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Sheep - Feeding OS



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School of Agriculture, Aberdeen  
Agricultural Economics Division

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**Forward Creep Grazing  
in the North of Scotland,  
1967/68**

**A Study of 13 Farms**

by R. J. Isaacs, B.Agr.Sc. (N.Z.), Dip. F.M. (Leeds)

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THE NORTH OF SCOTLAND COLLEGE OF AGRICULTURE

AGRICULTURAL ECONOMICS DIVISION

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FORWARD CREEP GRAZING IN THE NORTH OF SCOTLAND, 1967/68

SUMMARY

1. The survey covered thirteen farms where forward creep grazing of sheep was practised during the 1968 summer season. The objective of the investigation was to identify factors of management and performance associated with forward creep grazing and to examine financial results for the flocks over the year as a whole.
2. All of the farmers had been undertaking forward creep grazing for more than one season, and the average duration over which the system had been followed was roughly five years.
3. In general the system had the effect of enabling summer acreage requirements for sheep on the farm to be reduced, thus enabling expansion in the scale of other enterprises, usually barley.
4. Winter management of the flocks was in accord with normal practice. The lambing percentage averaged 158 per cent, with one flock exceeding 200 per cent.
5. The average size of forward creep field was 17 acres and of individual paddock 2.3 acres. Fencing costs per acre for paddocks, including labour for erection and dismantling averaged £2.63 per year.
6. The date of introduction of ewes and lambs on to the creep paddocks was between 15th April and 16th May. The frequency of moves of ewes between paddocks averaged 3.4 days.
7. Application of fertiliser averaged 134 units of Nitrogen per acre.
8. The 1968 season was characterised by a wet cold month of May, during which grass growth was inhibited, and on some farms this necessitated the withdrawal of ewes and lambs from creep areas for short periods of up to a week towards the end of May.
9. Stocking rates averaged 7.4 ewes and 12.0 lambs per acre at the maximum rate of stocking during the creep grazing period. The average duration of creep grazing with ewes and lambs was 13 weeks.
10. The average estimated liveweight gain achieved by lambs on forward creep grazing was 653 lb. per acre for a period of just over 13 weeks.
11. Nine farms sold an average of 36 per cent of lambs fat off their mothers before weaning. The average estimated dressed carcass weight of 635 lambs sold fat off their mothers was 46 lb.
12. The average gross margin per ewe for the year 1967/68 for these 13 flocks was £8.27. The average gross margin per forage acre was £31.88, a figure comparing favourably with gross margins obtained for barley in 1968.

13. In conclusion, it appears from the investigation that some farmers in the North of Scotland are still practising forward creep grazing of ewes and lambs with a measure of success. Most of those concerned are achieving comparatively high stocking rates over the summer period, thereby increasing the profitability of the sheep enterprise and the farm as a whole.
14. One of the key factors associated with high profitability in lowland sheep keeping appears to be a high stocking rate per acre, and forward creep grazing is one method of achieving this high density of stocking.



FORWARD CREEP GRAZING OF SHEEP IN THE NORTH OF SCOTLAND, 1967/68

A STUDY OF 13 FARMS

INTRODUCTION

Scope of Report

This report studies economic and technical factors associated with forward creep grazing of sheep flocks on 13 farms in the counties of Aberdeen, Banff and Ross. The period covered is the 1968 summer grazing season and the financial results are for the period October 1st, 1967 to September 30th, 1968.

Accounting methods and definitions are set out in Appendix IV.

Other work on creep grazing is discussed briefly and the references used are included in Appendix V.

It should be realised that forward creep grazing is only one method of intensifying the summer grazing of ewes and lambs, and that there are other methods such as set stocking or ordinary rotational grazing at high stocking rates not included within the scope of this study, but which might find a place under some farm situations.

Some Other Work on Forward Creep Grazing of Sheep

In Britain the forward creep grazing system for ewes and lambs was pioneered at the Cockle Park farm of the School of Agriculture, Newcastle-upon-Tyne in 1955 - 56 and this work is described by Cooper (1 and 2) and Dickson (3). The principle of the system is based on the fact that up to eight weeks of age, there is a close relationship between the growth of lambs and the milk yields of their mothers. After this, with milk production from the ewe declining, the relationship fades. With the full development of ruminant function the lamb's appetite increases rapidly, but meanwhile the ewes' efficiency in converting grass into milk for their lambs decreases. While this situation is not important at low levels of stocking, with a higher intensity of stocking the ewes become serious competitors with their lambs for the available grass to the point where the lambs suffer. Because of this rotational grazing of sheep has not always met with maximum success, stemming from the difficulty of attaining ideal grass and stock management at the same time. Creep grazing allows the lambs to have preferential treatment by having access to the next paddock in the rotation by means of a creep. At Cockle Park under experimental conditions in 1956 creep grazing gave an additional 11 lb. liveweight gain per lamb compared with rotational grazing and a 50 per cent reduction in worm burdens during a fourteen-week suckling period. The value of the liveweight increment was enhanced by the better condition of the creep-grazed lambs, 50 per cent of which were fat at weaning compared with only five per cent of the normally rotationally-grazed group.

Cooper draws attention to several features of the system, including the necessity for heavy stocking rates. He cites a stocking rate of 8 - 10 ewes per acre on good pasture since the system will not work properly unless there is grazing pressure to induce the lambs to graze ahead of their mothers. Again he has stressed the importance of getting the flock on to the system before the lambs are more than three weeks old.

From the experimental stage at Cockle Park the system was tried on a larger scale under commercial conditions at Nafferton Farm in 1958. In this instance the majority of lambs were sold fat off their mothers and a total liveweight production of over 800 lb. per acre was obtained in a period of 4 months. In addition sufficient silage was conserved from the area to meet the ewes' winter requirements.

More up-to-date observations of progress at Nafferton after 10 years have been reported in the Farmers Weekly (4). These confirm the necessity for high stocking rates of ewes with high lambing percentages. It was noted that by delaying the date at which the creeps were stocked, nearer to the date of seasonal growth, stocking rates could be increased and the grazing season on the creeps extended by several weeks. At Nafferton, stocking rates of 7 ewes and their lambs to the acre for maiden seeds and 10 ewes and their lambs for established leys are the figures aimed at.

A field survey in Yorkshire described by Simpson (5) included results for 1961 from farms where creep grazing was used. Forage acre requirements per 100 ewes on these units were 26.5 compared with 34.3 for non-creep grazed flocks. Gross margins per acre averaged £6: 5s. more for creep grazed flocks (£25: 1s. v. £18:16s.). However, in the previous year lack of rain had caused considerable difficulties and on several farms sheep had to be moved off the creep paddocks relatively early in the season.

Manson and Stobbs (6) studied performance on eight rotational creep grazing units in south-west Durham in 1961. The flocks concerned had had exceptionally good lambing percentages, the average for all ewes being 172 per cent. The authors of this study found that gross outputs per acre from creep grazed sheep units compared very favourably with those obtained from alternative enterprises. The density of ewes varied from 5.9 to 9.6 per acre and that of lambs from 9.8 to 14.4 per acre.

Maddox (7) discusses the application of forward creep grazing in store lamb production in the North of Scotland county of Caithness by reference to trials on four farms. He concluded that, given attention to certain points of management, store lambs produced from creep grazing can be of as good an average quality and value as those produced under traditional grazing systems. By budgeting techniques Maddox demonstrated that the expected increase in margin per acre and profit per farm could be substantial.

Based on the trials he recommended under Caithness conditions a stocking rate of 7 ewes and their lambs to the acre using 8 paddocks and with an application of 70 units of Nitrogen per acre.

Despite the favourable reports on the system, particularly in its earlier days, the number of farmers practising forward creep grazing with ewe and lamb flocks appears to have declined. In this respect Runcie (8) stresses the demands on management ability, and states that it is now difficult to find a farmer practising creep grazing of sheep in Scotland.

THE SAMPLE

Description of Farms

The sample for the survey comprised 13 lowground farms.

Of the 13 farms included in the survey, 10 were in the county of Aberdeen, two in Banff and one in Ross.

Excluding rough grazing areas the size of farm varied from 92 acres to 972 acres, with an average size of 332 acres. The size distribution is shown in Table 1 below.

Table 1 Distribution of Farms in Sample According to Acreage of Crops and Grass (excluding rough grazing)

Acres of Crops and Grass	Less than 100	100 - 199	200 - 299	300 - 399	400 - 499	500 - 599	600 and over
Number of Farms	1	4	2	1	3	1	1

Table 2 gives the average acreages and percentages of crops and grass for the 13 farms in the sample.

Table 2 Average Cropping in Acres on Farms in Survey (13 Farms)

Cropping	Number of Acres per Farm	Percentage
Wheat	15.7	4.7
Barley	129.9	39.1
Oats	4.7	1.4
Potatoes	9.4	2.8
Feeding Roots	15.6	4.7
Total Crops	175.3	52.7
Silage	51.8	15.6
Hay	16.2	4.9
Other grass	88.8	26.8
Total grass	156.8	47.3
Total crops and grass	332.1	100.0
Rough grazing	76.5	-

The average stocking of the farms as at 4th June, 1968 is shown in Table 3.

Table 3 Average Livestock Numbers per Farm, 4th June, 1968  
(13 Farms)

Type of Livestock	Number of Head per Farm
<u>Cattle</u>	
Bulls	0.9
Dairy Cows	37.8
Beef Cows	4.2
<u>Other Cattle</u>	
Under 1 year	34.4
1-2 years	67.7
Over 2 years	2.1
<b>Total Cattle</b>	<b>147.1</b>
<u>Sheep</u>	
Rams	4.5
Ewes	180.5
Other Sheep	274.8
<b>Total Sheep</b>	<b>459.8</b>
<u>Pigs</u>	
Sows	14.1
Other Pigs	165.5
<b>Total Pigs</b>	<b>179.6</b>
<u>Poultry</u>	
Layers	589.1
Other Poultry	543.4
<b>Total Poultry</b>	<b>1,132.5</b>

Two of the farms in the sample had large dairy herds.

The average size of the ewe flocks at this date was 180.5 and the size distribution of the ewe flocks is shown in Table 4. Not all of these ewes were on a forward creep grazing system in the 1968 summer.

Table 4 Distribution of Farms in Sample According to Size of Ewe Flock

Numbers in Ewe Flock	Less than 50	50 - 99	100 - 149	150 - 199	200 - 249	250 - 299	300 and over
Number of Farms	2	3	3	1	1	1	2

For all farms in the sample, sheep comprised 32.3 per cent of the grazing livestock units on 4th June, 1968.

Sheep Breeding and Production Policies

For the flocks studied the breeds used are set out in Table 5.

Table 5 Breed Crosses Used in the Ewe Flocks by Number of Farms

Breed of Ram	Breed of Ewe	No. of Farms
Suffolk	Half-bred	5½
Suffolk	Greyface	4
Suffolk	North Country Cheviot	3
Border Leicester	North Country Cheviot	½

On 10 of the farms, the first lamb was taken from gimmers, from ewe lambs in two flocks, while one farmer bought strong cast ewes, usually retained in the flock for one season.

From five of the flocks more than half the lambs were sold fat before the end of September, from four most of the lambs were sold fat in autumn or winter, while from four all the lambs were sold as stores.

Weather Conditions

The summer of 1968 was characterised by a particularly wet and cold May which slowed grass growth considerably and affected management. After a mainly dry, sunny June, July was much colder than normal with an above average rainfall. August was dry and sunny, while showery September weather freshened grazing in that month.

The winter of 1967/68 was a relatively mild one.

HISTORY OF CREEP GRAZING ON THE FARMS

Forward creep grazing had been in operation on the farms in the sample for periods varying from 2 years to 8 years, with an average time of roughly 5 years. On four of the farms concerned father and son were working together and on one a grandfather and grandson. All the farmers expressed satisfaction with the creep grazing system as related to their individual policies.

Forward creep grazing has generally been associated with the necessity for a high level of management. Many problems, none of them insuperable were brought to light during the survey.

On the disease side, foot-rot had appeared as a problem during the summer to a far greater extent than in more traditionally grazed flocks and this had meant a more frequent necessity for feet dipping and treatment.

Coccidiosis had occurred in six flocks at some time and there had been an occasional Nematodirus problem in some flocks.

The other main problem experienced has been shortage of grass early in the season, when the ewes and lambs are due to graze the first paddock on their second time round, but when regrowth has been insufficient to support them.

This occurred on several farms in the inclement May of 1968 and in these cases the ewes were removed to another area while growth caught up. If it is necessary to have a special reserve area to counter this eventuality some of the advantages of creep grazing are negated.

In some years drought conditions have created similar difficulties later in the season, but this is probably less of a problem in the north-east of Scotland than in areas further south.

Many of the farmers emphasised the necessity for strong fences forming the paddock divisions, particularly in the first year, and some mentioned the difficulty of keeping the ewes from going through the creep as the lambs become older and after the ewes had been clipped.

Two farmers mentioned that Suffolk/Cheviot cross lambs did not creep as well as the Suffolk/Half-bred crosses, but this may be attributable to factors apart from breed.

It is often assumed that lambs kept under this system do not fatten as early and as well as those managed under more traditional systems, and this was specifically mentioned by three farmers, but six stated that since adopting the system the rate of liveweight gain had either been maintained or had increased.

In general, stocking rates were at 6-7 ewes and their lambs to the acre over the creep grazing period. Eight paddocks were used in the majority of cases, although in 1968 six paddocks were used on three of the systems. One farmer grazed 10 ewes to the acre in his first year on the system, but found this rate too high and subsequently reduced the stocking rate to seven.

#### EFFECT OF SHEEP INTENSIFICATION ON THE FARM BUSINESS AS A WHOLE

The thirteen farmers in the survey were questioned as to the effects of the introduction of creep grazing and the intensification implied with it on the farm business as a whole.

On seven of the farms, the acreage freed by the same numbers of sheep being kept on fewer acres was used to increase the area in barley. On two farms both ewe numbers and the barley acreage were increased. On another two farms the silage area was increased and total cattle numbers raised and on one farm sheep were introduced into the farm business for the first time. Bearing in mind that gross margins per acre for the sheep enterprise are normally higher for this system than on traditional systems and coupling this with the increase in scale of the other enterprises, the adoption of a creep grazing system appears to have increased the potential profitability of the farm. This increase in profitability might well have occurred if any other intensive system of sheep management involving high stocking rates had been practised.

#### WINTER MANAGEMENT AND LAMBING PERFORMANCE

Supplementary winter feeding of the ewe flocks during the winter closely followed normal practice for the area, with feeding commencing in most cases early in January and continuing up to the time the flocks went on to the creep paddocks in April or early May. On most farms the ewes had the run of

virtually the whole of the grass acreage, but in two cases were restricted to smaller areas during the feeding period.

Protection against Clostridial diseases was given in all cases. Autumn or winter dipping was carried out on four farms, and in six flocks the ewes were drenched before going on to the creep paddocks. Ten of the farms carried out some form of foot-rot treatment for the ewes over the winter.

The ewe flocks in the sample recorded a lambing percentage (number of lambs tailed as a percentage of the number of ewes tupped) of 158 per cent, ranging from 132 per cent to 206 per cent. The main lambing occurred in March for seven flocks, in April for five flocks and in February for one flock.

### CREEP GRAZING

#### Description of the Creep Grazing Fields

One farm in the survey was running two separate forward creep grazing units. Of the 14 units, 11 had eight paddocks and three had six paddocks. However, eight-paddock units seemed to be just as adversely affected by lack of grass regrowth after the first round in May as the six-paddock units. Two of the latter had to remove the ewe flocks for a short period at this time, but three flocks on eight-paddock units also had to be removed.

Details of the field and paddock size for each individual farm are set out in Appendix I. The creep grazing fields averaged 17.0 acres, ranging from 6.0 acres to 30.5 acres. Paddock sizes ranged from 0.75 acres to 5.08 acres with an average size per unit of 2.30 acres. The ages of the swards are included in Appendix I.

The grass seed mixtures used at establishment of the swards in nearly all cases consisted of various mixtures of strains of perennial ryegrass, timothy and cocksfoot, with cocksfoot being omitted in some swards and Italian ryegrass being present in some mixtures at establishment.

The strength of construction of the fences varied, but in no case was difficulty reported with ewes breaking through fences or attempting to jump them. Sheep netting or a stronger type of pig netting was used, and on seven of the units no strand of strained plain wire was employed at the top of the dividing fences.

In all but two of the units, the creep gates were made on the farm.

Theoretically erection of the paddock fencing should not interfere with other demands for labour on the farm since this can be done in the pre-spring slack period. In actual fact, however, in all but four of the units, the paddocks were erected just prior to the ewes and lambs being put on, and in some cases paddock by paddock immediately before the next shift in the first rotation.

The normal recommendation is for the creep gates to be in the middle of the fence line, but on three of the units they were at the corners. In one unit where a burn separated three of the paddocks from the others, access for the lambs from the eighth to the first paddock was by a short length of road. It was reported in this case that movement between these two paddocks was accomplished with no difficulty and with no detriment to the efficiency of creeping.

The annual fencing costs per acre are summarised in Table 6

Table 6 Annual Fencing Costs per Acre for Paddock Divisions (13 Farms)

Item	Average Costs per Acre
<u>Materials</u>	£
Netting, wire, staples	0.78
Stakes and strainers	0.27
Gates	0.04
TOTAL MATERIALS	1.09
Labour	1.54
TOTAL FENCING COSTS*	2.63

Ideally, if the risk of Nematodirus infection is to be minimised in any system of lamb production, the lambs should not graze where lambs have been the previous year. Three farmers broke this rule without apparent consequences.

#### Management of the Creep Grazing Units

One of the most difficult decisions in management of the creep grazing units is at what date to introduce the ewes and lambs for the first time. This is a decision governed by the actual physical readiness of the paddock fences, the state of grass growth, the age of the lambs and the anticipated rate of grass growth during the unpredictable May period. The date of start for the units in 1968 varied between 15th April and 16th May. Growth of grass was away to a good start in the second half of April, but was considerably retarded during an unfavourable May. The dates of introduction of ewes and lambs are set out for each farm in Appendix I. The average age of the lambs at the start is given also, but these figures must be regarded very much as approximations. The average age of the lambs per farm was 3.8 weeks, varying between 2 and 8 weeks. On several farms not all the ewes with their lambs were introduced at the start, some being added at a later date.

Fertiliser application to the leys making up the creep grazing units averaged 134 units of nitrogen per acre, varying from 52 units per acre to 250 units per acre. The farm where 52 units were applied, supplemented this with 2,000 gallons of pig sludge per acre. The first dressings either as straight nitrogen or as a compound fertiliser were applied from the



21st of March to the 20th of April. Where a second dressing was given this was applied between the middle of May and the middle of June. A third dressing was used on four farms (in late June or early July) and one farm applied a fourth dressing at the end of July. Two farmers applied a top dressing of straight nitrogen after the lambs had been weaned. The normal practice was for the first application of fertiliser to be applied in one dose, but for subsequent applications to be split in timing between the paddocks. The relationship of fertiliser application to stocking rates is discussed in the next section.

The frequency of moves of ewes from one paddock to the next ranged from an average of 2.8 days to an average of 5.0 days, with an average for the 13 farms in the sample of 3.4 days.

The poor climatic conditions in May, 1968 had retarded growth to such an extent that on five farms the ewes and lambs had to be taken off the creep area for seven days in four cases and three days in one case. The critical period was between 18th and 21st May. Of the other farms, one had been feeding supplements to the ewes for their first six weeks on the system from 16th April onwards, and on another draff feeding was resorted to for 14 days to offset the grazing shortage. All the other farms, except one, had commenced creep grazing at the very end of April, or into May, and thus were able to commence the second round with some grass regrowth in hand.

On some of the farms where the flocks had been removed they were grazed on fields shut up for silage, and the farmers concerned maintained that damage to the crop was minimal.

The maximum stocking rates of ewes and lambs per acre for each farm at the start of the creep grazing period are shown in Appendix I. The stocking rate of ewes ranged from 5.6 to 8.5 ewes per acre with an average of 7.4 ewes per acre and from 8.3 to 16.1 lambs per acre with an average of 12.0 lambs per acre. The heaviest overall rate of stocking was on one farm with 8.2 and 15.5 lambs per acre.

At these levels of stocking there was no necessity for topping behind the ewes and lambs with a mower, except for single paddocks on rare occasions. However, on three units, one of the paddocks was able to be eliminated from rotation and a cut of silage taken (two in June and one in early July).

The length of time ewes and lambs were grazing together on the creep units varied from nine to 17 weeks, with an average period of 13.1 weeks. (See Appendix I for details).

As already mentioned one of the major disease hazards of the forward creep grazing system is footrot, and on only one unit was the flock not put through a footbath at regular intervals.

On nine of the units drenching of the lambs against internal parasites while on the creep was not considered necessary.

Supplementary feeding was carried out on six of the units. On one of these units where there had been a 206 per cent lambing a 7.7 ewe and 16.1 lamb per acre stocking rate was assisted from 16th April to the end of May by feeding the ewes 1 lb. of concentrate daily. On another unit draff feeding was necessary for the ewes in the last week of May because of the shortage of grazing.

On the other four units the lambs were creep fed concentrates, on three in the early part of the creep grazing period in May and on the other in the latter part in July. The effect of this will be discussed in the next section.

#### Performance on Creeps During the Creep Grazing Period

There are several measures by which the performances of the fields and of the flocks during the creep grazing period can be assessed. These include the total livestock carry during the period in terms of livestock units (including an allowance for conserved products removed), the liveweight gain of lambs during the period, the value of lamb sales and the percentage of lambs sold fat before weaning.

The figures for each unit are given in Appendix II.

##### (a) Livestock Carry

The average total livestock carry (including an allowance for silage removed) in terms of livestock unit days per acre was 197 during a creep grazing period averaging 92 days. Over the whole summer period up to 30th September the average total livestock carry amounted to 271 livestock unit days over an average grazing period of 156 days.

The small number of farms involved imposes limitations on any attempt to correlate livestock carry with level of nitrogen applied, but the higher applications of nitrogen do appear to have some relationship to higher stock carry over the season as a whole.

Silage was removed from paddocks where growth outstripped the capacity of the flocks to cope with it on 3 farms, and the yield of silage averaged an estimated 2.76 tons per acre.

There did not appear to be any difference in total livestock carry between six farms using first year leys and five using older leys (two other units comprised first and third year leys combined).

The feeding of concentrate supplements to ewes or lambs during the creep grazing period did not appear to result in any advantage in terms of livestock carry over the period.

##### (b) Liveweight Gains of Lambs

The calculation of lamb liveweight gain during the creep grazing period is based on the difference between the weights of the lambs at entry to the creep and their weights either when sold or at the termination of creep grazing. The weights at entry and termination are based in some cases on actual weighings, but in most cases on the farmers' estimates and the figures should be interpreted with this in mind.

The average estimated liveweight gain achieved per farm by lambs on forward creep grazing units was 653 lb. per acre over a period of just over 13 weeks. This compares with the figure of 800 lb. per acre obtained in a 12 week period at Nafferton (4).

The highest lamb liveweight gain per acre was estimated at 998 lb. over a 15 week period for a flock using 245 units of nitrogen per acre and at a maximum stocking rate per acre at 7.7 ewes and 16.1 lambs. The lowest gain was 447 lb. per acre. The relationship of lamb liveweight gain per acre on creeps and by amount of nitrogen applied also suggests increased gains at the higher rates, but again the sample size is too small to state this conclusively.

Estimated lamb liveweight gains over the creep grazing period averaged 727 lb. per acre on the six first year leys, compared with 576 lb. per acre on the five older leys. In three of the flocks on first year leys, ewes or lambs received supplementary concentrate feeding, while supplements were fed to ewes or lambs in two of the five flocks on older leys.

When discussing the effect of supplementary feeding on lamb liveweight gain on the creeps it is difficult to differentiate between the flocks where only the lambs received a supplement and the flocks where ewes were fed, since in the latter case lambs would have eaten some of the concentrates on offer. Taking as the basis for comparison simply whether concentrate supplements were fed or not, the feeding of concentrate supplements during the creep grazing period did not appear to confer any advantage in lamb liveweight gain.

(c) Sale of Lambs off the Creeps Before Weaning

The average total value per acre of lambs sold off the creep paddocks and on hand at the end of the creep grazing period was £83.95, ranging from £42.85 to £127.97.

Nine of the 13 units sold lambs fat off the creeps before weaning, and in these nine flocks an average of 36 per cent were sold fat off their mothers. The highest proportion sold off dams was 72 per cent. On this farm the lambs had access to concentrate creep feed for the first five weeks on the paddocks and there was a high proportion of single lambs. Of three other units where the lambs had access to creep-fed concentrates, from one the lambs were sold as stores, and a second had the second highest proportion of lambs sold fat off their dams (54 per cent). The remaining farm fed concentrates to the lambs over the last eight weeks on the creep paddocks, but only 19 per cent of the Suffolk/North Country Cheviot cross and North Country Cheviot lambs were sold fat off their dams.

A total of 635 lambs were sold fat off their mothers from the nine units. The average estimated dressed carcass weight of these lambs was 46 lbs. This is 3-4 lb. lower than weights achieved by lambs in this area fattened under traditional systems (9)

(d) Mortality

Mortality during the creep grazing period averaged 1.5 per cent for ewes (range Nil to 6.1 per cent) and 1.4 per cent for lambs (range Nil to 9.8 per cent).

MANAGEMENT AFTER WEANING

After weaning, management of the ewes and remaining lambs varied. As far as the ewes were concerned, in three cases they remained on the creep field right up to the end of summer (taken as 30th September) and beyond, while on three farms they were removed from the creep field and not returned at all. On the other seven farms, the ewes were either removed from the creep field after weaning and returned at a later date, or spent a period on the field before being removed to other grazing.

As for the lambs, in seven instances they were put onto silage aftermath and in one on to a field grazed previously by cattle. On the remaining farms the lambs stayed on the creeps for varying periods either on a set stocked or a rotationally grazed basis. On one farm following this practice an outbreak of coccidiosis occurred.

Summarising the management of the creep fields themselves after weaning, eight of the units had sheep only for the rest of the summer, three had cattle in addition to sheep. Silage was taken on two farms, one yielding 5 tons per acre, the other only one ton per acre.

FORWARD CREEP GRAZING COMPARED WITH SET STOCKING

On two of the farms where ewes and lambs were being run on a forward creep grazing system, flocks of ewes were also being kept over summer on a set stocked basis.

The main management and performance factors for the two systems on each farm are summarised in Table 7.

Table 7                      Comparison of Management and Performance, Creep Grazed and  
Set Stocked Units  
(2 Farms)

Factor	Farm No. 6		Farm No. 7	
	Creep Grazed Flock	Set Stocked Flock	Creep Grazed Flock	Set Stocked Flock
Total size of field (acres)	11	31	28	30
Lambing percentage	189	171	147	147
Total units of Nitrogen applied per acre	168	130	149	44
Number of ewes per acre at start	8.2	6.8	7.0	5.0
Number of lambs per acre at start	15.5	11.6	10.5	7.3
Total Livestock Unit Days per Acre during creep grazing period	247	189	182	129
Total Livestock Unit Days per Acre over whole summer period	276	225	230	180
Total estimated lamb liveweight gain per acre to weaning	827 lb.	566 lb.	602 lb.	420 lb.
Percentage of lambs sold fat off their mothers	18	9	20	9
Value per acre of lambs sold or on hand at weaning	£100.76	£73.59	£76.95	£53.58
Ewe Mortality	1.1%	3.3%	2.6%	2.7%
Lamb Mortality	3.5%	Nil	0.3%	Nil

The flock on Farm No. 6 was of Half-bred ewes which had been crossed with Suffolk rams, while on Farm No. 7 the ewes were mainly Greyface with Suffolk/Greyface lambs.

On Farm No. 6 while the stocking rate of the set stocked flock was not as high as on the creep grazed unit on the same farm, by average standards it was still high, and this applied in lesser degree to Farm No. 7. All the main efficiency factors were lower for the set stocked flock than for the creep grazed flocks, but the comparison is not completely valid due to the lower stocking rates. The average deadweight of lambs sold from Farm No. 6 before weaning was 50 lb. from the creep grazed units and 51 lb. from the set stocked, and for Farm No. 7 the average deadweight was 44 lb. in each case.

OUTPUT, VARIABLE COSTS AND GROSS MARGINS FOR THE WHOLE YEAR

In addition to studying performance during the actual creep grazing period, an attempt was made to derive financial details to enable gross margins for the year as a whole to be completed. The period taken is from 1st October, 1967 to 30th September, 1968.

The components of output and variable costs and the resultant gross margin per ewe are set out in Table 8. These figures are, of course, influenced by factors apart from those operating during the creep-grazing period in the summer.

Table 8      Average Output, Variable Costs and Gross Margin per Ewe, 13 Lowland Forward Creep Grazed Flocks for Year 1967/68

Total Number of Ewes	1,778
Number of Flocks	13
Average Number of Ewes per Flock	137
<u>OUTPUT</u>	£
<u>Sales</u>	
Lambs	7.50
Ewes	0.53
Rams	0.01
Wool	1.30
Total Sales	9.34
<u>Closing Valuation</u>	
Lambs	3.90
Breeding Stock	9.19
Total Closing Valuation	13.09
<u>TOTAL (A)</u>	22.43
<u>Purchases</u>	
Ewes	2.08
Rams	0.13
Total Purchases	2.21
Opening Valuation	8.05
<u>TOTAL (B)</u>	10.26
<u>OUTPUT (A-B)</u>	12.17
<u>VARIABLE COSTS</u>	
<u>Purchased Supplements</u>	0.83
<u>Home-grown Supplements</u>	
Grain	0.47
Roughages and Roots	0.30
Total Home-grown Supplements	0.77
Grazing	1.88
Total Supplements and Grazing	3.48
Miscellaneous	0.42
<u>TOTAL VARIABLE COSTS</u>	3.90
<u>GROSS MARGIN PER EWE</u>	8.27
<u>RANGE OF GROSS MARGIN PER EWE</u>	£4.67 - £12.43

Table 9 gives the average gross margin per forage acre, and the number of ewes per forage acre for the whole year, and per actual acre for the winter and summer periods.

Table 9 Average Gross Margin and Carrying Capacity per Acre, 13 Lowland Forward Creep Grazed Flocks for Year 1967/68

	Average	Range
Gross Margin per Forage Acre	£31.88	£12.04 - £59.44
	<u>No.</u>	<u>No.</u>
Ewes per forage acre (whole year)	3.76	2.48 - 5.50
Ewes per actual acre in winter	1.83	1.11 - 2.93
Ewes per actual acre in summer	5.42	3.41 - 8.85

The gross margin per forage acre of £31.88 compares not unfavourably with an average gross margin per acre of £27.9 for barley recorded on a survey of 52 farms in Kincardine, Aberdeen, Banff, Moray and Nairn in the 1968 season.

However, it has to be remembered that no debit for the costs of the temporary fencing is included in the gross margin calculation, and this would result in a decrease of just over £1 an acre for materials, and a further slightly higher amount should the labour be included.

The stocking capacity of 3.76 ewes per forage acre over the whole year compares with a figure of 2.50 ewes per forage acre obtained in a study for the previous year in Kincardine, Aberdeen and Banff of 56 flocks managed predominantly along traditional lines (9). It is of interest that the figure of 3.76 ewes per forage acre corresponds closely to the 26.5 acres per 100 ewes (3.77 ewes per acre) obtained in the Leeds survey (5).

A comparison of the gross margins for summer creep grazed and set stocked flocks on the two farms mentioned earlier is set out in Table 10.

Table 10 Comparison of Gross Margins and Stocking Rates for Creep Grazed and Set Stocked Ewe Flocks on 2 Farms 1967/68

	Farm No. 6		Farm No. 7	
	Creep Grazed Flock	Set Stocked Flock	Creep Grazed Flock	Set Stocked Flock
Gross Margin per ewe	£ 11.62	£ 7.60	£ 7.28	£ 8.39
Gross Margin per forage acre	59.44	29.66	34.68	34.95
	<u>No.</u>	<u>No.</u>	<u>No.</u>	<u>No.</u>
Ewes per forage acre	5.50	3.59	4.66	4.10
Ewes per actual acre in winter	2.93	3.00	2.49	2.64
Ewes per actual acre in summer	8.85	4.08	5.33	4.40

No firm conclusions can be drawn from these results. On Farm No. 6 the gross margin per forage acre was over double for the creep grazed flock as compared with that for the set stocked ewes, but other factors in addition to stocking density acted to affect this. For Farm No. 7 there was little difference in gross margin per forage acre between the two systems.



## APPENDIX I

## Description of Individual Creep Fields and of Management

Details of Field	Farm Number													Average	Range	S.E.
	1	2	3	4	5	6	7	8	9	10	11	12	13			
Total Size (acres)	14	6	11	16 $\frac{1}{2}$	6	11	28	23 27	10	30 $\frac{1}{2}$	12	18	25	17	6-30 $\frac{1}{2}$	2.23
Number of paddocks	8	8	8	6	8	8	8	8 8	6	6	8	8	8	-	-	-
Average paddock size (acres)	1.75	0.75	1.37	2.79	0.75	1.38	3.50	2.87 3.37	1.66	5.08	1.50	2.25	3.12	2.30	0.75-5.08	0.33
Age of sward (years)	4	1	2	1 and 3	1	1	1 and 3	1 1	1	3	2	3	1	-	-	-
Breed of Ram	Suffolk	Suffolk	Suffolk	Suffolk	Suffolk	Suffolk	Suffolk	BL + S Cheviot $\frac{1}{2}$ bred	Suffolk	Suffolk	Suffolk	Suffolk	S + C Cheviot	-	-	-
Breed of Ewe	Half-bred	Greyface	Half-bred	Half-bred	Greyface	Half-bred	Greyface		Greyface	Half-bred	Cheviot	Cheviot		-	-	-
Lambing Percentage	144	206	162	137	180	189	747	159	134	170	132	157	142	158	132-206	6.3
<u>Management</u>																
Total units N applied per acre	52	215	60	130	90	168	149	121 121	150	80	134	250	152	134	52-250	14.7
Date of Start	6 May	16 April	28 April	24 April	27 April	23 April	3 May	22 April	16 May	22 April	3 May	1 May	15 April	-	15/4-16/5	-
Approx. average age of lambs at start (weeks)	3	2	2	3	8	3	7	2	6	2	7	2	3	3.8	2-8	-
Number of ewes per acre at maximum	8.1	7.7	7.5	7.8	8.5	8.2	7.0	7.1 6.3	7.4	5.9	8.0	8.0	5.6	7.4	5.6-8.5	0.24
Number of lambs per acre at maximum	12.1	16.1	12.4	12.6	14.6	15.5	10.5	12.1 10.2	9.2	10.5	11.6	13.0	8.3	12.0	8.3-16.1	0.61
Average frequency of change of paddocks (days)	3.0	3.0	4.0	5.0	3.3	2.8	3.0	3.0 3.0	3.4	4.1	3.7	3.0	3.1	3.4	2.8-5.0	0.16
Number of weeks in full operation	13	15	14	15	12	14	13	11 14	12	13	9	12	17	13	9-17	0.5

Performance of Individual Creep Grazed Flocks

	Farm Number													Average	Range	SE
	1	2	3	4	5	6	7	8	9	10	11	12	13			
Total Livestock Unit Days per acre on creep field during creep grazing period	216	248	201	226	175	247	182	189	172	158	150	201	201	197	150-248	8.6
Total Livestock Unit Days per acre on creep field during whole summer	316	354	263	260	250	276	230	258	242	195	304	330	247	271	195-354	12.2
Total Estimated Lamb Liveweight gain per acre over creep grazing period	634	998	672	643	695	827	602	602	792	566	463	544	447	653	447-998	41.9
Percentage of lambs sold fat off their mothers	Nil	56	16	72	33	18	20	36	54	Nil	Nil	Nil	19	25	Nil-72	6.6

APPENDIX III

Output, Variable Costs and Gross Margins per Ewe and per Acre for the Whole Year, Individual Flocks

	Farm Number													Average	Range	SE
	1	2	3	4	5	6	7	8	9	10	11	12	13			
<u>Gross Margin per Ewe</u>	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£
Output	11.27	17.58	11.69	10.06	14.14	14.81	10.41	13.89	10.00	12.39	9.25	11.94	10.74	12.17	-	-
Variable Costs	3.00	5.15	2.88	4.49	3.35	3.19	3.13	6.24	3.72	3.22	3.04	3.13	6.07	3.90	-	-
Gross Margin	8.27	12.43	8.81	5.57	10.79	11.62	7.28	7.65	6.28	9.17	6.21	8.81	4.67	8.27	4.67-12.43	0.65
<u>Gross Margin per Acre</u>	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£
Output	29.32	54.14	44.23	31.89	48.48	75.78	49.56	40.38	43.98	46.29	51.68	56.84	27.74	46.18	-	-
Variable Costs	7.79	15.89	10.90	14.25	11.49	16.34	14.88	18.13	16.40	12.08	17.12	14.90	15.70	14.30	-	-
Gross Margin	21.53	38.25	33.33	17.64	36.99	59.44	34.68	22.25	27.58	34.21	34.56	41.94	12.04	31.88	12.04-59.44	3.36

APPENDIX IV

Definitions and Accounting Methods

Method of Deriving Information

Information was obtained from farmers by the survey method. Farmers were asked to record dates of shifts between creep paddocks, but apart from this no detailed records were required to be kept.

Average Figures

Where average figures are detailed in tables, these refer to per flock averages, unless specified otherwise.

Livestock Units

Where livestock unit calculations were made the following standard livestock units as agreed by the Scottish Conference of Agricultural Economists were used.

Bulls	1
Dairy Cows	$1\frac{1}{4}$
Beef Cows	1
Cattle - under 1 year	$\frac{3}{8}$
- 1-2 years	$\frac{2}{3}$
- over 2 years	1
Ewes	$\frac{1}{5}$
Lambs under 6 months	$\frac{1}{16}$
Lambs over 6 months	$\frac{1}{10}$

Annual Fencing Costs

In calculating the annual fencing costs for the paddock divisions, durable materials such as netting, stakes, strainers and gates have been assumed to have a life of eight years. Labour has been costed at 6s.11d. per hour.

Gross Margin

The gross margin for the sheep enterprise is the difference between output and variable costs. The gross margin per ewe for each flock for the year was calculated by dividing the total gross margin by the number of ewes tugged. The gross margin per forage acre was calculated by dividing the total gross margin by the number of forage acres used in the year.

Output

The output of the sheep enterprise for the year is the sum of the closing valuation of sheep and receipts from the sales of lambs, ewes, rams and wool, minus the sum of the opening valuation and purchases of sheep.

### Sale Prices

Sale prices for sheep appearing in this report include guarantee payments where applicable. Sale prices are net of market commission and insurance charges.

### Valuations

Valuations of sheep were based on the estimated market value at the time of valuation. Where sheep were bought immediately prior to or sold soon after this date, these sheep were valued at the price paid or received.

### Variable Costs

Variable costs are usually defined as those costs which can be both readily allocated to a specific enterprise and which will vary according to changes in the scale of that enterprise. In the section on gross margins the variable costs have been designated as purchased foods, the variable costs of home-grown foods, including grazing, veterinary and medicines, casual labour and carriage.

### Foods

Purchased supplements were charged at actual cost delivered to the farm. Home-grown oats and barley were valued at £1 per cwt. For hay and silage the total variable cost is made up of a share of the cost of seed, lime and slag, the cost of fertiliser and, where applicable, materials and contract work. Half of the costs of seed and fertiliser so allocated were debited to the hay and silage in the case of once cut crops and half to grazing. In the case of twice cut crops, three quarters of these costs were debited to the conserved crop and one quarter to grazing.

The variable costs of roots included the cost of seed, fertiliser, a share of lime and slag costs and, where applicable, casual labour. Accurate estimates of root yields are difficult and the costs are based on a yield of 20 tons per acre.

The variable costs of grazing were made up of fertiliser costs and a share of seed, lime and slag costs. Of the total variable costs for grazing and aftermaths, four-fifths were allocated to the spring and summer months (April 1st to September 30th) and one fifth to the autumn and winter months (October 1st to March 31st).

Where mixed grazing of cattle and sheep was practised, the grazing was allocated on a proportionate basis according to the length of time occupied by each class of stock and on a livestock unit basis.

### Forage Acres

Forage acres are the acres of forage crops - grazing and aftermaths, hay, silage and roots - used by sheep and adjusted in accordance with the factors detailed above. Cereals fed are not regarded as forage acres.

### Carrying Capacity

Livestock unit/days per acre were calculated by multiplying the total number of livestock units on the area by the number of days grazed and dividing the result by the number of acres. Carrying capacity of ewes per acre over the year, and over the winter and summer periods was calculated by dividing the average number of ewes on hand over the period by the number of acres used by the whole flock in that period.

### Standard Errors

The Standard Error of the Mean (S.E.) shown in some of the appendices is used to indicate the magnitude of sampling error in a set of observations, and is directly related to the number of observations in the sample and the dispersion of the original values.

APPENDIX V

References

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