ground in the west of Scotland. Presumably this fact accounts for the greater number of upland stock rearing farms in this sample; 25 farms carrying 26 herds 12 of which were inwintered.

Further analyses of topics of more local interest at the farm level, e.g. altitude, exposure aspect, etc. are continuing.

The following table gives details on the size of herds in the sample.

Table 2
DISTRIBUTION OF HERDS BY SIZE

Number of Cows in Herd	Number of Herds	
	Inwintered	Outwintered
Under 20	1	1
20 - 29	3	5
30 - 39	2	1
40 - 49	3	4
50 - 59	4	2
60 - 69	-	3
70 - 79	2	4
80 - 89	-	2
90 - 99	-	3
100 and over	1	2
Total	16	27

Average: Inwintered 48 cows
Outwintered 65 cows

Not unexpectedly, as housing is not a limiting factor on those farms where cows can be overwintered outdoors, the average size of herd in this group was greater. Here 59% of the herds had over 50 cows as compared to only 44% of the herds indoors.

(1) McCreath, J.B. Hill Cattle Costings in Argyll.
Statement 124, 1967.

THE WEATHER

The frailty of the human memory is well known and nowhere more so than on weather. Nevertheless, the effect of weather on crop and livestock production is important, particularly in the hill and upland areas.

This summary, drawn from information kindly supplied by the Glasgow Weather Centre, covers a period of some eighteen months.

The technical and financial results of the calf crop sold in October, 1969 could be influenced by the weather conditions prevailing in the spring and summer of 1968. The quantity and quality of hay and silage grown that year and, to a lesser extent, the weather at bulling time are two important factors.

Spring (March to May, 1968)

Temperature: Below average and in some places, particularly the east side of the country, the coldest spring since 1962. Rainfall was above average generally.

Summer (June to August)

On the western coast temperature and sunshine hours were well above average. The general indications are that in the west the securing of adequate fodder crops in 1968 was not difficult.

Autumn (September to November)

Again the western side of the country was more favoured. In many places the autumn of 1968 was the mildest since 1959. This has a direct bearing on the costs in the study as the date of housing and/or start of feeding outdoors was generally later than normal.

Winter (December to February, 1969)

Temperature: Below average everywhere and one of the coldest winters of the decade. This would have a relatively greater affect on those herds overwintered outdoors.

Spring (March to May)

Another adverse factor; the coldest spring in most places since 1962. Several farmers mentioned this and were of the opinion that turning out and/or feeding outside was some two to three weeks later than normal.

Summer (June to August)

In many areas 1969 was the warmest summer of the decade. Calves had the not inconsiderable advantage of "plenty of sun on their backs".

Autumn (September to November)

As the costing period stopped at the time of the suckled calf sales in October, the autumn of 1969 has little bearing on the 1969 calf crop. Generally the weather was about average.

CALVING PATTERNS

As one of the primary aims of the enquiry was to investigate the effect of time of calving on the profitability of hill cows, an examination of calving patterns was the obvious starting point. Several analyses of the data from all 43 herds indicated that grouping based on this factor would not give a meaningful picture. (See Page 7) In the event, the most informative was one based on method of over-wintering of the cows.

Table 3

MONTHLY DISTRIBUTIONS OF CALVINGS

		Inwintered Herds (16)	Outwintered Herds (27)
		<u>%</u>	<u>%</u>
1968	July and August	4	1
	September	6	2
	October	12	3
	November	14	6
	December	15	14
1969	January	13	16
	February	5	14
	March	13	22
	April	12	15
	May and June	6	7
		100%	100%

The meaning of the term "early born calves" varies across the country. An early born calf in one area might be regarded as a late calf in another. The choice of calving pattern is governed by many interdependent factors of which shelter is one of the most important.

The month by month position is rather diffuse for the inwintered herds. Several farmers, whose aim was early calving, mentioned the difficulties of getting cows in calf timeously. There is a tendency for cows to "slip back" over the seasons. By 31st January, 64% of the inwintered cows had calved.

For the outwintered herds, the position is much more clear cut. No less than 81% of calves were born in the period from December to April inclusive, with March the most common month. By 31st January, 42% of the outwintered cows had calved.

It is evident from the table that there is a strong link between date of calving and housing. This is not unexpected on hill and upland farms in the west. This is not to say, of course, that outwintered herds cannot have an early calving pattern. The possession of natural shelter in a glen, for example, may mean that an early drop of calves is perfectly feasible. The following table showing the spread of calving within herds over the winter, illustrates this and other points.

Table 4

CALVINGS WITHIN HERDS AT MONTHLY INTERVALS

A. INWINTERED HERDS

Proportion of Calves Born in Each Herd by:-	Number of Herds			
	31st Dec.	31st Jan.	28th Feb.	31st Mar.
%				
90 - 100	1	5	5	8
80 - 89	2	1	3	2
70 - 79	2	3	1	1
60 - 69	2	1	2	2
50 - 59	1	1	1	1
40 - 49	2	1	-	2
30 - 39	2	-	-	-
Under 30	4	4	4	-
	16	16	16	16

B. OUTWINTERED HERDS

Proportion of Calves Born in Each Herd by:-	Number of Herds			
	31st Dec.	31st Jan.	28th Feb.	31st Mar.
%				
90 - 100	-	-	3	10
80 - 89	-	2	2	5
70 - 79	-	2	3	6
60 - 69	2	3	9	5
50 - 59	3	3	2	1
40 - 49	3	6	5	-
30 - 39	1	4	-	-
Under 30	18	7	3	-
	27	27	27	27

In the housed sample only one herd had all cows calved by 31st December 1968. In fact, all the calves were born in October. The latest calving herd in this group had no calves born before 1st March, 1969.

Two herds in the outwintered sample had 100% calving by the end of February.

In either system a compact and regular calving pattern, although difficult to achieve, has much to offer in uniformity of calves and ease of day-to-day management.

Early Calving and Related Factors

The primary records from all 43 herds, irrespective of method of overwintering, were arranged in descending order of earliness of calving (A) then rearranged in descending order of margin per cow (B). The following table shows the average results for the 11 earliest calving herds alongside the average results achieved by the top 11 herds in terms of margin per cow.

Table 5

AVERAGE RESULTS FOR THE TOP 25% HERDS

By Earliness of Calving (A) and By Margin per Cow (B)

	A	B
Number of Herds	11	11
Number of Herds Housed	7	4
Average Size of Herd	47	54
Proportion Calves by 31st Jan.	88%	50%
Weaning Percentage	88%	92%
Value of Calves Per Cow	£45	£44
Feed Costs Per Cow	£31	£22
Margin Per Cow	£36	£48

This small table illustrates several major points:-

- a) In this sample at least, there was no relationship between earliness of calving and profitability between herds. Only one herd fell in the top 25% in both categories.
- b) Early calving was strongly associated with housing.
- c) Feed costs per cow were 41% higher for the early calving herds.
- d) The value of calves produced (i.e. sold and kept) expressed per cow was slightly higher for the early calvers.
- e) The margin per cow for the earliest calving group was only 75% of that for the most profitable herds.

Whereas seven of the 11 earliest herds were housed, only four (one of the above in column A* plus three others) were in the top 25% in order of margin per cow. The most profitable inwintered herd* - a small sub-herd of 11 cows with a 100% calving by 31st January - came fourth overall. Other housed herds came 7th, 10th and 11th.

Outwintered herds, none of which had particularly early calving patterns, filled the first three berths overall. The most profitable herd in the whole sample had 57% of the cows calved by 31st January. The earliest calving outwintered herd (82%) came 15th overall.

*The same herd.

Prolificacy

The average calving percentage for the 16 housed herds was 92% as compared to 91% for the 27 outwintered herds. Due to the higher death rate in calves in the former group the weaning percentage was 85% as against 86% for the latter. This difference of 1% was not statistically significant. In most instances where a cow lost her calf a replacement calf was purchased. The average price of bought-in calves(3) was £12 per head in the housed group and £16 per head(2) for the outwintered group.

A distribution of herds by weaning percentage is given in Appendix B, Table I.

Of all the major measurable factors affecting profitability of suckled calves, weaning percentage is the most important. For both methods of overwintering, there was a clear relationship between weaning percentage and margin per cow. The correlation coefficient for housed herds was 0.79; for outwintered herds 0.63. (See Figure I, Appendix A).

For the inwintered herds, on average, margin per cow increased by £0.55 for every 1% increase in weaning percentage. For the outwintered herds the equivalent figure was £0.74.

Health Aspects

Cows

From a health aspect the 1968-69 season was comparatively kind. The death rate in cows in this sample was below the average level of that found in other enquiries in the past.

The average death rate for inwintered cows was 2.1%. Two of the inwintered herds lost no cows and - excluding one herd of 29 cows where three (13.8%) died of hypomagnesaemia - the next highest death rate was 3.9%.

In the outwintered herds the average mortality was only 1.2% with a range from zero (4 herds) to 6.9%.

Several herdmasters fed magnesium-enriched nuts throughout the year as an insurance policy against "staggers". Of the 43 herds in the sample one herd had a "brucellosis storm". During the course of the study a further herd had a severe outbreak of brucellosis in season 1969-70. Some other herds were affected to a lesser degree by abortion.

Calves

The death rate in calves - calf deaths as a percentage of calves born - was about the seasonal average. The usual pattern of higher mortality with inwintering was found; 8% as against 5% for outwintered herds.

The inwintered herd with the highest death rate (37%) was unusual in so far as the main reason for this exceptionally high figure was an outbreak of "staggers" in the calves but not in the cows. In fact none of the 29 cows in this herd died.

The distribution of calf mortality by herds is given in Appendix B, Table II.

Choice of Breed

The correct breed or cross for the particular circumstances of the farm is a key factor but choice is a matter for the individual farmer. Also, the number of cows (over 2500) in the enquiry, although adequate for most analytical purposes, was not such that a full analysis of breed structure would have added much to the existing pool of knowledge.

The number and breed of sire and the total number of cows (irrespective of breed or cross) covered may be of interest.

Table 6
POPULARITY OF SIRES

<u>Breed of Bull</u>	Inwintered		Outwintered	
	No.	No. of Cows Sired	No.	No. of Cows Sired
Aberdeen Angus	18	448	12	389
Hereford	7	252	22	704
Galloway	2	47	10	290
Shorthorn*	-	-	12	254
Luing	-	-	3	78
Highland	-	-	1	32
British White	1	18	-	-
	28	765	60	1747

*Beef Shorthorns of various types.

Allowing for sharing between herds, the overall average was 3 bulls for every 100 cows carried.

Before the war and in the immediate post war years a herd of "white faced" calves was a rarity in the west of Scotland. The recent and increasing popularity of the Hereford as a crossing sire is borne out by the table. As expected, with the earlier calving herds indoors - and mostly on upland rather than hill farms - the Aberdeen Angus was the predominant sire.

On the dam side, apart from pure bred cows being kept for herd replacement purposes, the most commonly occurring cross cow was the Blue Grey, either the White Shorthorn X Galloway or Irish.

MARKETING

Method of Sale

This is most easily handled in tabular form.

Table 7

ANALYSIS OF NUMBER OF CALVES SOLD

Method of Sale	Inwintered		Outwintered		Combined Total	
	Steers	Heifers	Steers	Heifers		
<u>By Auction at:-</u>						
Oban	39	17	73	54	183	
Stirling	87	88	107	100	382	
Lanark	17	19	19	18	73	
Newton Stewart	-	-	127	99	226	
Castle Douglas	-	-	41	46	87	
Newcastleton	-	-	42	39	81	
Other Markets	50	58	136	98	342	
Sub Total	193	182	545	454	1374	88%
<u>Private Treaty</u>	12	12	27	3	54	3%
<u>Transfer</u>	-	-	70	66	136	9%
TOTAL CALVES	205	194	642	523	1564	100%

The evidence from this sample confirms that sale by auction is still by far the most common method of disposal of weaned calves on the western mainland of Scotland. No calves were sold through buying groups; nor is this class of livestock popular with dealers. Approximately one-tenth of the calves were transferred to other farms in the same ownership for future selling either as stores or fat cattle.

Average Realised Prices

The following table summarises the average gross prices realised by calves, irrespective of the method of overwintering of their dams, at certain main markets. The averages in this table are weighted i.e. total money-realised divided by total calves sold.

Table 8

AVERAGE PRICE PER HEAD AT CERTAIN MARKETS IN 1969

Market	Steers		Heifers	
	Sample	Market(1)	Sample	Market(1)
	£	£	£	£
Oban	52.05	42.88	36.97	41.85
Stirling	50.66	N.A.	37.87	N.A.
Lanark	48.94	N.A.	41.92	N.A.
Newton Stewart	51.63	53.59	43.56	43.08
Castle Douglas	50.27	N.A.	37.93	N.A.
Newcastleton	43.45(2)	45.57	62.23(2)	51.48

(1) Source: D.A.F.S.

(2) Blue Grey calves.

The combined average for steers and heifers was available for Stirling, the centre which handled the greatest single number of calves from the farms in this study. The market average was £47.90 per head; the sample average was £44.36.

Inter-market comparisons should not be drawn for sample calves due to the small volume of calves concerned. All that can be said from Tables 7 and 8 is that calves in this enquiry did not on average fetch higher prices than calves from other farms in the west of Scotland.

The overall average for 847 steer calves in the sample was £49.32 compared to the Scottish average for 1969 of £49.44; for the 717 heifer calves sold the average price was £42.49 as against £44.25 nationally.

Table VII in Appendix B gives further details on calf sales.

Price Per Unit of Weight

Calf weights at weaning and associated prices were available from five inwintered and eight outwintered herds. As, however, the number of weighed calves sold was relatively small in the former group, no distinction is made by method of overwintering in the next table.

Table 9

AVERAGE WEIGHT AND PRICE OF CALVES SOLD

	No. of Calves	Average Weight	Average Price		
			Per head	Per cwt.	Per lb.*
Steers	132	4.20 cwt.	£46.83	£9.80	1/9d
Heifers	98	4.62 cwt.	£42.92	£9.33	1/8d

Again averages are weighted. The range in batch price for steer calves was from £7.47 to £12.60 per cwt., the equivalent figures for heifers were £7.00 to £14.23.

As a matter of interest to co-operators the average prices per cwt. and per lb. for each method of wintering were as follows:-

	<u>In</u>	<u>Out</u>
Steers	£9.57 (1/8½d)	£9.80 per cwt. (1/9d)
Heifers	£9.10 (1/7½d)	£9.33 " " (1/8d)

Here, as in the following sub-section dealing with liveweight gain, calves born in September, 1968 or earlier were excluded.

*Metric Equivalentents

Price per kilogramme

Steers 3/10d or 19 new pence
Heifers 3/8d or 18 new pence

LIVEWEIGHT GAIN DATA

The month of birth of all home bred calves was recorded for all herds. As, however, the actual date of birth was not available in every case, the 15th of each month has been taken as the base line. The liveweight at birth was estimated at 65 lb. irrespective of breed or cross. Calves born in September 1968 or earlier were excluded on the grounds that they were at least yearling stores although sold at the special weaned calf sales in October 1969.

Calves from 15 herds were weighed on the farm and calves from a further five herds were weighed at market. In the latter case an addition of 20 lb. per head was made to allow for loss of weight in transit and to bring the results into line with those weighed at home on the College weighbridge. The difference in days between the earliest and latest weighing was such that no correction factor was necessary.

Table 10

AVERAGE LIVEWEIGHT GAIN PER DAY (lb)

	Steer Calves		Heifer Calves	
	No.	L.W.G./D*	No.	L.W.G./D*
Inwintered	119	1.8	110	1.7
Outwintered	156	1.9	162	1.7
Combined Total	275	1.9	272	1.7

The overall average liveweight gain for 547 calves was 1.8 lb. per day.

The herd ranges for all calves weighed in each group were as follows:-

		<u>L.W.G./D</u>
Inwintered :	Steers	1.4 to 2.0
Outwintered:	Steers	1.5 to 2.3
Inwintered :	Heifers	1.5 to 2.0
Outwintered:	Heifers	1.4 to 2.0

The within-herd range in batches of calves by month of birth was even wider.

For those herds where the actual date of birth was known, further analysis of liveweight gain is continuing.

*Metric Equivalents

Kilogrammes per day

Inwintered : Steers 0.82 Heifers 0.77
 Outwintered: Steers 0.86 Heifers 0.77

Price and Value of Calves

The following table summarises the position for the inwintered and outwintered samples.

Table 11

NUMBER, PRICES AND VALUE OF CALVES

Herd Averages

		Calves Sold		Calves Retained	
		Number	Gross Price/ Head	Number	Value/ Head
I N	Steers	13	£52	9	£36
	Heifers	12	£43	9	£36
	Combined	25	£48	18	-
O U T	Steers	24	£47	6	£38
	Heifers	19	£41	9	£38
	Combined	43	£45	15	-

As expected, the calves sold from inwintered herds realised higher average prices; £5 per head more for steers and £2 per head for heifers. This smaller price difference for heifers is partly due to the high price realised by Blue Grey heifers from two outwintering farms. The calves were sold at Newcastleton, the only centre in the country where the market average for heifer calves exceeds that for steers.

The inwintering sample retained a higher proportion of calves (18 ex 43 or 42%) as compared to 26% for the outwintering sample. In previous studies this retention differential, particularly in the absence of weight data, could raise problems. (See Appendix D).

The above averages are unweighted. Full details of calves sold are given earlier in the marketing section and in Table VII, Appendix B.

FEED

A wide variety of feeds was used on both the inwintering and outwintering farms. It is comparatively easy to ascertain the quantity of concentrates fed. In the following table these have been divided into cereals (starch feed) and proprietary compounds and protein concentrates.

Hay and silage were the predominant fodders, with some farmers feeding both. All 43 herds received one and/or the other. On seven farms sheaf oats were also fed and 11 herds received some straw. Draff was used on four farms. In all cases fodders were converted to a hay equivalent basis, e.g. 3 tons of silage = 1 tons of hay; straw, $1\frac{1}{2} = 1$; draff, $2\frac{1}{2} = 1$. Sheaf oats were taken as being directly equivalent to hay. This allows a reasonable comparison of fodder intake, particularly in terms of dry matter.

The difficulty of combining the concentrate and fodder constituents of the ration still remains. To overcome this problem, for comparative purposes only, the College Animal Husbandry Department suggested that the hay equivalent be halved and added to the actual concentrates. This method indicates, however, imprecisely, the total intake of feed of all herds expressed on a common basis, viz. Concentrate Equivalent.

Bull and calf feed are included in the per cow figures.

Table 12
AVERAGE QUANTITIES OF FEED CONSUMED
CWT. PER COW

		Top 25%	Middle 50%	Bottom 25%	All Herds	(1) Lowest Highest	
I N W I N T E R E D	No. of Herds	4	8	4	16	1	1
	<u>Concentrates</u>						
	Cereal (inc. Beet Pulp)	2.3	2.4	2.6	2.4	-	5.9
	Compounds and Protein	3.5	2.6	2.0	2.7	6.6	1.6
	Total Concentrates	5.8	5.0	4.6	5.1	6.6	7.5
	<u>Fodder (Hay Equivalent)</u>	25.4	39.2	37.1	35.2	20.4	44.4
	<u>Concentrate Equivalent(2)</u>	18.5	24.6	23.1	<u>22.7</u>	16.8	29.7
O U T W I N T E R E D	No. of Herds	7	13	7	27	1	1
	<u>Concentrates</u>						
	Cereal (inc. Beet Pulp)	0.9	0.5	0.2	0.6	-	4.5
	Compounds and Protein	4.3	4.1	6.8	4.8	2.3	5.4
	Total Concentrates	5.2	4.6	7.0	5.4	2.3	9.9
	<u>Fodder (Hay Equivalent)</u>	22.4	27.4	24.4	25.3	18.2	39.7
	<u>Concentrate Equivalent</u>	16.4	18.3	19.2	<u>18.1</u>	11.4	29.8

(1) In terms of Concentrate Equivalent

(2) Concentrate Equivalent = Total Concentrates + 50% of Fodder.

Although in both samples the top 25% herds in order of margin per cow had the lowest average feed consumption per cow, too much should not be read into the differences between groups because of the small number of herds involved. The overall average difference of 4.6 cwt. in favour of the outwintered herd is not insignificant however!

Perhaps the most striking point in the table is the wide variation in feed consumption, particularly of fodder, between herds. In both samples the highest individual herd average was more than double that of the lowest in terms of hay equivalent.

Feed Costs Per Cow

As feed is by far the largest single item of expenditure in running a herd, efficiency of feeding plays a key role in profitable calf production.

Table 13
AVERAGE FEED COSTS EXPRESSED PER COW

	Inwintered	Outwintered
Top 25%	£24	£21
Middle 50%	£31	£24
Bottom 25%	£29	£27
All Herds	£29	£24
Lowest	£21	£15
Highest	£37	£39

A statistically significant difference (£5 per cow) was found between the averages of the inwintered and outwintered samples.

The wide variation in levels of feed costs per cow between herds has been a recurring theme in previous investigations carried out by this department(1) and in studies from other centres(2).

Distribution tables of quantity and cost of feed are given in Tables III and IV (Appendix B).

Figure II (Appendix A) shows the broad relationship between feed costs and margin per cow.

With the outwintered sample the negative coefficient of correlation between feed per cow and margin per cow was significant. There was in general a decrease of £9.2 in margin for every increase in feed costs of £10.

On the other hand, the inwintered herds showed very little correlation but the evidence suggests that a decrease of £4.6 in margin was associated with each increase of £10 in feed costs. Apart from size, the heterogeneous nature of the sample may account for the less conclusive relationship.

- (1) Roberts, C.W. Hill Cattle in 1951-53. Report No. 14, 1954
McIntosh, F. & Macpherson, J.F. Hill Cattle Costings, 1960 Calf Crop. Statement 46, 1961
McCreath, J.B. Hill Cattle Costings in Argyll. 1966 Calf Crop. Statement 124, 1967

- (2) The Beef Recording Association. Suckler Beef Production. Technical Report No. 10.

Value of Calves Produced in Relation to Feed

Had all the calves in the sample been weighed, it would have been possible to measure in physical terms the relationship between feed consumption (including supplementary feed to calves but excluding grass) and calf production in terms of weight. The following table, based on financial terms, is put forward as a feasible alternative. Although some may question the use of concentrate equivalent as a common denominator, it is valid for comparative purposes.

Table 14

VALUE OF CALVES PRODUCED⁽¹⁾

In Relation to Feed

In Order of Margin/Cow	Per Ton of Concentrate Equivalent		Per £ of Concentrate Equivalent	
	In.	Out.	In.	Out.
Top 25%	£47	£54	£1.9	£2.1
Middle 50%	£33	£44	£1.4	£1.7
Bottom 25%	£31	£32	£1.2	£1.1
Average	£35	£43	£1.4	£1.7
Best Herd	£60	£69	£2.2	£2.6
Worst Herd	£27	£29	£1.1	£1.0

(1) i.e. Sold and kept.

In this sample of hill and upland stock farms where the majority of the herds are summered on the hill, the absence of grazing data is of little moment. The method might be less suitable for beef herds on intensively managed lowground farms where calves gain a higher proportion of their weight from top dressed pastures. Despite the built-in bias in favour of the inwintered and earlier calving herds - and hence a higher proportion of their feed coming directly from grass - the outwintered herds had better performances.

At the all herd average level, for every £10 of feed per cow the outwintered herd produced £17 worth of calf as compared to £14 for the inwintered herd.

Supplementary Feeding of Calves

Purchased concentrates were fed to some calves in 12 of the 16 inwintered herds. The average weight per calf fed was 1.1 cwt. The highest individual herd figure was 2.5 cwt. Five farmers also fed a little hay in addition.

The equivalent figures for the outwintered group were 17 ex 27 herds; 0.8 cwt. and 2.2 cwt. per calf respectively. Only in two herds did calves receive hay (negligible amounts).

An examination of individual herds revealed no clear linkage between supplementary feeding and calf price in either group.

Other Direct Costs per Cow

The following summarises these direct costs in tabular form.

	Costs per Cow (£)					
	Vet. Med. etc.		Haulage		Bedding	Total Av.
	Av.	Range	Av.	Range	Av. , Range	
Inwintered	1.30	0 -3.13	0.29	0 -0.71	1.80 0.25-7.30	3.39
Outwintered	1.09	0.19-2.97	0.35	0.11-0.50	0.11 Not Applic.	1.55

There was no marked difference in veterinary expenses between the two methods of over-wintering. Naturally, the inwintered herds had higher bedding costs per cow. A distribution table is given in Table V Appendix B.

Herd Depreciation per Cow

It is appreciated that a one year enquiry cannot determine precisely the rate of depreciation over the lifetime of individual cows. Chance events such as a heavy death rate in cows can give an inflated figure for that particular season. Conversely, a very good season with no mortality and no purchases or sales, can give a zero depreciation. Efforts were made to counteract the latter. (See Appendix D).

COW DEPRECIATION

	<u>Inwintered</u>	<u>Outwintered</u>
Average per Cow	£ 4.42	£4.26
Lowest Herd	£ 2.00	£1.12
Highest Herd	£11.20*	£7.62*
*Death Rate in Cows	14%	7%

For the inwintered herds the weighted average price of purchased in-calf heifers was £98, with a range of £75 to £125 per head. Cast cows sold averaged £55 per head with a range of £30 to £73 (in calf).

The equivalent figures for outwintered herds were £88 and £67 to £125 for in-calf heifers; £48 and £19 to £87 (fat) for cast cows.

Share of bull depreciation for the 1968-69 season averaged £0.97 per cow for the inwintered herds and £1.15 for the outwintered. The number of cows served in the whole sample by A.I. was negligible.

FINANCIAL RESULTS

The interaction of the various technical and economic factors discussed earlier resulted in the following financial outcome down to the margin per cow stage. Readers with a specialised interest in the economics of suckled calf production should consult Appendix D. In this and other tables in Section I homegrown hay and silage has been costed uniformly throughout at £12 and £4 per ton respectively.

Table 15

A FINANCIAL SUMMARY OF HERD AVERAGES

1969 Calf Crop

	Expressed in £'s per Cow	
	Inwintered	Outwintered
Value of Calf (sold & retained)	40.17	38.83
Subsidy Revenue:		
Hill Cattle*	21.98	21.95
Calf	<u>9.26</u>	<u>9.12</u>
Total Cattle Revenue	71.41	69.90
<u>Less</u> Herd Depreciation	5.39	5.41
Replacement Calves Bought	<u>0.76</u>	<u>0.49</u>
OUTPUT	65.26	64.00
<u>Less</u> Total Feed	28.58	24.07
Vet. Medicines etc.	1.30	1.09
Haulage	0.29	0.35
Bedding	<u>1.80</u>	<u>0.11</u>
	<u>31.97</u>	<u>25.62</u>
MARGIN	£33.29	£38.38
Range in Margin per Cow	£17.08 to £49.09	£19.85 to £56.63

*Including Winter Keep Supplement

Bearing in mind the fact that there was no significant difference in the average weaning percentage, the extra margin of £5 per cow in favour of the outwintered herd can be accounted for in one sentence. In round terms the £1 less of output, due mainly to lower prices for calves sold, was more than compensated for by lower costs of £6 per cow, of which feed accounted for £4 10/-. Bedding was the only other cost item which was appreciably different between the inwintered and outwintered samples.

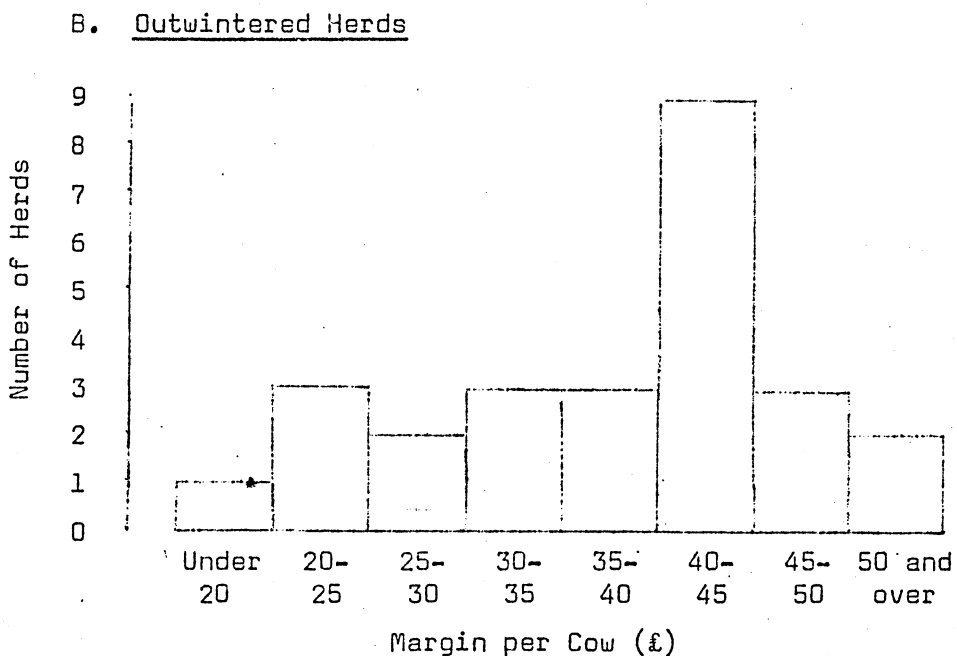
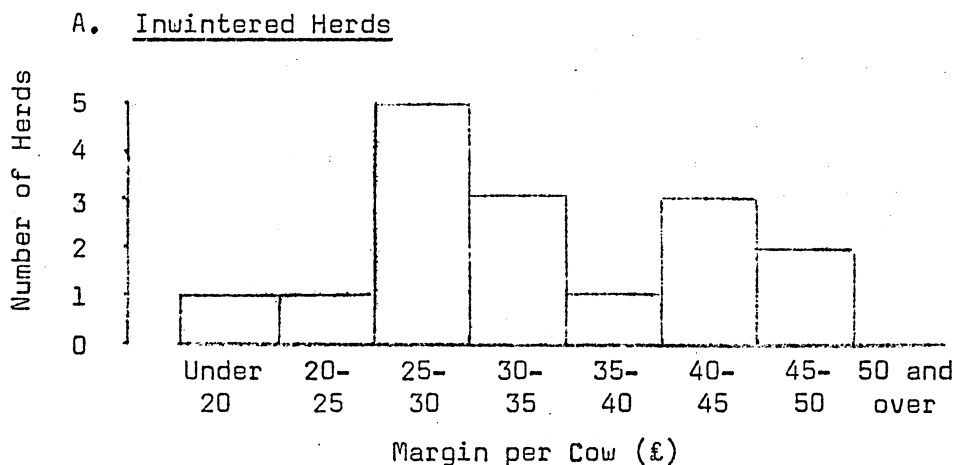
In both, total subsidy revenue was virtually identical at £31 per cow. For the housed herds, this made up approximately 94% of the margin; 82% for the outwintered.

Grazing costs are not included. It was impossible to establish these costs accurately for all farms. It can be deduced, however, that inclusion of grazing costs would reduce the margin per cow more in the inwintering sample.

Figure 1 shows the distribution of herds by margin per cow.

Figure 1

DISTRIBUTION OF HERDS BY MARGIN PER COW



Note: Where the margin per cow coincided with the division between two classes, it was included in the upper class e.g. Margin per Cow = £30 was included in class £30-£35.

The average margin per cow in the inwintered sample was £33 compared to £38 in the outwintered sample. The average over all 43 herds was £36 10/- per cow.

For the herds indoors the range in average margin per cow was from £17 to £49 and half the herds in this sample had margins between £25 and £35 per cow.

For the cows wintered outside the range was from £20 to £57 per cow. Here, a third of the 27 herds lay in the modal group £40 to £45 per cow and more than half of this sample had average margins per cow of over £40.

Average Performance Figures Within Groups

The following table is given mainly for the interest of co-operating farmers. Although these intra-group figures must be interpreted with caution, the same broad pattern emerges.

The most profitable herds in both samples in terms of margin per cow had above average weaning percentages, the calves fetched higher prices and the feed costs per cow were below average.

Table 16

SOME INTRA-GROUP AVERAGES

In order of Margin per Cow		Top 25%	Middle 50%	Bottom 25%	All Herds
I N W I N T E R E D	No. of Herds	4	8	4	16
	No. of Cows	33	54	51	48
	Weaning Percentage	97%	85%	74%	85%
	Steer Calf Price	£56	£54	£48	£52
	Heifer Calf Price	£47	£44	£38	£43
	Feed Costs per Cow	£24	£31	£29	£29
Margin per Cow	£45	£32	£23	£33	
O U T W I N T E R E D	No. of Herds	7	13	7	27
	No. of Cows	66	71	50	65
	Weaning Percentage	89%	91%	75%	86%
	Steer Calf Price	£51	£48	£42	£47
	Heifer Calf Price	£48	£38	£39	£41
	Feed Costs per Cow	£21	£24	£27	£24
Margin per Cow	£49	£39	£26	£38	

Low profitability was associated with lower than average calf crops, lower prices for calves sold and average or above average feed costs per cow.

Perhaps the most disturbing aspect of the difference of £5 in margin per cow is that labour, tractor and housing costs, if any, have not been charged. The implications, particularly for the inwintered herds, are examined in Section II.

SUMMARY

The report collates the results from 43 herds on 40 hill and upland farms in the west of Scotland in the 1968-69 season. All cows (over 2,500) were single suckling and were eligible for the full rate of Hill Cattle Subsidy.

The sample was not random. It was chosen in the expectation of approximately equal numbers of early and more traditional calving herds. On analysis by calving dates, this hope was not realised. There would appear to be relatively few early calving herds in the west of Scotland.

There was no clear relationship between earliness of calving and profitability. Consequently, the sample was divided into two groups based on the method of overwintering.

Early calving was associated with inwintering.

Both groups had the same weaning percentage.

Calf mortality was slightly higher in the housed herds.

Calves from inwintered herds made higher prices.

A higher proportion of calves were retained in the inwintering group.

The inwintered herds had significantly higher feed costs.

In both groups there was a very wide range in feed costs between herds.

The average margin per cow for the inwintered herds was £5 lower than that for the outwintered, mainly due to higher feed costs.

Calf weights were available from 20 herds. The average liveweight gain was 1.8 lb. per day.

The average price realised per cwt. was £9 16/- for steers and £9 7/- for heifers.

The most profitable herds in both samples in terms of margin per cow had above average weaning percentages, the calves fetched higher prices and the feed costs per cow were below average.

SECTION II

SOME WIDER ASPECTS

This section deals with some of the wider aspects arising from the present study and indicates some of the possible implications, beyond the farm gate, for producers of suckled calves from the hills and uplands.

Labour and Tractor Costs (See Appendix D)

In past enquiries the cost of labour per cow has always been higher for inwintered herds and the difference in cost between the two systems of overwintering has been increasing with the upward movement of wages over time. In 1953 the gap was approximately £2 10/- per cow; in 1960, £2 15/- per cow and in 1966, £3 10/-.

Against this, outwintered herds generally have had higher tractor costs due to hauling feed but tractor costs per hour have not risen so steeply as wage rates.

In this 1968-69 investigation the position was as follows:-

<u>Herd Averages per Cow</u>	<u>Inwintered</u>		<u>Outwintered</u>	
	<u>Hours</u>	<u>Cost</u>	<u>Hours</u>	<u>Cost</u>
Labour	20	£8.0	12	£4.8
Tractor	2.0	<u>0.5</u>	5.5	<u>1.4</u>
Total Cost		<u>£8.5</u>		<u>£6.2</u>

A distribution table on number of hours is given in Table VI of Appendix B. Labour, including the farmer, was charged at 8/- per hour; tractors, land rovers or vans at 5/- per hour.

The average herd size in each sample was very similar to those in the 1966 pilot study. As wage rates have risen steeply in the interval, there would appear to have been an increase in efficiency of labour use for the gap between the two groups in 1969 was £3 4/- per cow.

Share of Building Costs

Seven of the 16 inwintered herds were in unconverted byres, six in loose housing and the remainder in cubicles.

The variation in building costs can be extremely wide, ranging from the second-hand wooden shed erected by farm staff to the portal frame cubicle set-up built by a contractor.

On the evidence available the average cost of loose housing net of grant, was around £40 per cow or spread over ten years, £4 per annum. This does not include silage pit etc. but for comparative purposes this is not vital as some outwintering farms also had silage systems.

The combined effect of labour, tractor and building costs markedly widens the gap in profitability between the two methods of overwintering.

<u>Per Cow</u>	<u>In.</u>	<u>Out.</u>
Margin (as defined)	£33	£38
<u>Less</u> Labour & Tractor Costs	8	6
Building Costs (share)	<u>4</u>	<u>-</u>
Adjusted Margin	<u>£21</u>	<u>£32</u>

It is appreciated that on certain farms the climate is too severe or the tendency for the soil to poach is such that outwintering is ruled out. It is not implied that in this situation hill cattle do not pay. On the contrary, without a herd of cows many of the smaller units would have gone out of business.

The main point being made is that Margin is not Profit. To arrive at this figure a share of the general farm overheads and other fixed costs would have to be deducted from the adjusted margin. This can only be meaningful at the individual farm level. A general average over a sample of farms, with varying ratios of sheep to cattle would be only of academic interest.

The Importance of Hill Cattle

The next table summarises the spectacular increase in size of the national beef herd and the relative importance of the west of Scotland's contribution.

Table 17

CHANGES IN BEEF COW NUMBERS OVER TIME

000's

	<u>Scotland</u>			<u>West of Scotland</u>		
	<u>1951</u>	<u>1961</u>	<u>1969*</u>	<u>1951</u>	<u>1961</u>	<u>1969*</u>
Hill Cows	106	217	357	25	60	132
Other Beef Cows	<u>49</u>	<u>74</u>	<u>41</u>	<u>6</u>	<u>11</u>	<u>17</u>
Total Beef Cows	<u>155</u>	<u>291</u>	<u>398</u>	<u>31</u>	<u>71</u>	<u>149</u>

Source D.A.F.S.

*Provisional

In Scotland in the ten years from 1951 to 1961 the rate of increase in hill cows was double that of other beef cows. Over the same period the west of Scotland province, including West Perthshire, experienced a faster rate of increase in hill cows than for the country as a whole.

In the later period the increase continued but at a slower rate at both the national and provincial level. For the first time the west of Scotland contains more than one-third of the national hill herd.

Level of Subsidy Support

There can be no question but that Exchequer support in the form of the Hill Cattle and Calf Subsidy Schemes, has played the major role. The rates of Hill Cattle Subsidy per cow over the past ten years were as follows:-

1961	£12	1966	£13
1962	£12	1967	£14-5
1963	£12	1968	£16-5
1964	£12	1969	£17-5
1965	£13	1970	£18-15

Between 1951 (£7) and the present day this subsidy has risen by 168%.

In Section I all costs and revenue were expressed in terms of per cow. It may be of interest perhaps to express the same data in terms of per calf produced, as the calf is the ultimate aim of the production process as seen from the national standpoint.

Because every cow does not produce a calf, the conversion raises both costs and output per unit. The average result for all 43 herds was:-

Calf Revenue	£43
Subsidy Revenue	<u>34</u>
Total Revenue	77
<u>Less</u> Herd Depreciation	<u>6</u>
OUTPUT	71
<u>Less</u> Direct Costs	<u>30</u>
MARGIN PER CALF	<u>£41</u>

Subsidies contributed 44% of total revenue and 83% of margin per calf. A similar calculation for the top and bottom 25% - in order of margin per cow - illustrated the relative strength or weakness to withstand any shading of subsidy support in the absence of a compensatory rise in calf prices.

If there were to be any marked decrease in the rate of the subsidisation, the number of hill cows would sharply decline, other things remaining equal. But in the real world they seldom do! A contraction in the supply side with even static demand would tend to raise prices. It is difficult to see, however, an increase in the calf price sufficient to compensate for the complete withdrawal of subsidy support.

In closing, it should be remembered that factors such as breed, method of wintering, date of calving, level of feeding and stage of selling are to some degree interlinked. The optimum solution lies in getting the right blend! Whatever the system, stockmanship is the critical factor.

Figure I

RELATIONSHIP BETWEEN WEANING PERCENTAGE AND MARGIN PER COW

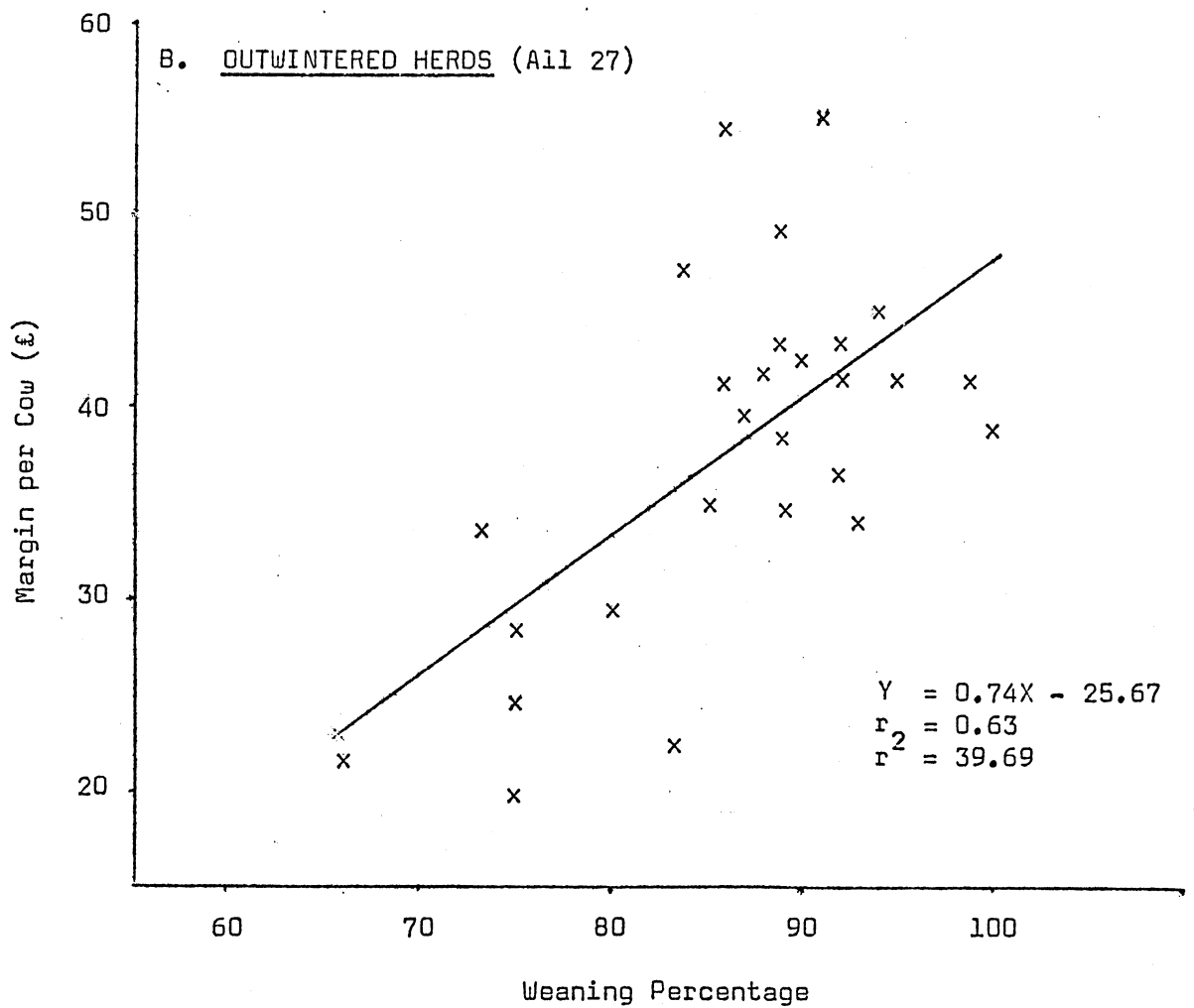
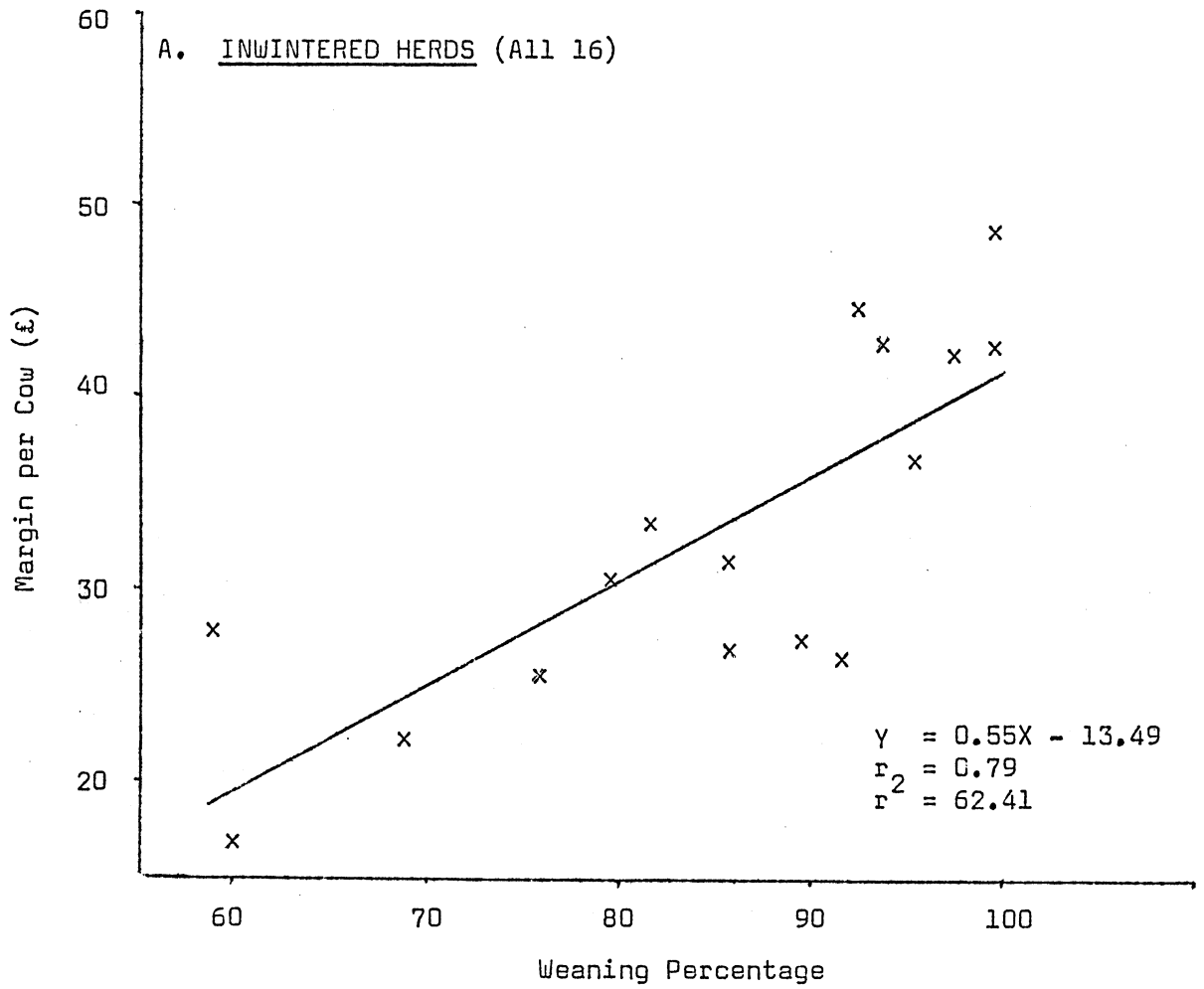


Figure II

RELATIONSHIP BETWEEN FEED COST PER COW AND MARGIN PER COW

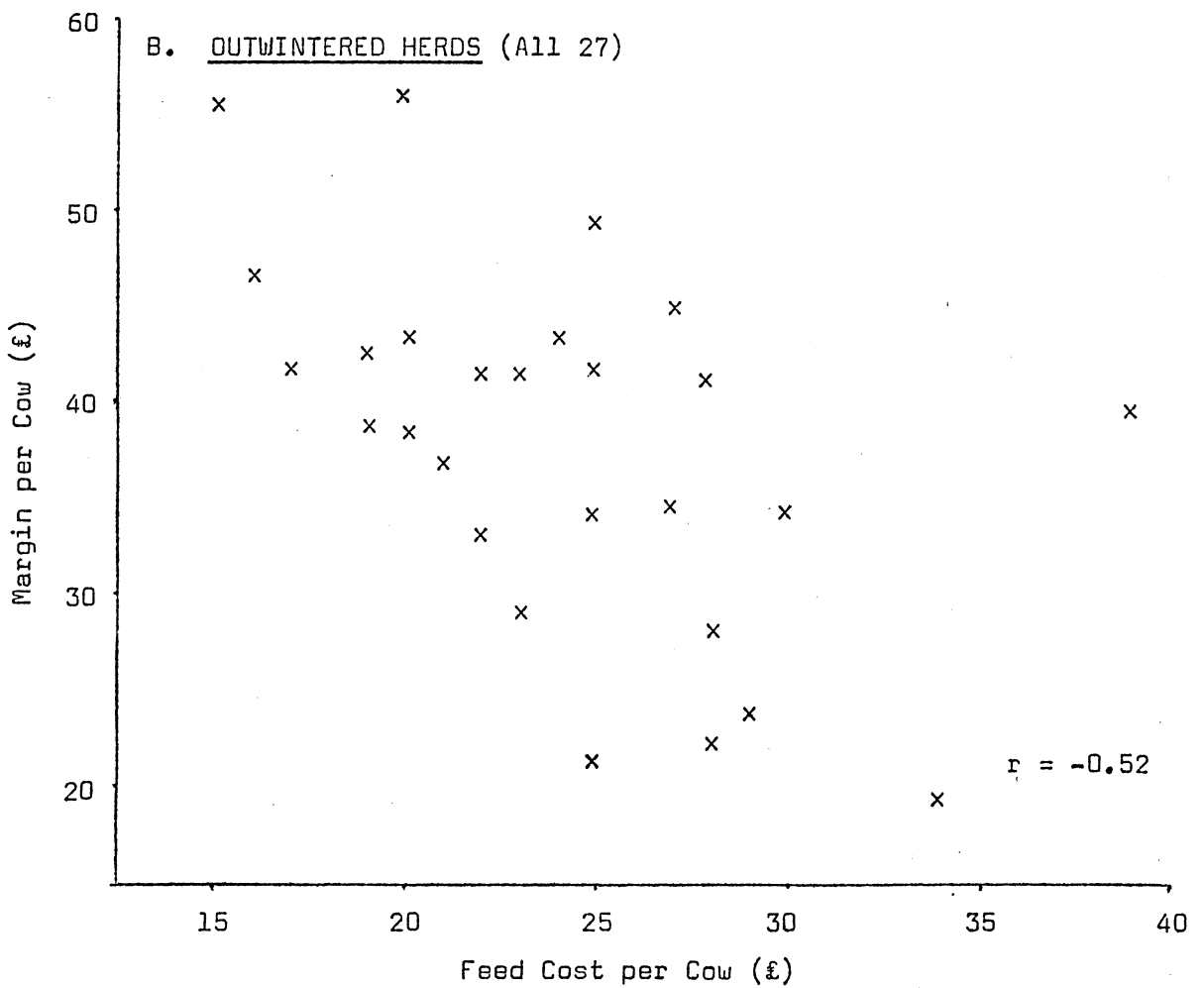
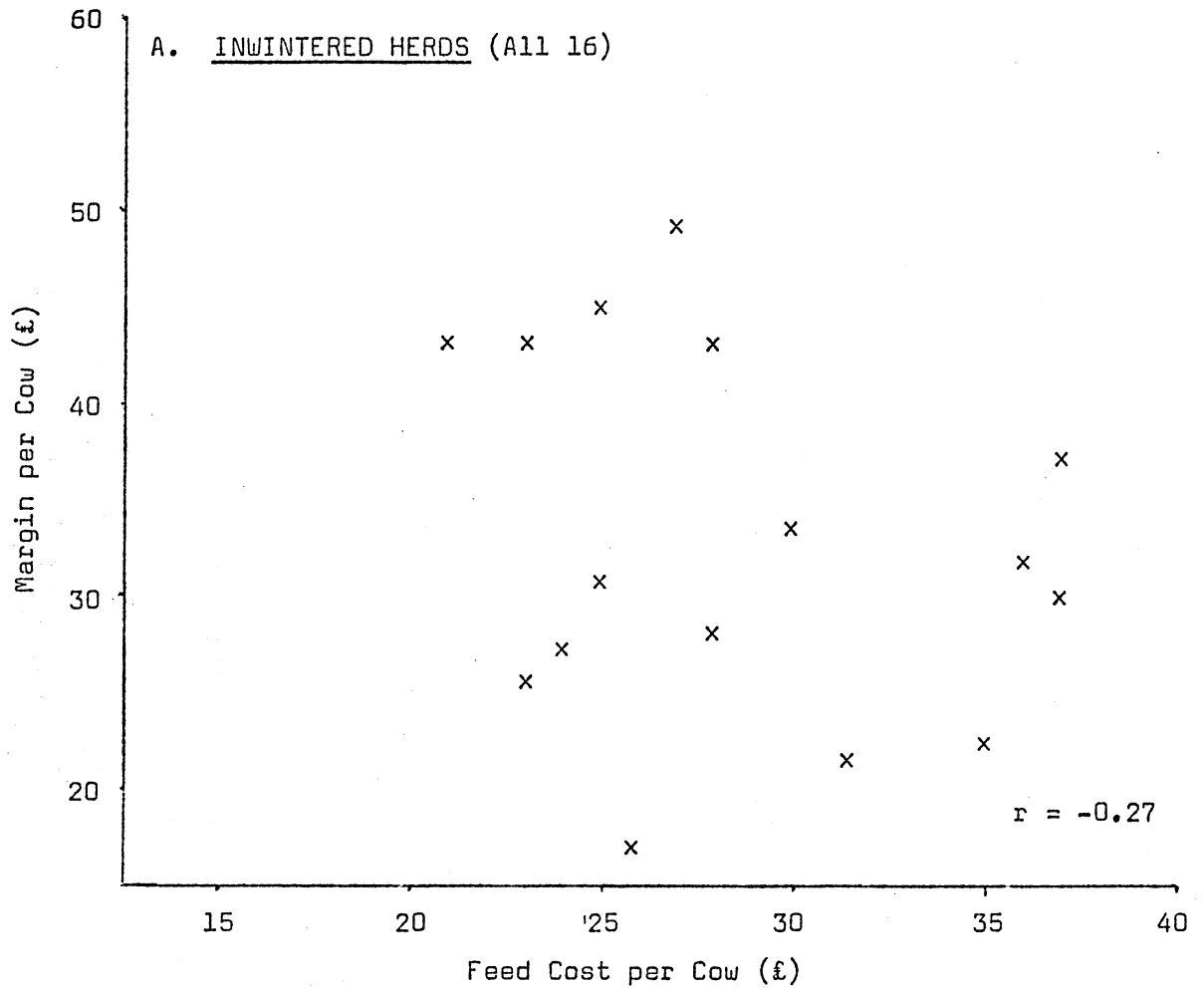


TABLE I
DISTRIBUTION OF HERDS BY WEANING PERCENTAGE

Weaning Percentage	Number of Herds	
	Inwintered	Outwintered
100%	2	1
95 - 99%	2	2
90 - 94%	4	7
85 - 89%	2	9
80 - 84%	2	3
75 - 79%	1	3
70 - 74%	-	1
Under 70%	3	1
Total	16	27

Average: Inwintered 85%
 Outwintered 87%

Lowest: Inwintered 59%
 Outwintered 66%

TABLE II
DISTRIBUTION OF CALF MORTALITY

Death Rate percentage	Number of Herds	
	Inwintered	Outwintered
Under 1%	2	4
1 - 3%	4	6
3 - 5%	4	6
5 - 7%	1	4
7 - 9%	-	1
9 - 11%	1	3
11 - 13%	1	3
13% and Over	3	-
Total	16	27

Average 8% 5%
Range 0% - 37% 0% - 12%

TABLE III
DISTRIBUTION OF HERDS BY FEED COST PER COW

Feed Costs £ per cow	Number of Herds	
	Inwintered	Outwintered
15 - 19	-	5
20 - 24	4	9
25 - 29	6	10
30 - 34	2	2
35 - 39	4	1
Total	16	27

Average: Inwintered £29
 Outwintered £24

TABLE IV
DISTRIBUTION OF HERDS BY QUANTITY OF FEED
EXPRESSED IN CONCENTRATE EQUIVALENT PER COW

Concentrate Equivalent Cwt. per cow	Number of Herds	
	Inwintered	Outwintered
10.00 - 13.99	-	4
14.00 - 17.99	1	8
18.00 - 21.99	8	11
22.00 - 25.99	3	4
26.00 - 29.99	4	-
Total	16	27

Average: Inwintered 23 cwt.
 Outwintered 18 cwt.

TABLE V

DISTRIBUTION OF HERDS BY OTHER COSTS* PER COW

Other Costs £ per cow	Number of Herds	
	Inwintered	Outwintered
0.00 - 0.99	-	8
1.00 - 1.99	5	14
2.00 - 2.99	3	3
3.00 - 3.99	2	2
4.00 and over	6	-
Total	16	27

*Vet, medicines, haulage and bedding

Average: Inwintered £3.39
 Outwintered £1.55

TABLE VI

DISTRIBUTION BY MAN AND TRACTOR HOURS PER COW

	Man Hours		Tractor Hours		
	In.	Out.		In.	Out.
0 - 5	-	3	0.0 - 0.9	6	1
6 - 10	3	7	1.0 - 1.9	4	2
11 - 15	6	12	2.0 - 3.9	3	5
16 - 20	1	4	4.0 - 5.9	3	7
21 - 25	1	1	6.0 - 7.9	-	6
26 - 30	-	-	8.0 - 9.9	-	5
31 - 35	3	-	10.0 and over	-	1
36 - 40	2	-			
Total	16	27	Total	16	27

Average Hours
 per Cow 20 12 2.0 5.5

TABLE VII
CALVES SOLD

A. DISTRIBUTION OF HERDS BY AVERAGE SELLING PRICE (gross)

Calf Price £ per head	Number of Herds			
	Inwintered		Outwintered	
	Steers	Heifers	Steers	Heifers
Under 35	-	2	1	4
35 - 40	1	2	1	6
40 - 45	1	3	7	8
45 - 50	2	6	5	3
50 - 55	4	-	9	1
55 - 60	2	-	3	-
60 and over	3	-	-	1
Calves retained	3	3	1	4
Total	16	16	27	27

Average Price	£52	£43	£47	£41
*Lowest Price	£36	£32	£29	£29
*Highest Price	£62	£49	£59	£68

*Herd averages; not individual prices within herds.

B. DISTRIBUTION OF CALVES BY AVERAGE SELLING PRICE

Calf Price £ per head	Number of Calves							
	Inwintered				Outwintered			
	Steers	%	Heifers	%	Steers	%	Heifers	%
Under 35	-	-	10	5	16	2	59	11
35 - 40	9	4	33	17	8	1	112	21
40 - 45	10	5	66	34	158	25	234	45
45 - 50	17	8	85	44	135	21	79	15
50 - 55	83	41	-	-	267	42	15	3
55 - 60	34	17	-	-	58	9	-	-
60 and over	52	25	-	-	-	-	24	5
Total Sold	205	100	194	100	642	100	523	100

Proportion Sold at £50 or over	83%	-	51%	8%
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Note: Including transfer values of calves going to other units.

TABLE I

DISTRIBUTION OF HERDS BY GROSS MARGIN PER COW

Gross Margin £ per cow	Number of Herds	
	Inwintered	Outwintered
65 - 70	-	1
60 - 65	-	1
55 - 60	3	3
50 - 55	3	4
45 - 50	2	5
40 - 45	2	7
35 - 40	3	2
30 - 35	1	1
25 - 30	2	-
20 - 25	-	2
Under 20	-	1
Total	16	27

*Average: £44 £45
 *Range : £26 - £60 £20 - £66

*Rounded to nearest whole number

TABLE II

DISTRIBUTION OF HERDS BY FEED COST PER COW

Feed Costs £ per cow	Number of Herds	
	Inwintered	Outwintered
Under 10	-	2
10 - 14	5	10
15 - 19	7	6
20 - 24	2	5
25 - 29	1	3
30 - 34	1	1
Total	16	27

Average: £18 £17
 Range : £11 - £33 £6 - £34

N.B. In all tables dealing with GROSS MARGIN homegrown hay and silage has been priced at £5 and £1.25 per ton respectively.

TABLE III

SOME INTRA-GROUP AVERAGES

In Order of Gross Margin per Cow

		Top 25%	Middle 50%	Bottom 25%	All Herds
I N W I N T E R E D	No. of Herds	4	8	4	16
	No. of Cows	39	57	39	48
	Weaning Percentage	96%	86%	72%	85%
	*Feed Costs per Cow	£15	£18	£21	£18
	Gross Margin per Cow	£56	£44	£31	£43
O U T W I N T E R E D	No. of Herds	7	13	7	27
	No. of Cows	63	75	47	65
	Weaning Percentage	89%	89%	79%	87%
	*Feed Costs per Cow	£13	£16	£22	£17
	Gross Margin per Cow	£58	£46	£31	£45

TABLE IV

SOME AVERAGE FIGURES FROM ALL 43 HERDS
IRRESPECTIVE OF METHOD OF OVERWINTERINGIn order of Gross Margin per Cow

	Top $\frac{1}{3}$	All Herds
No. of Herds	14	43
No. of Cows	58	58
Weaning Percentage	91%	86%
Calved by 31/1/69	62%	50%
*Feed Costs per Cow	£15	£17
Gross Margin per Cow	£56	£44
No. of In. Herds	5	16
No. of Out. Herds	9	27

*All purchased feed at cost + variable costs of homegrown fodders i.e. Variable costs excluding top dressing of pasture or hill.

METHODOLOGYMethod of Inquiry

The primary aim of the study was to investigate the effect of date of calving on the profitability of hill cows. Earlier experience from a pilot study in Argyll suggested that random sampling would be of little value due to the scarcity of early calving herds. Consequently, members of the Advisory Service were requested to supply a list of names of herdmasters known to have early calving herds (80% or more of cows calved by 31st January or earlier) and an equal number with the more traditional calving pattern. Two conditions had to be met:- (a) Single suckling hill cows in receipt of the full rate of Hill Cattle Subsidy and (b) preferably herds on hill farms.

Recording of the primary data was done by the farmers on monthly sheets provided by the Economics Department. Each farm was visited three times to ensure that the information being sent in monthly was correct and to collect background information. In the event the discipline of monthly recording was very valuable in that any changes in the daily ration, as cows calved for example, were noted timeously. Retrospective recording either from memory or farming diaries would certainly have led to less accurate information, particularly on feed.

Weight data on calves was available from 20 herds, 15 of which were weighed on the College mobile weigh bridge.

The Costing Period Generally, this was from the start of winter feeding in the late autumn of 1968 until the weaned calf sales in October, 1969.

Feed Costs

Purchased Feed including fodder was charged at cost delivered on the farm.

Homegrown Feed was charged at the following prices per ton:-

	<u>Margin Method</u>	<u>Gross Margin Method*</u>
Oats and Barley	£22	£22
Oat Sheaves	£15	£15
Straw	£ 4:10/-	£ 4:10/-
Turnips & Swedes	£ 3:10/-	£ 3:10/-
Hay	£12	£ 5
Silage	£ 4	£ 1: 5/-

*Confined to Appendix C.

These prices were used for all farms. In the circumstances it was not possible to establish the variable costs of homegrown fodders for every farm. In any case, for inter-herd comparisons on the efficiency of calf production the actual per unit cost of homegrown feed would only mask the performance of cattle. The efficiency of crop production is outwith the scope of this enquiry.

Bull feed is included in the per cow figures.

Herd Depreciation. In order to conform as far as possible with the output and costs form of presentation, herd replacements bought and cast cows sold have been incorporated in the depreciation calculation. The effect of cow deaths is also included here. Purchased cows and in-calf heifers were charged at cost; bulling heifers at cost plus keep until entering the herd and home bred heifers at estimated cost of production. Where a herd had no change in numbers over the year, an estimated annual share was charged, based on the past prices of heifers and cast cows.

For bulls, an annual share of the difference between the cost price and the selling price (or closing value) was charged against the 1969 calf crop.

Calf Prices and Values. Except in the financial summaries, calf prices are gross of commission. Haulage on all animals to or from markets is shown separately. Calves retained at the close of the costing period were valued, in consultation with the farmer, in the light of prices prevailing for calves sold. The possession of data on prices obtained per cwt. was of great value in overcoming this problem of valuation.

Subsidy Revenue is the combined revenue from hill cow and calf subsidies. For the year in question the rates were £22: 5/- per cow including £5 Winter Keep Supplement, £11: 5/- for stots and £9 for heifers..

Margin is the balance of output over costs of feed, haulage, veterinary and other direct expenses. Labour and tractor costs of growing feed are included in the price per ton.

Gross Margin is the balance of output over costs of feed, haulage, veterinary and other direct expenses but with homegrown hay and silage charged at standard variable cost of production. In other words, Gross Margin per cow is higher than Margin per cow by £7 and £2:15/- respectively for every ton of hay or silage consumed.

Grazing Costs on hill and lowground are not included except for those fields where hay and/or silage was grown. In such fields the all-in cost of both fodder and grazing is included in the per unit price.

Other Items Not Included

Margin Method: Labour and tractor hours and share of rent, rates and other farm general expenses except for homegrown feed where the price per ton includes the appropriate share of such items.

Gross Margin Method: Here homegrown hay and silage do not contain any share of such items.

Group Averages are unweighted unless where stated otherwise.

Results per Cow. Generally, the divisor is the number of cows and in-calf heifers on hand at the beginning of the costing period reduced by the number of any cows sold or dying early in the season and increased by the number of cows bought shortly after the start of the costing period. Where there was a significant change in cow numbers over the costing period, the per cow divisor was calculated on a cow-month basis.

Labour and Tractor Costs

Although not included in the financial summaries, provision was made in the monthly sheets for the recording of man and tractor hours on attendance on the herds. These hours covered such items as hauling feed, feeding, cleaning out byres or courts and gatherings. Man hours were charged at 8/- and tractor hours at 5/-; Land Rovers, vans etc. were also charged at the same hourly rate.

Building Costs

Where financial information was available, the net cost of a new building or substantial conversion of an existing shed were spread over a ten year life. For original steadings no charge was made.

Co-operating farmers have already received detailed results for their own herds. The main reason for showing average performance figures within groups is to enable co-operators to make appropriate comparisons. Size of sample limitations makes any wider comparisons of doubtful value.

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