University of Reading
Department of
Agricultural Economics & Management

# GRASS AS A BREAK

An economic study in Southern England

J. A. L. DENCH

with contributions from A. K. Giles, C. Ritson and
W. G. Gwynne (ADAS)

Agricultural Enterprise Studies in England & Wales

Economic Report No. 35

1975

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## FOREWARD

### AGRICULTURAL ENTERPRISE STUDIES IN ENGLAND AND WALES

University departments of Agricultural Economics in England and Wales have for many years undertaken economic studies of crop and livestock enterprises. In this work the departments receive financial and technical support from the Ministry of Agriculture, Fisheries and Food.

A recent development is that departments in different regions of the country are now conducting joint studies into those enterprises in which they have a particular interest. This community of interest is being recognised by issuing enterprise reports in a common series entitled "Agricultural Enterprise Studies in England and Wales", although the publications will continue to be prepared and published by individual departments.

Titles of recent publications in this series and the addresses of the University departments are given at the end of this report.

## PREFACE AND ACKNOWLEDGEMENTS

In recent years this Department has been engaged on a series of studies concerned with the economics of break crops on the cereal growing farms of Southern England. Beginning with separate studies of Oilseed Rape and Outdoor Pigs, the Department then turned its attention to a more comprehensive study of Cash Break Crops, published in this series in 1972, and updated in 1974. The Department is currently co-ordinating a national study of forage crops other than grass. Between the earlier study of Cash Break Crops and the present work on forage crops attention has been devoted to 'grass as a break' and the results of that work are contained in this report.

Again, attention is focused largely on the use of grass as a break crop on the dominantly arable farms of Southern England, and the Department wishes to thank the many farmers who have helped to provide the raw material for sections III and IV of the report. Special thanks are also due to Mr. W.G. Gwynne of A.D.A.S. who has contributed Section II.

Within the Department, J.A.L. Dench has been responsible for the two main sections of the report (III & IV) which present the results of field work and analysis undertaken largely by himself, J. Wright, E.G. Hunt and Miss F. Wilks. A.K. Giles has written an introduction and C. Ritson a concluding section on the outlook. Mrs. H.B. Davis has been responsible for the reproduction of the report. An accompanying bibliography has been prepared by Miss S.M. Fletcher.

R.H. Tuck

October, 1975.

SECTION I : AN INTRODUCTION - A.K. Giles

In post war British agriculture cereal growing has been one of two farm enterprises (the other one being dairying) that, given reasonable levels of management, have usually been capable of yielding profits, together, alone, or in combination with other enterprises, these two have more often than not provided, and still do provide, the major part of many farmers' incomes. From time to time one of them may have outstripped the other in profit terms but generally speaking it would be true to say that dairying has provided the more even profit levels and cereal growing, more vulnerable as it is to world harvests and trade, the greater variations in returns.

A good example of this phenomena has occurred in the early 1970's with, initially, the combination of good harvests and high prices working together to produce unusually high profits - only to be followed by falling world and domestic prices combined with a dramatic increase in the cost of cereal growers' main inputs. Generally speaking, however, the swing of the pendulum has not been unfavourable to cereal farmers, especially when measured in terms of return on capital, and as a result many individual farmers have sought to increase their cereal acreage. In the majority of cases, however, this increase has stopped well short of the point of monoculture. On the light downlands of Southern England, for instance, where this particular study has been concentrated, it is relatively rare to find cereals occupying as much as 70% of the total area on any one farm; in most cases it is substantially less than that. The sophistication of contemporary farming - especially in terms of its capital and managerial requirements - has pointed the way towards increasingly specialised systems, but except in the case of relatively small grassland farms, this trend has not usually gone all the way. Mixed systems still dominate.

The alternative breaks

So far as the cereal grower is concerned a 'mixed' system will mean one of four basic alternatives, or some combination of them: cereals with:

(i) An intensive livestock enterprise e.g. pigs, frequently (in the South) located at least partly outdoors and becoming part of a rotational system.

(ii) Cash crops other than cereals

(iii) Fodder crops other than grass

(iv) Grass - with or without livestock.

As part of this Department's continuing interest* in the 'break' in cereal rotations, this particular study is concerned with the fourth of these alternatives and especially with the use of grassland by livestock. It is not conerned with permanent pasture as such (although small qualities do exist on some of the surveyed farms), nor even with grassland where it forms an equal or dominant part in a mixed system - but with grassland in a dominantly cereal system of farming.

Some advantages of grass

The reasons why grassland appears in this role at all are fourfold. First, it has a husbandry contribution. Except where the rare arts of continuous corn have been mastered, economic cereal yields are maintained through rotational or 'balanced' cropping systems. Some of the technical arguments in favour of grass in this context are discussed in Section II. Secondly, there are economic arguments - not least in the maintenance of cereal yields just referred to. To this extent, husbandry and economic arguments amount to one and the same thing. In addition, however, a grass break provides a degree of economic manoeuvre, through variations in its style and intensity of use, which is virtually non-existent in cereal farming. It also permits a spreading of risks in that, climatically speaking, 'poor' ceral years can often be 'good' grassland years (and vice versa) and in so far as cereals constitute an important share of the total inputs for most forms of livestock production, cereal prices can hardly be unfavourable for the cereal and the livestock farmer at the same time. Thirdly, there are in addition to these technical and economic arguments in favour of a grass break, arguments stemming more from managerial considerations - such as the evening out of work loads and of cash flows throughout the year - and finally there are arguments related to personal preferences reflecting perhaps an individual's aesthetic attitudes or his particular farming interests.

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*See Preface

Each of these four different kinds of arguments in favour of a grass break might apply equally well where the break is provided by alternative cash crops. The particular reasons why some farmers in fact elect for grass and for livestock, however, is summarised in Section III of this report and these reasons can be compared with the technical arguments presented in Section II.

Which livestock?

Except for outdoor pigs which usually occupy only a small part of any rotation, livestock on grass means dairy cows, beef or sheep and which of these three, or which combination of them, a particular farmer chooses will depend on a variety of economic, technical and personal factors. In the important but limited context of what contribution each of these enterprises can make towards the overall farm profit (measured in terms of gross margin) dairying has always outstripped the other two. At the time of writing, a well managed dairy unit might be expected to yield a gross margin of over £100 per acre. By contrast, fat lamb production, with conventional levels of stocking, and numerous beef systems, including even some of the semi-intensive ones, would be unlikely to yield more than between a third and a half of this value. As all farmers know, however, the contribution that any particular grazing livestock enterprise can make to an overall farm system does not begin and end with its gross margin. The overall level of fixed costs will, in part, be determined by the type and scale of livestock enterprise. In some cases some of those costs will be clearly identifiable with the enterprise in case, whilst in others the sharing of such costs between two or more enterprises makes any thought of allocation - especially when large indivisible units are involved - a rather futile exercise. Different livestock enterprises will also make different levels of demand on available working capital; will have different requirements for fixed equipment and buildings; will make different seasonal calls upon labour and management and for various reasons will dovetail more or less easily into the remainder of the farm system. Sheep, for example, are the classic example of a grazing livestock enterprise which, relatively speaking, do not produce a handsome gross margin but which, within certain limits of scale, score heavily on most other counts i.e. in terms of their

relatively low requirements for capital, for buildings and for labour, and because of their high contribution as scavengers to the growth and utilization of crops grown primarily for other purposes, Depending upon the scale of operation and the particular kind of system adopted, beef cattle also have some of these same advantages with the result that farms can more easily move in or out of either sheep or beef production than is usually the case with dairy cows. The same would be true so far as expansion and contraction is concerned - where in many cases the expansion and contraction might occur within an existing beef or sheep enterprise with relatively little impact on fixed costs.

The need for budgeting data - and the difficulties of obtaining it

In any situation where such changes are being contemplated, irrespective of the scale or direction of the change, it will not be undertaken these days by any thinking farmer without first some evidence from supporting budgets. Recent uncertainties about product prices and the costs of inputs have, inevitably, made budgeting a more hazardous process but, for these same reasons, an even more essential exercise. Much of the information in Section IV of this report has been collected and presented with that purpose in mind. Because of the constantly changing financial situation the emphasis has been placed on physical information. It must be stressed, however, that this data is not the result of experimental work and neither does it suggest target performance levels of the kind that current research and advisory effort may be directed towards. It is, rather, a statement of what has actually been achieved by commercial farmers and to which normally efficient farmers can, therefore, reasonably be expected to aspire. For each of the specificied livestock systems physical performance levels in respect to output, to variable costs and to the more fixed type of cost have been indicated. Farmers and their advisers are invited to select, in any particular situation which of these items are relevant to any farming situation, or particular change that is being contemplated, and to 'clothe' that physical data with the best possible estimates that can be made of costs and returns in the time period under review.

This latter part of the exercise may be a difficult task, but the alternative is either not to attempt it, or perhaps not even to contemplate change. In the present uncertain economic climate, many farmers may prefer to react in this latter way - despite the encouragement of proposed new expansion programmes for British agriculture. For a limited period, a cautious attitude so far as investment is concerned, with increased attention to good technical management and to careful cost control, may well be the most sensible policy for many. Unless, however, the relative movement of product prices and of costs is such that existing profit levels are automatically maintained or improved - and how many farmers would ever bank on that? - some form of change sooner or later becomes synonomous with growth and survival. Basically there are only two kinds of change that can be made: either to the system of farming or to the level of performance within the existing system. The latter kind is usually more difficult to effect than the former and whilst grassland farming presents a potential for improvement (e.g. through increased stocking rates) not enjoyed by the arable sector it also, because of its complexities - which often make precise measurements of performance difficult - calls for managerial levels which only the best can obtain.

Despite these difficulties however, and those of the present financial situation, strategic decisions involving some form of change will sooner or later confront most farmers. In many cases these decisions will involve capital investment. The current uncertainties that surround these decisions have recently been described in an article published from this Department[1] and reference is made there to the stultifying effect of extreme uncertainty on investment decisions. Nevertheless when the time comes on any individual farm for some investment to be made, it will remain in the nature of things that investment has to take place <u>now</u> in anticipation of some <u>future</u> return. It is an inescapable fact that the future is unknown and that at best some best estimate of the future has to be made. This process has never been easy and the current economic climate certainly means that past and present price and cost levels are a less good guide to the future than we have been accustomed to them being.

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1. Uncertainties facing British Farmers by J.S. Marsh in "Farm Business Data 1975" pp 13-15.

The need for outlook information

Because of the situation just described the farmer contemplating change, now finds himself looking increasingly beyond his traditional use of physical and financial budgeting data (of the kind presented in Section IV ) and even beyond the normal supply of market intelligence data that is at his disposal. Increasingly, he will be looking also for a longer term 'outlook' type of assessment of the prospects for particular enterprises and commodities. Assessments of this kind are usually difficult, if not impossible to quantify. They are concerned with long term indications of supply and demand and with the likely and possible influences of regional and international policies and events - many of which defy more than the broadest of speculation. Nevertheless, it is in the context of these kinds of considerations that strategic plans have to be made and it is for this reason that the final Section of this report has been devoted to 'the outlook' for grassland-based enterprises.

## SECTION II : SOME TECHNICAL CONSIDERATIONS - W.G. Gwynne (A.D.A.S.)

If the term grass is taken in its widest context to include herbage legumes, the grass crop is the most popular break on the arable farm and indeed until the idea of free rotations became popular and accepted it was practically the only break crop.

Since grass is not a readily saleable commodity and usually has to be processed into meat or milk the grass break is almost always associated with dairying, beef, or sheep enterprises. Nevertheless, the grass break can be and often is an enterprise in its own right, the produce being directly sold as a cash crop. Examples of this are frequent in Southern England and comprise herbage seed, hay grown for sale and more rarely green crop drying. There are also cases of grass areas grown especially for a break from cereals, the grassland being let for grazing or conservation to a neighbouring livestock farmer.

### Grass in its own right

Herbage seed production is a specialized enterprise particularly well suited for integrating with cereals and oil seed production. Grass seed crops may only be grown on land which has a previous history of four cereal crops, is well isolated from crops of hay and silage and preferably on open fields not overhung with trees and shade. Such conditions are found on cereal farms and furthermore the mechanization needs of grass seed crops coincide with those for grain, namely adequate combine harvester strength and the availability of drying facilities. It is not surprising therefore that the South East of England and East Anglia produce the bulk of our home grown grass seed.

A popular break on the cereal farm is the one/two year red clover ley to produce hay for sale. The difficulty of making large areas into hay and the relatively low returns have put a limit on the popularity of this method of cropping. Technically, however, the system has much to commend it. Red clover being non-gramineous is a complete break from cereals. The crop makes no demand for nitrogen fertilizers and modern varieties are capable of producing up to five tons of dry matter in most seasons. Red clover for hay has a well deserved reputation as an excellent entry for winter wheat. Its popularity is likely

to increase with the availability of new and more productive varieties, many of which are resistant to the pests and diseases which have in the past restricted red clover cropping. It has to be admitted, however, that with modern methods of hay making the hay from red clover is of mediocre quality.

Lucerne is suitable for longer breaks of three to four years and is not popular due to its rigid management requirements, difficulties of establishment and its proneness to disease. It could stage a revival with the high cost of nitrogen and the availability of new, relatively disease free varieties. Its excellence as a break in the rotation is well proven. Again, the hay is of mediocre quality.

Green crop drying is a specialized enterprise and is unlikely to make widespread headway on the cereal farm. Suitable herbage crops for this purpose are tall fescue, Italian ryegrass and lucerne.

Grass breaks and livestock

Most grass break enterprises on cereal farms are associated with livestock. These farms have many advantages when compared with specialised grassland farms. Probably the most obvious advantage is the freedom from the vital necessity of "preserving" the pasture or ley at all costs to enable production to be maintained for a number of years. In most cases on the farms under discussion the grass break will last two or three or at most four years. This means that the grassland management can often be a secondary consideration, especially in the last year of the life of a ley since ploughing and reseeding is no problem. This can be a serious constraint on the grass farm especially during wet seasons. The arable farmer has another advantage, the ability to sow catch crops such as Italian ryegrass or stubble - turnips to supplement his winter fodder in times of scarcity. Machinery is always available for such operations and there is no shortage of an area of stubble which can be put to this use. The abundance of power on the cereal farm makes light work of any mechanical operations such as the making of silage, topping of pastures and cultivations for renewing grass.

Grass and Dairying

Dairy farming is frequently associated with cereal production. At the time when milking bails were popular it was not uncommon for the dairy herd to move round the farm and leys of three to four year duration were utilized for grazing sometimes integrated with conservation or supplemented by one year cutting leys. With the virtual disappearance of the bail the picture has changed. Fixed milking parlours with their associated yards, cubicles and silage and hay stores have meant a concentration of the grazing for the herd in the vicinity of these facilities with a separation of the conservation grassland to the more remote areas of the farm grown in rotation with the cereals. The permanent type of sward has become popular for the grazing area consisting of the late leafy perennial ryegrasses which thrive on close defoliation and heavy nitrogen fertilizing and are capable of forming a dense turf which minimizes poaching damage. Ploughing is rarely necessary so that the impact of this part of the farm on the fertility of the arable land is less than when bail milking was in vogue. The yarding of the animals in winter does, however, provide an abundance of dung which is available for use on the arable areas within easy reach. Hitherto referred to as the slurry problem, the situation is changing with the high cost of fertilizers and the slurry is rapidly becoming an asset and more serious attention is being given to its efficient disposal. Dairy cow grazing can be concentrated on as little as half an acre of grass so that the pasture area can have only a limited effect on the overall farm fertility.

Silage and hay for the dairy herd will come in the main from areas remote from the buildings but distance does have a bearing on the areas cropped for grass conservation. One or two year leys based on Italian ryegrass and early types of perennial ryegrass are normally used, with modest dressings of nitrogen. The difficulty of handling the very heavy cuts potentially available from the lavish use of nitrogen places a limit on the quantity of fertilizers applied.

Dairy herds usually often carry the appropriate number of followers. The arable farm is well placed for rearing with the possibility of newly sown leys free from parasitic infestation. The young stock frequently utilize the conservation areas and there are few problems in providing for their needs.

Grass and Beef

Beef is a popular enterprise and can be integrated with arable cropping rather more easily than dairying. There is no restriction to the vicinity of the buildings during the grazing season so that the full benefit of the ley break can be realised. As in the case of young dairy replacements health problems are more easily tackled and the provision of clean grazing presents few headaches.

There is a tendency to increase the intensity of stocking during the grazing period. While the process has not gone as far as with dairy cows a number of systems incorporating "paddock grazing" have been demonstrated for beef grazing allowing a heavier stocking capacity coupled with satisfactory growth rates. The 18 month system in which the animal is kept growing actively for the entire period to slaughter at eighteen to twenty-one months is popular on many farms while others are successfully practising more intensive systems with older finishing ages.

Building design too has revolutionized beef on many farms. Modern multipurpose buildings are popular, the building being frequently utilized for corn storage in the Autumn and early Winter and as a fattening yard during the later part of the winter.

Conservation is fairly easy on the cereal farm with its abundance of tractor power. Silage is the preferred form of winter feed as this is easily fitted into the work on the farm. Rapid ensiling is the key to success and this is easily achieved. The best silage is normally made in the vicinity of the animal yards but second quality material can be ensiled where grown and fed in the field on many classes of soil particularly in early winter and to store animals.

The finishing of store cattle is a frequently popular enterprise on the cereal farm. Possibilities exist for growing catch crops of Italian ryegrass, kale and other brassicas for grazing during the early winter with later fattening in the yards. The possibilities of feeding home produced grain and the abundance of cheap straw are an advantage denied to many other beef producers.

Beef systems are thus infinite in their variety and the cereal producer on dry land is uniquely placed to take advantage of the rather changeable scene and make the most of the prevailing market situation.

Grass and Sheep

Sheep production is the traditional adjunct to cereal growing. In the past the sheep were grazed on the red clover and roots considered necessary as a break to cereals. Today the scene is completely different, the sheep being carried much in the same way as beef on short term grass leys. To a large extent sheep have defied intensification so that on most cereal farms they are carried extensively and well below the numbers which have been demonstrated as feasible. Fencing is a deterrent to intensification but the cereal farm is well placed to take advantage of the disease control which is possible in this situation and is the key to more intensive production from sheep. The Grassland Research Institute is currently demonstrating the potential of sheep on the arable farm with highly fertilized short leys and rigid disease control.

In a similar way to the beef finisher on the cereal farm so the purchasing of autumn store lambs and early winter fattening is feasible and popular. Good autumn grass and roots are easily produced. Many producers too make high grade silage for part of the winter feed. The quantities necessary, however, are small and have a negligible effect on the cropping policy.

Some Benefits of Grass as a Break Crop

Continuous or close cereal cropping can lead to a number of problems such as the build-up of cereal diseases and pests, arable weeds such as couch, blackgrass and wild oats and a deterioration

in the structure or workability of the soil. The introduction of a break crop can do much to improve this situation. The improvement will depend on the duration and use to which the break crop is put.

The grass break gives an excellent rest from cereal diseases especially "take all" and the leaf and straw pathogens. A one year ley will alleviate the disease problem somewhat but greater benefit is derived from longer breaks of two or three years. Careful cropping with grass can reduce the incidence of weeds such as couch. In this instance the break can be a two-edged weapon and leys cut for conservation or herbage seed will encourage couch grass, and benefit will only be derived when longer ley breaks are used with intensive grazing. Wild oats are reduced during a grass break especially if the grass stays down for a number of years and there is no restriction to the use to which the grass may be put. Meadow grass is unlikely to be reduced during a grass break and a long period in grass would be necessary to effect much improvement in the case of blackgrass. The pests of grass can affect cereals and the seriousness of frit fly to grassland and to subsequent cereals has been fully appreciated only in recent years.

Cereal monoculture has been blamed for an alleged deterioration in soil structure. The situation is complicated since structure can be damaged in many different ways and soil types vary in their stability. It is generally agreed that a break in grass is beneficial to soil structure and workability due to the increase in soil organic matter which results during a period in grass and the return of animal residues from the associated livestock enterprise. The one year ley, however, cannot be expected to contribute much to soil organic matter unless large quantities of farmyard manure are available for surface application. The one year red clover ley has been mentioned earlier as an excellent entry for winter wheat. In this case the benefit is less to soil structure than an improvement in the soil nitrogen status following a leguminous crop and a temporary reduction in soil pathogens and pests. For a real improvement to soil structure a three year break in grass provides the best answer especially when associated with intensive livestock.

Grazed grass is more beneficial than that taken for hay, silage or grass seed and there is little to choose between the grass species. Cocksfoot has long been held in high regard for improving the structure of heavy soils but experimental evidence indicates that ryegrass is equally effective.

The cereal farmer then is in a situation where a number of alternatives are open to him to make profitable use of his grass break in the sequence of cereal crops. Many of the opportunities are unique to the cereal grower and enable him to enhance his fertility, break down cycles of disease and pests while at the same time building into his system the flexibility which is so necessary in modern farming practice.

## SECTION III : GRASSLAND POLICY AND PRACTICES ON 174 FARMS - J.A.L. Dench

### Introduction

In the study of cash break crops carried out by this Department in 1970 [1] a postal survey of nearly 1200 farms established the following broad patterns of cropping on "mostly cereals" farms [2] in Southern England.

| | Percentage of total farm area |
|---|---|
| Cereals | 67 |
| Non cereal cash crops | 7 |
| Fodder crops and fallow | 3 |
| Temporary grass and lucerne | 10 |
| Permanent grass | 10 |
| Rough grazing and other area | 3 |
| | 100 |

Comparison with the national cropping figures shows that these farms differed very little in terms of land use from the broader national average on this kind of farm and moreover that the picture has changed relatively little since then. The proportion of farm area which is devoted to grass - whether temporary or permanent - is (by definition) relatively small. But in absolute terms grass often forms an important and integral part of the farming system both solving and creating certain technical and economic problems. It was therefore decided as part of this Department's long-term interest in the general problem of break crops in Southern England, to examine the grassland aspect of these farms in more detail.

To this end a sub-sample of 174 farms was selected from the 1200 on which not less than 20 acres of temporary grass [3] existed. The selected farms were visited during 1972 when the farmers and farm managers involved kindly answered a detailed enquiry into the size, use and management of this grassland area. The purpose of this section, and of the next section, is to describe the results of that enquiry. In this section the emphasis is on a description of the farms and the grassland practices adopted; in the next it is on the more quantifiable findings for use in farm planning.

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1. Dench and others op cit.
2. "Cropping mostly cereals farms" defined by the M.A.F.F. as farms having over 50% of their standard man-day requirement devoted to cropping of which 50% or more is for cereal production.
3. Temporary grass in the sense that it was part of an arable rotation.

To do justice to the subject this section is lengthy and in order to facilitate easy reading it is, as far as possible, confined to text with most of the tables relegated to Appendix II. The topics that are touched on are as follows:



## Location and type of farm

The visited farms were located in the four counties of Berkshire, Buckinghamshire, Hampshire and Oxfordshire. Their detailed geographical and soil-type location and their broad production characteristics are shown in Table 1 and 2 of the Appendix. In Table 2 a dual classification by soil and production type[1], has been adopted that is frequently used (either separately or together) throughout the report.

Cropping patterns on the 174 farms for 1970 (the time of the original postal survey) and for the year in which they were visited for this study, 1972, are detailed in Appendix Tables 3 to 6. The average size of farm in the sample increased by approximately 40 acres (6%) during this period. The proportion under arable cropping declined very slightly but the proportion of arable devoted to cereals and to temporary grass both increased at the expense of a decline in the area of other cash crops. Temporary grass on the 174

1. See definitions Appendix I

farms in 1972 averaged 18% of the total farm area and a slightly higher proportion (20·8%) of the arable acreage only. On a percentage basis virtually all of the rest of the arable area was in one or other of the three main cereals: dominantly barley (42·6%) and wheat (25·9%). Generally there was little difference in cropping pattern between farms in the predominantly chalk or limestone soil areas and the others. But the relationship varied in the following way between cereals and temporary grass according to the nature of the livestock enterprise. Not unexpectedly the highest proportion of temporary grass was found on the dairy farms and the lowest on the non-livestock ones.

| | Single Suckle | Other Cattle | Dairy | Sheep | Cattle and Sheep | No L/S | All Types |
|---|---|---|---|---|---|---|---|
| Number of farms | 20 | 50 | 26 | 20 | 43 | 15 | 174 |
| | Percentage of arable area in 1972 | | | | | | |
| Cereals | 73·6 | 75·2 | 67·8 | 73·1 | 71·4 | 79·4 | 72·2 |
| Temporary Grass | 18·1 | 20·0 | 23·8 | 20·4 | 21·6 | 13·9 | 20·8 |

The proportion of permanent grass and rough grazing in the total farm area varied within slightly wider limits than the temporary grass (Appendix Table 6). At the lower end, it accounted for under 8% in the "sheep" group, but in the "single suckle" group the proportion was nearly 14% of the farm area. These two extremes may well be a reflection of the suitability of these two classes of livestock for utilizing permanent grass and rough grazing. In many cases this area represented an irreducible minimum of relatively unploughable land, the utilization of which was stated by a number of farmers as a reason for keeping a grazing livestock enterprise. An additional area of temporary grass being necessitated in order to support a viable sized unit.

The Place Occupied by Grass in the Crop Rotation

Whilst rotation or cropping sequences may not be rigidly adhered to by many farmers, most of those in the survey had some sequence of crops in mind when planning their cropping policy (Appendix Table 7). Many farms were operated under two or more separate rotations to suit blocks of land having different soil types or accessibility, i.e. continuous cereals or barley, or a sequence including a break crop other than grass on part of their area.

Clearly (Appendix Table 7) the most usual crop to follow grass was wheat - after about 80% of the grass breaks - with barley very much second in frequency. In about 50% of the cases where a barley or an oat crop followed a ley it in turn was followed by one or two wheat crops before the land again carried barley. This practice, of introducing a barley crop between a ley and the following wheat crop or crops was a little more common in the "chalk/limestone" areas than in "other soils" areas. The crop preceding a ley was even more universal, 85% of the leys followed barley. In the few instances where crops other than wheat or barley either preceded or followed a ley they were usually adding an additional year to the break from cereal growing provided by a short ley.

From Appendix Table 8 it will be seen that 5, 6 and 7 year rotations were the most common and that one, two or three year leys respectively were very roughly associated with them, although more one year leys occurred in the 6 years rotations that in any other. Appendix Table 9 shows that there was a roughly similar association of three, four and five year cereal runs following one, two and three year leys, although within this grouping there was very little relationship between length of ley and the length of the following cereal run. Similarly with the number of wheat crops grown after a ley (Appendix Table 7), the most popular number was two with a single crop in close second place. The ley was not followed by wheat in rather more rotations on the "chalk/limestone" soils than on the "other soil" types. Although there was again no close association, a single wheat crop most frequently followed a one year ley and two years of wheat frequently followed the two year leys on both soil types.

Thus a general picture emerges of the most common cropping sequence as being of six years duration with a two year ley break followed by one or two wheat crops depending on weed and fertility conditions followed in turn by three or two barley crops. This, although giving roughly the same proportions of wheat to barley as shown in Appendix Table 4, represents a higher proportion of grass to cereals than in the sample as a whole. The "non-grass" rotations and areas under continuous cereals will account for this difference.

Why is temporary grass grown on cereal farms?

In both the 1970 and the 1972 surveys co-operating farmers were asked their reasons for growing temporary grass. Seven possible reasons were suggested and other reasons specified by the farmers were noted (Appendix Table 10). The overall response from the 174 farms indicated the following order of priorities in 1972.

| | Replies % of 174 farms [1] |
|---|---|
| To improve cereal yields | 70 |
| To maintain soil structure | 70 |
| To control persistant weeds | 45 |
| For cereal disease and pest control | 44 |
| For the income generated (mostly through livestock) | 30 |
| To keep down fertilizer costs for cereals | 28 |
| As a short duration crop in place of a full bare fallow | 18 |
| Other reasons | 37 |

The most frequently given "other reasons" for growing grass were to provide feed for livestock, i.e. it was dictated by the livestock policy, and secondly to provide a wheat entry - probably linked to the leading reason "to improve cereal yields".

Slight differences in the order of priorities are apparent between 1970 and 1972, and between the different groupings within the 174 farms but the general pattern was fairly consistant. There was, for example, a shift away from regarding grass as an income generator between 1970 and 1972. As might be expected, the "no livestock" farmers who grew grass emphasised the income generation aspect more than the livestock farmers, but to a much lesser extent in 1972 than in 1970 as a result of the poor market for hay in that period. Again not surprisingly, the "other soils" farmers emphasised the beneficial influence of grass on soil structure to a greater extent than did the "chalk/limestone" farmers, the former placing this first above the benefits to cereal yields in 1972. The fact that a large proportion of the "cattle and sheep" group of farms were situated in "other soils" areas [2] may account for the emphasis placed on soil structure benefits by this group.

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1. Percentages add to over 100 because grass was usually grown for several reasons
2. See Appendix Table 2.

Factors dictating the proportion of arable area which is devoted to temporary grass

| | Replies % of 174 farms |
|---|---|
| Rotational reasons | 60 |
| Livestock requirements | 50 |
| Other factors | 15 |

Rotational requirements were given as the main factor dictating the area of temporary grass (Appendix Table 11) on all except "dairy" farms and the "cattle and sheep" and "other cattle" farms in "chalk/limestone" areas. The emphasis for these groups was placed on the requirements of the livestock. Relatively few "other factors" were given: field size, a use for land unsuited to arable cropping and production of hay for sale being the most common.

Problems associated with grassland (Appendix Table 12)

Just one third of the 174 farmers stated that they experienced technical and managerial problems in connection with grassland, one quarter said that its inclusion in the farm cropping system involved problems of capitalisation for livestock and over a fifth claimed that weed problems were created by temporary grass. Some experienced all three. Technical/managerial problems appeared to be least frequent on the "sheep" farms and most prevalent in the "no livestock" group and on farms in "other soils" areas. The four most common problems, accounting for over 50% of the replies on this theme were, in order of frequency:

(i) Fencing for livestock.
(ii) Difficulties in ley establishment including poor yields from undersown cereals.
(iii) Problems created by the labour requirement for conservation and difficulties associated with effective conservation.
(iv) Difficulties in utilizing grass profitably including poor profitability of grazing livestock enterprises.

Capital problems were rather more prevalent on "single suckle" and "cattle and sheep" farms than the other groups, possibly due to their investment in beef cows - an enterprise having a fairly slow turnover. By far the major difficulty in this context was the capital investment required for the livestock themselves, but capital for fencing and water supplies also imposed restrictions on some farms. In relatively few cases was the capital requirement for buildings mentioned.

In spite of the fact that 45% of farmers in the sample claimed to grow temporary grass in part at least because it helped to check or control persistant weeds in cereals, 22% also claimed that grass itself gave rise to weed problems. Significantly perhaps a very much smaller proportion of the "no livestock" group made this assertion. The weeds most frequently mentioned were couch,, followed by volunteer grasses in the succeeding cereal crops. Other weeds mentioned were black-grass (mainly in "other soils" areas) and wild oats (mainly in "chalk/limestone" areas).

Cereal crop disease and pest problems associated with temporary grass appeared to be of very minor significance, the pests being mainly leather jackets and slugs (on "other soils"). The only cereal disease getting a mention was mildew.

Livestock numbers and composition of the forage acreage

Attention has already been drawn to the basis used for grouping the 174 farms according to their livestock enterprises. It may be appropriate at this stage however to describe in a little more detail, the type and number of livestock (Appendix Table 13) and the composition of the forage area (Appendix Table 14) in the six groups. The essential outline presented in the following Table shows clearly that in all groups except the "no livestock" group the whole basis of the grass and forage systems is grass utilized by cattle or sheep. Other forage crops are of relatively small importance and the other uses of grass also account for a relatively small area.

## Livestock Numbers

Grazing livestock per 100 adjusted acres[1] of forage grassland

| | Single Suckle | Other Cattle | Dairy | Sheep | Cattle and Sheep | No L/S |
|---|---|---|---|---|---|---|
| Dairy Cows | - | - | 34 | - | - | - |
| Beef Cows | 36 | 3 | 2 | - | 13 | - |
| Other Cattle | 64 | 100 | 50 | - | 48 | - |
| Ewes and Rams | - | - | 18 | 302 | 90 | - |
| Other Sheep over 6 months | - | - | 4 | 76 | 59 | - |
| Outdoor Sows and Boars | - | 1 | 2 | 2 | 5 | - |
| Pigs under 4 months | - | .. | .. | .. | 20 | - |

## Composition of forage area

acres per farm

| | | | | | | |
|---|---|---|---|---|---|---|
| Adjusted acres[1] of forage grass per farm | 220 | 138 | 389 | 112 | 211 | 95 |
| Add: | | | | | | |
| Fodder crops | 9 | 2 | 23 | 10 | 17 | - |
| Purchased keep and fodder (acres equivalent) | 4 | 3 | 5 | 3 | 7 | - |
| Deduct: | | | | | | |
| Keep let and area used by pigs and horses | 9 | 5 | 16 | 7 | 10 | 24 |
| Acreage equivalent of hay sold | 6 | 10 | 5 | 11 | 22 | 51 |
| =Forage acres per farm used by cattle or sheep | 218 | 128 | 396 | 107 | 213 | - |
| Average forage acres per grazing livestock unit | 1·62 | 1·61 | 1·55 | 1·45 | 1·60 | - |

1 Adjusted for grazing equivalent of rough grazing

Symbols: - means Nil

.. means less than 0·5

Composition of the Temporary Grass Area - Duration

A breakdown of the temporary grass acreage on the 174 farms according to its duration (Appendix Table 15) reveals a roughly similar pattern to that derived from the crop rotation analysis. Leys over three years duration, however, account for a larger proportion of the grass area than the rotation analysis would indicate. This may be because a number of long leys were in fact shorter leys left down for an extra year or so.

Two year leys account for a little over one third of the temporary grass area excluding that set aside for herbage seed production, more on the "chalk/limestone" farms than on those in the "other soils" areas.

Composition of temporary grass area

| | Chalk Limestone | Other Soils | All Types |
|---|---|---|---|
| | % | % | % |
| 1 year leys | 22 | 14 | 18 |
| 2 year leys | 42 | 30 | 35 |
| 3 year leys | 30 | 23 | 27 |
| Over 3 years | 6 | 33 | 20 |
| | 100 | 100 | 100 |

Another feature is the higher proportion of shorter leys on the "chalk/limestone" farms (64% of the area was down to one and two year leys compared with 44% on the "other soils" farms).

When the composition of the grassland area is related to the type of livestock enterprise instead of soil type it appears that the shorter leys are particularly favoured by the specialist "sheep" farmers and the "no livestock" group also, to a lesser extent, by the two groups having beef cattle only.

| Livestock enterprise group | Percentage of temporary grass down to 1 and 2 year leys |
|---|---|
| Single Suckle | 59 |
| Other Cattle | 61 |
| Dairy | 52 |
| Sheep | 79 |
| Cattle and Sheep | 37 |
| No livestock | 69 (63% 1 year) |
| All types average | 53 |

There may however be some connection between these proportions and the soil type area because half the "dairy" farms and nearly three quarters of the cattle and sheep farms are situationed in "other soils" areas (Appendix Table 2).

Method of Ley Establishment

The most usual method of ley establishment was by undersowing to a cereal crop, almost invariably barley (Appendix Table 16) as opposed to direct seeding.

| | Propertion of temporary grass area | | |
|---|---|---|---|
| | Chalk/Limestone | Other Soils | All Types |
| | % | % | % |
| Undersowing to a cereal | 86 | 68 | 76 |
| Direct sowing | 14 | 32 | 24 |
| | 100 | 100 | 100 |

Undersowing was rather more usual for one and two year leys than for leys of 3 years duration but the proportion of leys of over 3 years duration which were established by undersowing was greater than for 3 year leys. One inference which may be drawn from this is that, as indicated in the previous section, some leys reported as of over 3 years duration were origianally intended to be of shorter duration.

When the method of establishment is examined in relation to the livestock enterprise on the farm it is noticeable that a smaller proportion of the temporary grass area was established by undersowing (61%) in the "dairy" group than in any of the others. This may be a reflection of the importance placed on productive grassland for this enterprise.

Composition of the Temporary Grass Area - Types of seeds mixture

The most striking feature in the analysis of seeds mixtures overleaf .and in more detail in Appendix Tables 17 and 18) is the very small proportion of the temporary grass area which is down to leys which do not contain ryegrass. This must considerably reduce the value of leys in general as a check to cereal disease. Notable exceptions are the leys of over three years duration, just over a third of the area of these did not contain ryegrass. However, the figures clearly show the popularity of ryegrass either alone or in mixtures with other grass species and clovers.

| Types of seed mixture | Proportion of temporary grass area | | |
|---|---|---|---|
| | Chalk Limestone | Other Soils | All types |
| | % | % | % |
| I.R.G. only or with clover | 16·0 | 14·3 | 15·1 |
| I.R.G. + P.R.G. only or with other species | 25·0 | 27·5 | 26·4 |
| P.R.G. only or with other species | 51·2 | 38·2 | 44·6 |
| Non ryegrass mixtures | 5·0 | 14·8 | 9·9 |
| Not stated | 2·8 | 5·2 | 4·0 |
| | 100·0 | 100·0 | 100·0 |

| Types of seed mixture | Intended duration of ley | | | | |
|---|---|---|---|---|---|
| | 1 year | 2 years | 3 years | over 3 years | all leys |
| | % | % | % | % | % |
| I.R.G. only or with clover | 50·9 | 12·1 | - | - | 15.1 |
| I.R.G. + P.R.G. only or with other species | 30·5 | 31·9 | 24·4 | 15·7 | 26·4 |
| P.R.G. only or with other species | 9·6 | 47·4 | 67·7 | 49·7 | 44·6 |
| Non-ryegrass mixtures | 4·3 | 3·6 | 3·6 | 33·5 | 9·9 |
| Not stated | 4·7 | 5·0 | 4·3 | 1·1 | 4·0 |
| | 100·0 | 100·0 | 100·0 | 100·0 | 100·0 |

Appendix Table 18 presents an analysis of the seeds mixtures by livestock enterprise grouping as well as by intended duration. In view of the small acreages involved in some of the categories it would be unwise, however, to draw many conclusions from this analysis.

Methods of Grassland Management

The combinations of cutting and grazing treatment, and systems of grazing management, practiced on the 159 farms which carried livestock are summarised below and a more detailed analysis will be found in Appendix Tables 19 and 20.

| Cutting/Grazing Treatment | Percentage of 159 farms on which the treatment or system was operated over at least part of the grassland area. |
|---|---|
| | % |
| Alternate cutting and grazing through the season | 37 |
| Separate cutting and grazing blocks for part of the season | 47 |
| Areas set aside for cutting only | 36 |
| Areas set aside for grazing only | 50 |
| Zero grazing | 1 |
| **Grazing Management System** | |
| Set stocking | 57 |
| Rotational paddocks | 36 |
| Rotational paddocks in large blocks or fields | 13 |
| Forward creep (for sheep) | 2 |
| Sideway creep ( " " ) | Nil |
| Rotational strips without a back fence | 7 |
| Rotational strips with a back fence | 3 |
| No system. | 13 |
| Not stated | 9 |

Note: 159 farms = 100%. Many farms operated more than one system.

With the exception of grass areas intended for cutting only, a combination of cutting/grazing treatment and grazing management would be operated on any given piece of grassland. For example alternate cutting and grazing might be operated with rotational paddock grazing. The high proportion of replies stating that the grazing management was set stocking may be a little suspect. Although many farmers may try to manage their grazing on a set stocking basis the system adopted might not in all cases be regarded as set stocking in the strict sense.

Quite a large proportion of the grass area, especially of shorter duration leys, was set aside for cutting only. This implies not only grass grown for this purpose alone but also leys set aside for cutting only in a particular year of their life i.e. the first or the second year of a two year ley.

In whatever light one may regard the pattern of replies on grazing management, they show clearly the popularity of systems having a low labour requirement and the tendency to avoid the more "intensive" strip and creep systems. Even in the "dairy" group only a third of the farms practiced some form of strip grazing.

Areas of grassland used for conservation

The proportions of the adjusted area of forage grassland mown for conservation are summarised below, (see also Appendix Table 21). The proportions are calculated on the area mown including the areas of any second cuts.

Conservation per 100 adjusted acres of forage grass

| | Single Suckle | Other Cattle | Dairy | Sheep | Cattle & Sheep | No L/S | All Types |
|---|---|---|---|---|---|---|---|
| Hay | 30 | 46 | 24 | 40 | 30 | 62 | 34 |
| Silage | 18 | 9 | 20 | - | 2 | - | 11 |
| Haylage | - | - | 3 | - | 1 | - | 1 |
| Drying* | - | - | - | - | 6 | - | 2 |

*One farm with a commercial grass drying plant - nearly all the production sold.

Hay was clearly the most important method of conservation and only on farms having a sizeable beef or dairy cow population did silage play a significant role.

Fodder Crops

From the Table on page 21 and Appendix Table 13 it will be seen that the contribution from fodder crops was on average fairly small although they made a significant contribution to livestock feeding on some farms. The composition of the forage crop area is set out in Appendix Table 23. Kale type crops accounted for a major part of the fodder crop area on the cattle and dairy farms while roots made a more significant contribution on the farms carrying sheep. Only on dairy farms were arable silage crops including maize of any importance.

## Composition of Fodder Crop Area

| | Single Suckle | Other Cattle | Dairy | Sheep | Cattle & Sheep | All live-stock farms |
|---|---|---|---|---|---|---|
| Kale | 50 | 58 | 54 | 48 | 24 | 39 |
| Roots | - | 5 | - | 40 | 42 | 22 |
| Other including rape, mustard mixtures and rye | 50 | 26 | 2 | 12 | 29 | 17 |
| Cereal silage | - | - | 35 | - | 5 | 17 |
| Lucerne | - | 11 | 9 | - | - | 5 |
| | 100 | 100 | 100 | 100 | 100 | 100 |

## Arable by-products and catch crops

The contribution to animal feed by arable by-products and catch crops is indicated in Appendix Table 22. Significant, though not large, by-product contributions came from herbage seed straw and a certain amount of autumn and spring grazing on the herbage seed area. The extent of both these contributions depend very much on the species of herbage being grown for seed. The grazing of winter cereals also provide some early spring keep for sheep.

Of the catch crops, stubble turnips accounted for the largest area followed by stubble grazings of Italian Ryegrass.

| | Composition of total area of catch crops grown on 159 livestock farms % |
|---|---|
| Stubble Turnips | 33 |
| Italian Ryegrass | 25 |
| Rape or Rape and Turnips | 24 |
| Other types of catch crops | 18 |
| | 100 |

Past, Present and Future Livestock Policies

The reasons why any business proprietor makes a particular change or adopts a certain policy in his business tend to be highly individual and dictated by a number of particular personal circumstances. Thus any attempt to analyse reasons, considerations or factors contributing to the policies adopted by a relatively small group of 174 farmers is bound to result in a multiplicity of answers which present no very coherent pattern. Especially if the decisions in question are taken at differing periods in time. There are, however, a number of salient features which emerge, some of which are summarised below.

(1) A fairly high proportion of farmers have persued their present livestock system without major change for over 10 years:

| | Single Suckle | Other Cattle | Dairy | Sheep | Cattle & Sheep | No L/S |
|---|---|---|---|---|---|---|
| Proportion of farmers operating present system for 10 years or more | 35% | 36% | 42% | 45% | 56% | 47% |

Many claimed not to have made any major change for a great deal longer than ten years.

(2) Personal preference was the most frequently mentioned consideration involved in the original choice of system, considerations involving labour requirements or utilization and suitability of land or grassland for a particular livestock system also played an important part.

The three most frequent considerations in each group including "ties" for one of the three "placings" were:

| | Proportion of number of holdings in each group | | | | | |
|---|---|---|---|---|---|---|
| | Single Suckle | Other Cattle | Dairy | Sheep | Cattle & Sheep | No L/S |
| | % | % | % | % | % | % |
| Personal preference | 45 | 34 | 35 | 55 | 33 | 27 |
| To utilize land/grassland better suited to the enterprise | 30 | - | 31 | - | 23 | 20 |
| Low labour requirement or to improve farm labour utilization | 30 | 30 | - | 25 | 43 | - |
| Simplicity of the system | 30 | 28 | - | - | - | 40 |
| Tradition | - | - | 42 | - | - | - |
| To improve soil fertility through grassland | - | - | - | 25 | 23 | - |
| Low capital requirement | - | - | - | 35 | - | 20 |

Note: The percentages add to more than 100% because frequently more than one consideration was involved.

It is interesting that simplicity of the system does not appear among the sheep farm "placings".

(3) In the period 1968 to 1971 the pattern of changes made in livestock enterprises showed no particular pattern of shift out of one type and into another except for a movement out of milk production (6 "from" 2 "into"). For the other enterprises the movements "from" were broadly balanced by the movement "to" similar types of enterprise within the sample of 174 farms. There was however, a tendency to increase the size of existing livestock enterprises, nearly 10% of the 174 farms did so as against just over 2% who reduced their livestock during this period. Other frequently made changes, i.e. those occurring on 5% or more of the total of 72 farms making some form of change, were as follows:

| | Percentage of 72 farms: Changing from | Changing to |
|---|---|---|
| Single suckle selling weaned calves or stores | .. | 5·6 |
| Single suckle selling fat | 6·9 | 5·6 |
| Rearing purchased calves - selling weaned calves | 6·9 | .. |
| Rearing purchased calves - selling weaned stores | .. | 9·7 |
| Rearing purchased calves - selling fat | 11·1 | 12·5 |
| Purchased stores - selling fat | .. | 8·3 |
| Purchased stores - selling as stores | - | 5·6 |
| Milk production | 8·3 | .. |
| Breeding ewe flock selling fat lambs | 9·7 | 5·6 |

Note: - means nil; .. means less than 0·5%

The possible combinations of change of enterprise are, of course, enormous so that here again no very distinct pattern emerges. The most frequent combination of "from" and "to" occurring were:

| Enterprise given up | Enterprise introduced | Number of farms |
|---|---|---|
| Purchased calves sold fat | Purchased calves sold as stores | 4 |
| Milk production | Purchased calves sold fat | 3 |
| A breeding ewe flock selling lambs fat | Purchased calves sold fat | 3 |

The first of the changes listed above was probably a reflection of the very high store cattle prices ruling in 1971-72 resulting in little margin on finishing store cattle. The second change in the list may well reflect the application of skills existing on dairy farms to an alternative enterprise.

(4) Only two reasons for changes in the period 1968 to 1971 stand out: the need to improve labour utilization or to accommodate a shortage of suitable labour (on one third of the farms making a change) and secondly in order to improve soil fertility through grassland utilization by livestock (18% of farms).

(5) In relation to the changes they had made, the farmers making them were asked specifically whether any of three particular considerations influenced these decisions:

| | Percentage of 72 farms making a change 1968-71 |
|---|---|
| Expansion of the farm business | 42 |
| Profit per acre devoted to the enterprise | 33 |
| Return on capital invested | 25 |

Perhaps the most interesting feature of these replies is the proportion of farmers (over a quarter) for whom none of these factors were important considerations and secondly the small proportion who considered that return on capital was an important factor.

(6) Fresh injections of capital were, however, required in over 60% of the changes made, mainly for livestock but also quite frequently for buildings. The most usual source other than transfer from the enterprise discontinued, was outside borrowing, i.e. from banks, but fresh introductions of the farmers' own capital from some off-farm investment was also quite frequent (31% of farms introducing fresh capital). Investment through the gradual build-up of the enterprise, i.e. saving through deferred output, was a less common though not unusual source of capital (over 8% of farmers).

(7) No change was planned for the immediate future in the livestock enterprise on 40% of the 159 farms in the sample which carried livestock and of the 60% planning a change of some sort nearly a third were simply planning to expand their existing enterprises. For the others a multiplicity of possibilities again precludes any distinct pattern. The two most frequently mentioned enterprises which farmers had definite plans to move into were milk production (5 farms) - in contrast to the changes in the previous four years - and single suckle cow herds selling the progeny fat (5 farms). The retention of surplus dairy calves and rearing them for beef was planned on another four dairy farms. Perhaps not surprisingly, fattening purchased store cattle was the only enterprise which can be singled out as one which any member of farmers were planning to give up.

(8) Reasons given for the changes planned, follow roughly the pattern evident in some of the previous analysis tables. Farmers planning expansion of their livestock numbers gave the following reasons most frequently:

| | Percentage of farmers planning a change |
|---|---|
| The improved profitability of livestock | 44 |
| To expand or intensify the farm business | 13 |
| To improve the farm fertility through grass and livestock | 12 |

and farmers planning other changes, i.e. from one enterprise to another or the introduction of a fresh enterprise were mostly prompted by the following:

| | |
|---|---|
| The improved profitability of livestock | 16 |
| Difficulty in obtaining calves or the high price of calves for rearing | 16 |
| To reduce labour requirements because of cost or labour shortage | 14 |

(9) In 1971-72 the impact of E.E.C. membership on farmer's decisions was not very great. Of the 159 livestock farms in the sample just under 40% said that this was a factor influencing their future plans.

(10) Response to the question "have you ever seriously contemplated giving up livestock" provides further evidence of the importance attached to grassland and grazing livestock enterprises on a large proportion of cereal farms. Nearly 85% of the 159 livestock farms replied "No". Problems in livestock management and the desire for a simplified system appeared to be factors influencing the 6% or so of farmers who had considered giving up their livestock enterprises.

The few farmers who had farmed without livestock in the past but had abandoned doing so, gave their reasons for keeping livestock again as poor profits from cereals and an increase in weed problems.

The special case of non-livestock cereal farmers

Questions on policy which were put to the small group of 15 non-livestock farmers (all of whom had some area of temporary grass) of necessity differed from the questions designed for the livestock farmers.

The fairly high proportion (4 out of the 15) who had been operating their system for over 20 years (in "other soils" as well as "chalk/limestone" areas) indicates that in the right hands such systems can operate successfully for an indefinite period. Further evidence of this is offered by the fact that three out of these four farmers (and 8 out of the 15) had no intention of keeping livestock again under any foreseeable circumstances. Two of the 15 however were in effect farming with livestock by taking in their neighbours' animals at keep or letting the grass.

The most frequent reasons given for originally giving up livestock were labour problems (5 farms) and inadequate buildings, fencing or water supplies (4 farms). Three farmers inherited their non-livestock systems and three others mentioned the high capital requirements of livestock as a factor in their decision to operate non-livestock systems.

Hedges

The general impression conveyed by farmers' answers to questions about hedges was that with the aid of modern trimming machines and contractors' services hedge upkeep presented few problems and no great cost. Although 37% of livestock farmers claimed that they did not retain the hedges they had in order to provide shelter for their livestock 57% did do so partly at least for this reason. Comments indicated that most farmers had already reduced the hedges on their farms to the minimum that they considered desirable and a few were considering replanting some.

Conflicts between the labour requirements of grassland and cereals

The main labour demands associated with grassland are those of the livestock which utilize it and that required for its conservation. Although the labour demands of livestock are generally more level than those of cereal production, many livestock enterprises require constant if minimal attention which can be an embarrassment at such peak times as cereal sowing and harvest. Also, even with the best of planning,

busy times with the livestock such as lambing, calving, yarding etc. can conflict in an abnormal season, particularly with drilling. Labour requirements for grassland consdervation on the other hand, although critical in timing, tend to fall into a period when the requirements of cereal production are low - between spraying and harvest - and so create few problems. In a number of cases conservation fitted in well to the extent of levelling up the labour demand through the summer. The relative importance of both the potential points of conflict is indicated by the proportion of farms on which difficulties were experienced:

| | Proportion of 159 livestock farms on which there was conflict at certain periods with labour requirements for cereal production |
|---|---|
| Labour demands by livestock enterprise | 30% |
| Labour demands of grassland conservation | 8% |

Spring drilling was the most frequently mentioned "problem" time followed much less frequently by Autumn drilling and still less frequently be difficulties at harvest time. The available labour at these times was "stretched", usually by working longer hours and by keeping the attention given to livestock down to a minimum, also by the use of contract or casual labour in some instances. The general tenure of the replies, combined with the high proportion stating that there was no problem, conveyed the impression that most difficulties were avoided by careful selection of the livestock enterprise or by planning to avoid a combination of peak requirements. Also, especially on larger farms, through having the livestock units of sufficiently large size for them to be self contained in terms of labour, except for occasional help, and by mechanization of such jobs as bale handling the cost of which can be spread over straw as well as hay.

## SECTION IV: GRASSLAND PERFORMANCE - LIVESTOCK OUTPUT AND PRINCIPAL INPUTS - J. A. L. Dench

*The reader is advised to read the following text carefully before attempting to use or interpret the data contained in this section.*

### Explanation of the data

The tables in this section have been compiled from data collected on a survey (question and answer) basis rather than from purposely kept records on the farms involved. The performance standards presented here are therefore intended as a guide to the levels of input and output achieved by grazing livestock enterprises on cereal growing farms in Southern England rather than as an exact record of performance on the particular farms included in this survey. Also, output and the main inputs have been shown as far as possible in physical terms the reader being left, in times of rapidly changing prices and costs, to apply current values.[1]

The reader is especially asked to note that some variable and fixed inputs have been omitted. In the case of variable costs this has been either because they are relatively small (e.g. sprays for grassland) or are fairly easily ascertained from the various farm management handbooks and enterprise study reports available, and are not likely to be markedly different on these farms (e.g. veterinary fees and medicines and the cost of seed for grassland and forage). Certain fixed costs have not been shown, not because they can be ignored but because their assessment would have involved a major additional task which lay outside the scope of this particular survey (e.g. labour and tractor costs for grassland and for hay and silage making, also investment in permanent fencing and water supplies).

### Use of the Data

It is intended that the main use of this section will be to provide a bases upon which to build budgets for actual or modal situations. The main economic features of a variety of grazing livestock enterprises have therefore been described in the hope that they can be varied to fit a fairly wide range of circumstances on cereal farms.

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1. Capital investment in machinery and equipment for grassland and livestock is the only item which is stored in financial terms (based on 1974 new values) because of the difficulty of finding meaningful physical measures.

The data have of necessity, been grouped into five main types of grazing enterprise[1] as follows:-

1. Single suckling
2. Other cattle (but not dairying)
3. Dairying
4. Sheep
5. Cattle and sheep

Tables showing the physical distribution of the origin and sales of livestock within these groups have been placed in Appendix III leaving the main set of tables that comprise this section to itemise the more important details of performance in terms of physical production and the principal inputs used to create that production. There are 12 main tables presented without text and dealing with:

1. Performance of livestock enterprises
2. Composition of livestock "output" and "input"
3. Concentrate feeding - farms with beef cattle only
4. Concentrate feeding - farms with dairy cows, sheep only, and cattle and sheep.
5. Concentrate feeding - some specific enterprises
6. Fertilizers
7. Labour
8. Machinery and equipment - capital
9. Machinery and equipment - an inventory
10. Buildings - age, type and usage.
11. Buildings - cost of construction 1967 to 1971
12. Field boundary maintenance

An indication of how the data contained in these tables may be used in building up a budget for an actual or modal situation is presented opposite. It depicts the kind of financial margin per forage acre over certain specified variable and fixed costs that might be expected at prices reigning at the time of going to print (i.e. late 1975), on a mixed cattle and sheep farm of the type comprising group 5 in this survey. The final result, of course, will always depend greatly on the proportions of any specific holding devoted to cattle and to sheep respectively as well as on the price and cost levels which are taken to be relevant at the time.

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1. See Appendix I for a full definition of these five groups.

## EXAMPLE CALCULATION OF FINANCIAL VALUES FOR CATTLE AND SHEEP FARMS

| | Table Number | Physical measure used | Standard value per unit (1) | Calculated Output/Input | Per forage acre |
|---|---|---|---|---|---|
| | | | £ | £ | £ |
| **Output** | 4 | Adjusted liveweight output per forage acre = 4.04 cwt | | | |
| Cattle | | 64% cattle = 2.59 cwt | 25.75 | | 67 |
| Sheep | | 36% sheep = 1.45 cwt<br>= 1.45 x 112 x 50% = 81 lbs D.C.W. | 0.36 | | 29 |
| | | | | Total | 96 |
| **Variable inputs** | | | | | |
| Concentrates (may be priced in more or less detail) | 4 | Cwt. per livestock unit | | | |
| | | Cereals 6.22 | £70/Ton | 21.77 | |
| | | Compounds 2.80 | £80/Ton | 11.20 | |
| | | Others 0.39 | £85/Ton | 1.60 | |
| | | 9.41 | | 34.57 | |
| | | 34.57 ÷ 1.6 forage acres per livestock unit = | | | 22 |
| Fertilizers | 6 | Units per forage acre | | | |
| | | N = 85) 2 cwt. compound | £85/Ton | 8.50 | |
| | | P = 30) 1½ cwt. nitrogen | £55/Ton | 4.13 | |
| | | K = 20) | | 12.63 | 13 |
| Other variable costs | Footnote (3) | Seed for leys and forage | | 2 | |
| | | Sprays and sundry for grassland | | 1 | |
| | | Veterinary fees & medicines | | 4 | |
| | | | | 7 | 7 |
| | | | | Total | 42 |
| Gross margin | | 96 - 42 = | | | 54 |
| **Fixed costs**(2) | | | | | |
| Labour for livestock | 7 | Man-days per forage acre = 1.48 £10 per man-day | | | 15 |
| Machinery & equipment | 8 | Capital per forage acre 1974<br>= 20.2 + price index change since 1974 (say 45%)<br>= 29.3 @ 15%<br>= annual charge for depreciation & repairs | | | 4 |
| | | | | Total(4) | 19 |
| Margin per forage acre over above costs | | | | | 35 |

(1) For the purpose of example only.

(2) Costs of this type are not directly proportioned to the size of the unit so that the figures compiled on a per acre basis will be a very approximate guide only to the total level of these costs for a unit of a given size.

(3) Based on figures published in farm management handbooks: Farm Business Data, University of Reading
Farm Management Pocketbook, by J.Nix, Wye College.

(4) General farm labour and machinery costs may not be greatly affected by a change in the use of part of a farm from cereal growing to grass and livestock production although an improved spread of requirements, e.g. haymaking in place of harvest, may allow some reduction. Additional capital requirements for buildings for livestock and for fencing will depend very much on the individual farm situation.

TABLE I

## THE PERFORMANCE OF GRAZING LIVESTOCK ENTERPRISE

| Group | | Single Suckle | | Other Cattle | | Dairy | | Sheep | | Cattle & Sheep | | All Farms with Livestock | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ave | Prem[1] | Ave | Prem[1] | Ave | Prem[1] | Ave | Prem[1] | Ave | Prem[1] | Ave | Prem[1] |
| Number of farms | | 20 | 5 | 50 | 12 | 26 | 7 | 20 | 5 | 43 | 11 | 159 | 40 |
| | | | | | | | Acres | | | | | | |
| Forage acres per farm | | 218 | 168 | 128 | 96 | 396 | 376 | 107 | 118 | 213 | 150 | 203 | 172 |
| Forage acres per grazing livestock unit | | 1.62 | 1.11 | 1.61 | 1.03 | 1.55 | 1.16 | 1.45 | 1.01 | 1.60 | 1.13 | 1.58 | 1.11 |
| | | | | | | | Liveweight in hundredweights | | | | | | |
| Livestock output per[2] forage acre | cwt. | 3.50 | 6.26 | 5.37 | 11.19 | 6.46 | 9.55 | 3.52 | 5.37 | 4.04 | 6.76 | 4.97 | 8.39 |
| Liveweightoutput per[2] grazing livestock unit | cwt. | 5.67 | 6.95 | 8.65 | 11.53 | 10.01 | 11.08 | 5.11 | 5.43 | 6.46 | 7.64 | 7.85 | 9.31 |
| | | | | | | ANNUAL NUMBER OF HEAD PER 100 FORAGE ACRES (See Table 2 for breakdown) | | | | | | | |
| Cattle output (sales plus home reared replacements) | | 46.5 | 81.4 | 88.3 | 170.1 | 36.6 | 54.4 | - | - | 39.1 | 72.1 | 46.4 | 76.7 |
| Cattle purchases[3] | | 13.4 | 41.1 | 86.8 | 172.0 | 3.8 | 9.9 | - | - | 26.6 | 63.9 | 27.7 | 53.1 |
| Sheep output (sales plus home reared replacements) | | - | - | - | - | 40.7 | 50.1 | 477.8 | 732.4 | 205.3 | 226.2 | 102.8 | 136.5 |
| Sheep [3] purchases | | - | - | - | - | 9.3 | 38.0 | 30.4 | 33.9 | 56.5 | 27.3 | 21.1 | 24.0 |
| | | | | | | ANNUAL REPLACEMENTS PER 100 BREADING ANIMALS | | | | | | | |
| Breeding herd replacement | | | | | | | | | | | | | |
| Heifers per 100 cows | | 11.0 | 10.6 | - | - | 22.7 | 24.7 | - | - | - | - | 13.5 (18 SS herds) | 14.1 (6 S.S.herds) |
| Sheep per 100 ewes | | - | - | - | - | NA | NA | 20.4 | 16.0 | 23.2 | 21.6 | 20.4 | 18.5 |

TABLE 2 COMPOSITION OF LIVESTOCK OUTPUT AND INPUT

Cattle

| Group | Single Suckle | | Other Cattle | | Dairy | | Cattle & Sheep | | All Farms with Cattle | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Ave | Prem(1) | Ave | Prem(1) | Ave | Prem(1) | Ave | Prem(1) | Ave | Prem(1) |
| **Cattle output** | % | % | % | % | % | % | % | % | % | % |
| Calves under 1 month | - | - | - | - | 27 | 18 | - | - | 7 | 5 |
| Calves 1 month & under 12 months | 15 | - | 1 | - | 4 | 7 | 6 | - | 5 | 2 |
| Stores 12 to 18 months | 22 | 24 | 7 | 10 | 3 | - | 20 | 33 | 11 | 14 |
| Stores over 18 months | - | - | 8 | 3 | - | - | .. | 8 | 3 | 1 |
| Fat 18 months or less | 35 | 51 | 33 | 64 | 26 | 45 | 26 | 57 | 29 | 44 |
| Fat over 18 months | 13 | 18 | 45 | 17 | 14 | 5 | 40 | - | 32 | 23 |
| Breeding stock: | | | | | | | | | | |
| Heifers for sale | 8 | 5 | 6 | 6 | 7 | 5 | 4 | 2 | 6 | 5 |
| Heifers for herd replacements | 5 | 2 | .. | - | 19 | 19 | 2 | - | 6 | 5 |
| Young bulls | 2 | - | - | - | .. | 1 | 1 | - | 1 | .. |
| | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| **Cattle "input"(4)** | % | % | % | % | % | % | % | % | % | % |
| Home bred calves | 71 | 49 | 2 | - | 90 | 82 | 32 | 11 | 40 | 31 |
| Purchased: | | | | | | | | | | |
| Calves under 1 month | 18 | 36 | 46 | 71 | 8 | 18 | 35 | 65 | 30 | 50 |
| Calves 1 month & under 12 months | 10 | 15 | 21 | 4 | 1 | - | 11 | - | 12 | 3 |
| Stores 12 to 18 months | 1 | - | 26 | 11 | - | - | 19 | 24 | 15 | 10 |
| Stores over 18 months | - | - | 5 | 14 | 1 | - | 3 | - | 3 | 6 |
| | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

Sheep

| Group | Dairy | | Sheep | | Cattle & Sheep | | All Farms with Sheep | |
|---|---|---|---|---|---|---|---|---|
| | Ave | Prem(1) | Ave | Prem(1) | Ave | Prem(1) | Ave | Prem(1) |
| **Sheep output** | % | % | % | % | % | % | % | % |
| Store lambs under 6 months | - | - | 11 | 1 | 7 | 23 | 8 | 10 |
| Store lambs 6 months & over | - | - | 7 | - | 5 | 2 | 5 | 1 |
| Fat lambs under 6 months | 38 | 24 | 62 | 83 | 42 | 37 | 48 | 56 |
| Fat lambs 6 months & over | 59 | 76 | 9 | 6 | 30 | 35 | 27 | 27 |
| Breeding sheep under 12 months | - | - | 2 | 5 | .. | - | 1 | 2 |
| Breeding sheep 12 months & over | - | - | 7 | 5 | 13 | 1 | 9 | 3 |
| Ewe flock replacement | 3 | - | 2 | 1 | 2 | 2 | 2 | 1 |
| | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| **Sheep "input"(4)** | % | % | % | % | % | % | % | % |
| Home bred lambs | 76 | 24 | 94 | 95 | 73 | 88 | 79 | 82 |
| Purchased: | | | | | | | | |
| Store lambs under 6 months | - | - | - | - | 5 | - | 3 | - |
| Store lambs 6 months & over | 24 | 76 | - | - | 9 | 11 | 8 | 15 |
| Ewe lambs for breeding | - | - | 6 | 5 | 13 | 1 | 10 | 3 |
| | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

Notes on Tables 1 & 2

(1) Premium figures represent the best 25% of farms in the group in terms of liveweight output per forage acre.

(2) Liveweight output includes the liveweight gain by animals reared as breeding herd or flock replacements less the estimated liveweight of all young animals purchased. Liveweight "output" in the form of animals sold at the end of a breeding life (culls etc) is thus taken into account. The liveweight output from dairy farms includes the estimated equivalent of milk produced in terms of liveweight production. This estimation is based on the total S.E. requirements to produce an 11cwt. fat beast and for maintenance and production by a cow producing 977 gallons per year.

(3) The number purchased excludes purchased breeding herd or flock replacements unless bought as young animals for rearing, it therefore represents the proportion of cattle or sheep output which originated as purchased animals.

(4) Excluding purchased replacements for the breeding herd or flock unless bought as young animals for rearing

Concentrate feeding and output

Notes on Tables 3, 4 and 5.

(1) a. Group averages comprise all the farms in each enterprise group for which details of concentrate feeding were obtained.

b. The sub-groupings represent 25% of the number in the group average.

(2) These sub-groupings were almost identical with those consisting of farms having the highest liveweight output per forage acre.

(3) Three of the four farms in this sub-group carried sizable calf rearing units for purchased calves besides a single suckle herd.

(4) Based on the average number of livestock units for the enterprise calculated on an annual basis.

(5) (Table 5) Figures for specific enterprises have been calculated where five or more farms were involved for which feeding details could be separated.

Symbols:

.. means less than 0.005 cwt.
- means nil.

TABLE 3

## CONCENTRATE FEEDING AND OUTPUT - FARMS WITH BEEF CATTLE ONLY

| Group (1) | Farms with single suckle beef cow herds | | | | Farms with other beef cattle | | |
|---|---|---|---|---|---|---|---|
| | Group Average | Farms with highest liveweight output per feed acre (2) (3) | Farms with highest liveweight output per feed acre (2) excluding those rearing purchased calves | Farms with lowest concentrate input per cwt. of liveweight output | Group Average | Farms with highest liveweight output per feed acre(2) | Farms with lowest concentrate input per cwt of liveweight output |
| Number of farms | 17 | 4 | 4 | 4 | 45 | 11 | 11 |
| Type of concentrate | cwt. per average livestock unit (4) | | | | | | |
| Cereals and equivalent straight feeds | 4.40 | 8.14 | 3.72 | 0.74 | 14.58 | 8.32 | 3.87 |
| High protein and grain balancer compounds | 0.04 | - | 0.09 | - | 0.76 | 0.30 | 0.27 |
| Balanced compounds | 2.20 | 6.04 | 0.79 | 0.80 | 2.96 | 6.36 | 1.14 |
| Minerals etc | 0.13 | 0.06 | 0.10 | 0.10 | 0.26 | 0.13 | - |
| Urea, glucose and molasses feeds | 0.17 | 0.45 | 0.40 | 0.02 | 0.43 | 0.19 | 0.49 |
| Calf milk and rearer feeds. | 0.09 | 0.28 | 0.11 | - | 0.88 | 1.30 | 0.17 |
| Total concentrates | 7.03 | 14.97 | 5.21 | 1.66 | 19.87 | 16.60 | 5.94 |
| | Acres per average livestock unit (4) | | | | | | |
| Acreage equivalent of concentrates | 0.23 | 0.49 | 0.17 | 0.05 | 0.64 | 0.54 | 0.19 |
| Forage acres | 1.62 | 1.11 | 1.06 | 2.05 | 1.61 | 1.03 | 1.76 |
| Feed acres | 1.85 | 1.60 | 1.23 | 2.10 | 2.25 | 1.57 | 1.95 |
| | cwt. | cwt. | cwt. | cwt. | cwt. | cwt. | cwt. |
| Total concentrates per cwt. of liveweight output | 1.24 | 2.15 | 1.01 | 0.32 | 2.30 | 1.44 | 0.77 |
| Liveweight output per average grazing livestock unit | 5.67 | 6.95 | 5.16 | 5.16 | 8.65 | 11.53 | 7.71 |
| Liveweight output per feed acre | 3.06 | 4.34 | 4.20 | 2.46 | 3.84 | 7.34 | 3.95 |
| Liveweight output per forage acre | 3.50 | 6.26 | 4.87 | 2.52 | 5.37 | 11.19 | 4.38 |

TABLE 5

## CONCENTRATE FEEDING AND OUTPUT - SPECIFIC ENTERPRISES

| | CATTLE | | | | | | SHEEP | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sales | Fat 18 months old or less | | Fat over 18 months old | | Stores at 18 months old or less | | Fat lamb under 6 months | Fat lamb various ages or over 6m | Store and fat lamb | Fat lamb 6m. or over |
| Input | Home Bred single suckle calves | Purchased calves | Purchased calves | Purchased stores over 12 months | Home Bred single suckle calves | Purchased calves | Lambs from own ewe flock | | | Purchased store sheep |
| Number of farms (5) | 5 | 6 | 5 | 15 | 8 | 9 | 13 | 14 | 13 | 6 |
| Type of concentrate | cwt. per average livestock unit (4) | | | | | | | | | |
| Cereals and equivalent straight feeds | 3.33 | 20.09 | 17.72 | 13.67 | 2.04 | 15.82 | 2.07 | 2.22 | 4.15 | 7.74 |
| High protein and grain balancer compounds | 0.08 | 0.87 | 2.10 | 2.07 | 0.06 | 1.51 | 0.10 | 0.16 | 0.13 | 0.22 |
| Balanced compounds | 0.90 | 6.81 | 2.12 | 1.14 | 1.35 | 1.17 | 1.30 | 2.17 | 1.72 | - |
| Minereals etc. | 0.21 | 0.50 | 0.51 | .. | 0.15 | .. | 0.12 | 0.06 | 0.05 | - |
| Urea, glucose and molasses feeds | 0.07 | 0.19 | 0.09 | 0.46 | 0.11 | 0.06 | .. | 0.06 | - | - |
| Calf milk and rearer feeds | - | 3.65 | 1.82 | - | - | 3.29 | - | - | - | - |
| Total concentrates | 4.59 | 32.91 | 24.36 | 17.34 | 3.71 | 21.84 | 3.59 | 4.67 | 6.05 | 7.96 |
| | Acres per average livestock unit (4) | | | | | | | | | |
| Acreage equivalent of concentrates | 0.15 | 1.06 | 0.78 | 0.56 | 0.12 | 0.70 | 0.12 | 0.15 | 0.20 | 0.26 |
| Forage acres | 1.66 | 1.09 | 1.54 | 1.69 | 2.00 | 1.55 | 1.38 | 1.72 | 1.54 | 1.79 |
| Feed acres | 1.81 | 2.15 | 2.32 | 2.25 | 2.12 | 2.25 | 1.50 | 1.87 | 1.74 | 2.05 |
| | cwt. | cwt. | cwt. | cwt. | cwt. | cwt. | cwt. | cwt. | cwt. | cwt. |
| Total concentrates per cwt. of liveweight output | 1.02 | 2.81 | 2.81 | 3.25 | 0.74 | 2.39 | 0.61 | 0.77 | 1.18 | 1.48 |
| Liveweight output per average grazing livestock unit | 4.51 | 11.70 | 8.68 | 5.34 | 4.99 | 9.15 | 5.92 | 6.11 | 5.12 | 5.39 |
| Liveweight output per feed acre | 2.50 | 5.45 | 3.74 | 2.37 | 2.35 | 4.07 | 3.95 | 3.26 | 2.95 | 2.62 |
| Liveweight output per forage acre | 2.72 | 10.73 | 5.64 | 3.16 | 2.50 | 5.90 | 4.29 | 3.55 | 3.32 | 3.01 |

TABLE 4

## CONCENTRATE FEEDING AND OUTPUT - FARMS WITH DAIRY HERDS, SHEEP OR CATTLE AND SHEEP

| Group[1] | Farms with dairy herds | | | Farms with sheep only | | | Farms with cattle and sheep | | |
|---|---|---|---|---|---|---|---|---|---|
| | Group Average | Farms with highest liveweight output equivalent per feed acre(2) | Farms with lowest concentrate input per cwt. of liveweight output | Group Average | Farms with highest liveweight output per feed acre(2) | Farms with lowest concentrate input per cwt. of liveweight output | Group Average | Farms with highest liveweight output per feed acre(2) | Farms with lowest concentrate input per cwt. of liveweight output |
| Number of farms | 19 | 5 | 5 | 20 | 5 | 5 | 40 | 10 | 10 |
| Type of concentrate | | | | Cwt. per average livestock unit(4) | | | | | |
| Cereals and equivalent straight feeds | 7.86 | 14.79 | 7.48 | 2.31 | 1.00 | 0.12 | 6.22 | 8.27 | 2.46 |
| High protein and grain balancer compounds | 0.97 | 1.72 | 0.62 | 0.02 | - | - | 0.88 | 1.46 | 0.05 |
| Balanced compounds | 10.51 | 4.52 | 2.06 | 1.43 | 1.74 | 0.09 | 1.56 | 1.33 | 0.94 |
| Minerals etc. | 0.04 | - | 0.10 | 0.04 | 0.04 | 0.01 | 0.09 | 0.01 | 0.01 |
| Dried grass (one farm) | - | - | - | - | - | - | 0.17 | - | - |
| Brewers grains (two farms) | 0.92 | - | - | - | - | - | - | - | - |
| Urea, glucose and malasses feeds | 0.48 | 0.21 | 0.89 | 0.01 | 0.03 | 0.10 | 0.13 | - | 0.15 |
| Calf milk and rearer feeds | 2.03 | 3.61 | 0.37 | - | - | - | 0.36 | 0.88 | 0.14 |
| Total concentrates | 22.81 | 24.85 | 11.52 | 3.81 | 2.81 | 0.32 | 9.41 | 11.95 | 3.75 |
| | | | | Acres per average livestock unit(4) | | | | | |
| Acreage equivalent of concentrates | 0.74 | 0.80 | 0.37 | 0.12 | 0.09 | 0.01 | 0.30 | 0.39 | 0.12 |
| Forage acres | 1.55 | 1.16 | 1.58 | 1.45 | 1.01 | 1.39 | 1.60 | 1.13 | 1.75 |
| Feed acres | 2.29 | 1.96 | 1.95 | 1.57 | 1.10 | 1.40 | 1.90 | 1.52 | 1.87 |
| | cwt. | cwt. | cwt. | cwt. | cwt. | cwt. | cwt. | cwt. | cwt. |
| Total concentrates per cwt. of liveweight output | 2.28 | 2.24 | 1.33 | 0.75 | 0.52 | 0.06 | 1.46 | 1.56 | 0.65 |
| Liveweight output per average grazing livestock unit | 10.01 | 11.08 | 8.68 | 5.11 | 5.43 | 5.57 | 6.46 | 7.64 | 5.75 |
| Liveweight output per feed acre | 4.37 | 5.65 | 4.45 | 3.25 | 4.94 | 3.98 | 3.40 | 5.03 | 3.07 |
| Liveweight output per forage acre | 6.46 | 9.55 | 5.49 | 3.52 | 5.37 | 4.01 | 4.04 | 6.76 | 3.29 |
| Composition of output | % | % | % | % | % | % | % | % | % |
| Milk (as liveweight equivalent) | 57 | 56 | 53 | - | - | - | - | - | - |
| Beef and cattle | 38 | 42 | 38 | - | - | - | 64 | 78 | 58 |
| Sheep and lamb | 5 | 2 | 9 | 100 | 100 | 100 | 36 | 22 | 42 |
| | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Milk yield per cow - gallons | 977 | 1060 | 964 | - | - | - | - | - | - |

TABLE 7

## LABOUR FOR GRAZING LIVESTOCK

| Group | Single suckle | Other cattle | Dairy | Sheep | Cattle and sheep | All farms with livestock |
|---|---|---|---|---|---|---|
| Number of farms[1] | 20 | 50 | 26 | 20 | 40 | 156 |
| Labour hours per livestock unit | 20 | 22 | 31 | 18 | 19 | 24 |
| | | | Per 100 forage acres | | | |
| Men-days[2] | 154 | 171 | 250 | 155 | 148 | 190 |
| Contract for livestock[3] | £18 | £2 | £14 | £55 | £8 | £13 |
| Casual labour cost for livestock | - | - | - | £.. | £1 | £.. |
| Seasonal distribution of labour hours | % | % | % | % | % | % |
| January to March | 29 | 33 | 27 | 38 | 35 | 31 |
| April to June | 22 | 22 | 24 | 27 | 22 | 23 |
| July to September | 20 | 14 | 23 | 15 | 15 | 19 |
| October to December | 29 | 31 | 26 | 20 | 28 | 27 |
| | 100 | 100 | 100 | 100 | 100 | 100 |
| Months of lowest labour requirement | June,July,Aug | July,Aug. | July,Aug,Sep | July,Aug,Sept | June,July,Aug | June, July, Aug. |
| Months of highest labour requirement | Oct, Feb,March | Dec,Jan,Feb | Jan, Feb,Mar. | Feb,Mar,Apr. | Jan,Feb,Mar. | Jan,Feb,Mar. |
| | % | % | % | % | % | % |
| Proportion of annual hours in lowest 4-weeks | 4.9 | 3.6 | 7.0 | 4.4 | 4.3 | 5.5 |
| Proportion of annual hours in peak 4-weeks | 9.2 | 10.5 | 8.6 | 16.4 | 12.2 | 9.9 |

(1) The number of farms for which labour details were available
(2) One man-day = 8 hrs.
(3) Contractors charges (1971-72 rates) for such work as much removed from yeards, branding, sheep shearing

Symbols:-

.. means less than £0.50
- means nil

TABLE 6

## FERTILIZER APPLICATION TO GRASS AND FORAGE AREA

| Group | Single suckle | | Other cattle | | Dairy | | Sheep | | Cattle & Sheep | | No livestock | All Farms | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Average | Premium Stocking(1) | Average | Premium Stocking(1) | Average | Premium Stocking(1) | Average | Premium Stocking(1) | Average | Premium Stocking(1) | Average | Average | Premium Stocking(1) |
| Number of farms | 20 | 5 | 50 | 12 | 26 | 7 | 20 | 5 | 43 | 11 | 15 | 174 | 40 |
| Forage acres per livestock unit | 1.62 | 1.03 | 1.61 | 1.05 | 1.55 | 1.15 | 1.45 | 1.04 | 1.60 | 1.05 | - | 1.58(2) | 1.08 |
| **Annual fertilizer application** | | | | | | | Units per forage acre | | | | | | |
| Nitrogen (N) | 158 | 201 | 122 | 182 | 183 | 225 | 134 | 184 | 85 | 134 | 58 | 133 | 185 |
| Phosphate (P) | 46 | 46 | 28 | 37 | 37 | 32 | 40 | 48 | 30 | 40 | 12 | 34 | 38 |
| Potash (K) | 36 | 36 | 25 | 29 | 35 | 35 | 23 | 39 | 20 | 29 | 8 | 28 | 32 |
| **Premium farms difference** | | | | | | | | | | | | | |
| N | | +43 | | +60 | | +42 | | +50 | | +49 | | | +52 |
| P | | 0 | | + 9 | | - 5 | | + 8 | | +10 | | | + 4 |
| K | | 0 | | + 6 | | 0 | | +16 | | + 9 | | | + 4 |
| **Fertilizer applications by soil type district** | | | | | | | | | | | | | |
| | Chalk L'stone | Other Soils | Chalk L'stone | Other Soils | Chalk L'stone | Other Soils | Chalk L'stone | Other Soils | Chalk L'stone | Other Soils | Chalk L'stone | Other Soils | Chalk L'stone | Other Soils |
| N | 155 | 162 | 129 | 117 | 152 | 206 | 155 | 101 | 130 | 69 | 72 | 53 | 142 | 128 |
| P | 45 | 47 | 29 | 26 | 44 | 33 | 39 | 42 | 40 | 26 | 20 | 9 | 39 | 30 |
| K | 34 | 40 | 25 | 22 | 44 | 29 | 35 | 6 | 38 | 13 | 20 | 4 | 37 | 21 |

**Fertilizer applications to temporary grass** — Units per acre

| Duration / Soil type district | ONE YEAR LEYS | | | TWO YEAR LEYS | | | THREE YEAR LEYS | | | LEYS OVER THREE YEARS | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Chalk L'stone | Other Soils | All soil types | Chalk L'stone | Other Soils | All soil types | Chalk L'stone | Other Soils | All soil types | Chalk L'stone | Other Soils | All soil types |
| N | 114 | 97 | 105 | 146 | 155 | 151 | 168 | 117 | 140 | 95 | 133 | 123 |
| P | 24 | 24 | 24 | 42 | 41 | 41 | 53 | 34 | 43 | 17 | 28 | 25 |
| K | 22 | 15 | 18 | 35 | 27 | 31 | 38 | 19 | 27 | 53 | 21 | 29 |

(1) 25% of the farms in each group having the highest stocking rate, i.e. lowest forage acres per livestock unit
(2) For 159 farms carrying grazing livestock
(3) Including some lucerne and tetraploid clover leys grown for cutting

TABLE 8 CAPITAL INVESTMENT IN MACHINERY AND EQUIPMENT FOR GRASS AND LIVESTOCK

| Group | Single Suckle | Other Cattle | Dairy | Sheep | Cattle & Sheep | All farms with livestock | Farms with no livestock |
|---|---|---|---|---|---|---|---|
| Number of farms(1) | 19 | 48 | 22 | 18 | 40 | 147 | 11 |
| Adjusted acres of forage grass per farm | 213 | 139 | 351 | 120 | 216 | 199 | 113 |
| Type of machinery or equipment(2) | Approximate 1974 new value per adjusted acre of forage grass(3) | | | | | | |
| | £ | £ | £ | £ | £ | £ | £ |
| For grassland establishment & maintenance | 1.7 | 2.5 | 1.6 | 2.9 | 2.1 | 2.1 | 3.4 |
| For hay & silage making | 16.5 | 21.1 | 13.3 | 22.5 | 14.1 | 16.4 | 24.5 |
| For foddering | 1.2 | 0.3 | 1.3 | - | 0.5 | 0.7 | - |
| Milling & mixing | 1.6 | 2.7 | 1.6 | 1.5 | 1.9 | 1.9 | - |
| Miscellaneous : | | | | | | | |
| Milking machines & bulk tanks | - | - | 20.7 | - | - | 5.5 | - |
| Sundry - cattle | 1.6 | 1.2 | 0.7 | - | 0.6 | 0.9 | - |
| Sundry - sheep | - | - | .. | 2.8 | 1.0 | 0.5 | - |
| Total | 22.6 | 27.8 | 39.2 | 29.7 | 20.2 | 28.0 | 27.9 |
| Forage acres per acre of forage grass(3) | 0.99 | 0.92 | 1.02 | 0.96 | 0.96 | 0.97 | - |
| Fodder storage requirements | Cumulative(4) acreage conserved per 100 adjusted acres of forage grass | | | | | | |
| Hay | 30 | 46 | 24 | 40 | 40 | 32 | 62 |
| Silage | 18 | 9 | 23 | - | 3 | 12 | - |

(1) The number of farms for which machinery details were obtained.

(2) See Table 9 opposite for an inventary of types of machinery and equipment. Tractors, general cultivating implements and trailers not specifically for grassland have been excluded, as also has investment in silos.

(3) The values are intended to be an estimate of the investment involved per acre of grass on the farm. The distinction between the adjusted area of forage grass and "forage acres" will be apparent from Section III Page 21. The distinction does not affect the above values significantly, (except for farms without livestock) but if desired the values may be converted to a forage acre basis by dividing them by the apropriate figure "for forage acres per acre of forage grass".

(4) Including the acreage of second cuts conserved.

Notes

1. The written down value (based on 1974 prices) may be taken as roughly half the above figures. This would be the case if the average age of all machinery was four years and has been depreciated at 15% on a reducing balance basis.
2. An estimation of the annual charge for machinery and equipment may be made by assuming a figure of about 7½% of the current new value for repairs. If the average written down value is taken as half the new value and it is depreciated at an annual rate of 15% this represents a further 7½% on the full new value. Thus an estimation of the average annual charge for repairs and depreciation may be made by taking 15% of the current new value.
3. The values in this table may be very approximately up-dated by reference to one of the price indices published in "Trade and Industry," e.g. the wholesale price index for mechanical engineering products - early 1974 = 143 and October 1975 = 208, i.e. 45½% increase.

Symbols: - means nil
.. means less than £0.50

TABLE 9 INVENTORY OF MACHINERY EQUIPMENT SPECIFICALLY FOR GRASSLAND OR GRAZING LIVESTOCK ON 147 FARMS HAVING LIVESTOCK

## For grassland establishment & maintenance

Number of farms with no equipment specifically for this purpose 30

Number of farms with some equipment 117

| Type of equipment | Number of machines on 117 farms |
|---|---|
| Seed box | 15 |
| Seed drill | 3 |
| Fertilizer spinner | 53 |
| Large ditto | 19 |
| Fertilizer sprayer | 2 |
| Heavy grass roll | 44 |
| Flat rolls | 34 |
| Spike harrows | 16 |
| Chain & grass harrows | 65 |
| Rotary toppers | 11 |

## For hay and silage making

Number of farms with some equipment 147

| Type of equipment | Number of machines on 147 farms |
|---|---|
| **Hay making** | |
| Cutter bar mowers | 77 |
| Flail & rotory mowers | 88 |
| Crimpers | 14 |
| Tedders | 112 |
| Sidrakes/turners | 158 |
| Balers | 144 |
| Fully mechanised bale handing outfits | 28 |
| Bale accumulators | 4 |
| Bale sledges | 73 |
| Bale grabs/handlers/loaders | 75 |
| Bale elevators | 61 |
| Moisture extractor fans/ units | 15 |
| **Silage making** | |
| Forage harvesters-flail | 23 |
| - double chop | 20 |
| -full precision chop | 7 |
| Back rakes | 35 |
| Silage trailers | 14 |
| Silage trailer sides | 7 |
| Dump/forage boxes | 9 |

## For foddering

Number of farms with no equipment specifically for this purpose 128

Number of farms with some equipment 19

| Type of equipment | Number of machines on 19 farms |
|---|---|
| Tracter mounted loader/grab | 9 |
| Dump/forage box | 9 |
| Tipping/self feed trailers | 3 |
| Unloading/feeding conveyors | 3 |
| Forage blowers | 2 |
| Elevators | 2 |

### Silos

Number of farms with no silos 115

Number of farms with some form of silos 32

| Type of silo | Number |
|---|---|
| Clamp | 32 |
| Haylage towers | 4 |
| Silage tower | 1 |
| Moist barley tower | 2 |

## For milling and mixing

Number of farms with no equipment specifically for this purpose 27

Number of farms using mobile contract mill & mix services 20

Number of farms with own equipment 100

| Type of equipment | Number of machines on 100 farms |
|---|---|
| Mill only | 14 |
| Mixer only | 1 |
| Mill and mixer | 14 |
| Roller mill | 23 |
| Roller mill and mixer | 17 |
| Mill,roller and mixer | 7 |
| Mill, mixer and cuber | 4 |
| Not specified and other | 20 |

### Milking equipment

Number of farms 21

| Type of equipment | Number of machines on 21 farms |
|---|---|
| Herringbone & abreast | 21 |
| Rotary and tandem | 3 |
| Cows per milking point | 18 |

TABLE 10 BUILDINGS FOR GRAZING LIVESTOCK

| Group | Single Suckle | Other Cattle | Dairy | Sheep | Cattle & Sheep | All Farms with Livestock |
|---|---|---|---|---|---|---|
| Number of farms(1) | | | | | | |
| With no special buildings | 2 | 3 | - | 6 | 2 | 13 |
| With some livestock buildings | 9 | 27 | 8 | 12 | 23 | 79 |
| Total | 11 | 30 | 8 | 18 | 25 | 92 |
| Building age | Percentage of total building area | | | | | |
| 1 to 5 years | 42 | 27 | 26 | 27 | 30 | 30 |
| 6 to 10 years | 12 | 12 | 15 | 8 | 5 | 11 |
| Over 10 years or not known by occupier | 46 | 61 | 59 | 65 | 65 | 59 |
| | 100 | 100 | 100 | 100 | 100 | 100 |
| Type of building | | | | | | |
| Covered yards | 58 | 47 | 36 | 57 | 45 | 46 |
| Semi covered yards | 4 | 21 | 11 | 16 | 26 | 18 |
| Open yards | - | 1 | - | - | 7 | 2 |
| Umbrella buildings | | | | | | |
| dutch barns and other loose housing | 3 | 5 | 22 | 13 | 4 | 8 |
| Cubicles | - | - | 16 | - | .. | 3 |
| Calf pens & loose boxes | 2 | 6 | 7 | - | 3 | 5 |
| Other types (including old "traditional"buildings) | 33 | 20 | 8 | 14 | 15 | 18 |
| | 100 | 100 | 100 | 100 | 100 | 100 |
| Usage | | | | | | |
| Cattle | 87 | 99 | 92 | - | 74 | 85 |
| Sheep | - | - | 1 | 86 | 7 | 6 |
| Handling only | - | .. | - | 5 | - | .. |
| Multipurpose (i.e. hay then cattle or cattle & sheep) | 3 | .. | 7 | 9 | 19 | 8 |
| Other & "available if necessary | - | 1 | - | - | .. | .. |
| | 100 | 100 | 100 | 100 | 100 | 100 |
| | Square feet of building area(2) | | | | | |
| Building area per livestock unit | 68 | 89 | 93 | 34 | 79 | 77 |
| Building area per 100 adjusted acres forage grass(3) | 4100 | 5100 | 6100 | 2300 | 4800 | 4900 |
| Building area per 100 forage acres(3) | 4200 | 5600 | 6000 | 2400 | 5000 | 5100 |

(1) The number of farms for which sufficient details of building was obtained.
(2) Calculated for all farms including those without any livestock buildings.
(3) For the distinction between adjusted area of forage grass and forage acres see Appendix I Table 13.

Symbols: - means nil
.. means less than 0.5%

TABLE 11 BUILDINGS FOR GRAZING LIVESTOCK

Net cost of construction of new and second hand buildings in the five years 1967 to 1971

| By type of building | £ per sq. ft. | Number of buildings | Average size to in sq.ft. |
|---|---|---|---|
| Covered yards | 0.53 | 31 | 6050 |
| Semi covered yards | 0.22 | 8 | 4300 |
| Dutch barns | 0.31 | 4 | 1700 |
| Other types | | No meaningful average (1) | |
| All types | 0.55 | 62 | 5040 |
| **By use** | | | |
| Cattle on dairy farms | 0.92 | 8 | 6150 |
| Cattle on non dairy farms | 0.57 | 13 | 4940 |
| Fattening cattle | 0.79 | 6 | 4340 |
| Calves | 0.42 | 9 | 2270 |
| Single suckling cows & calves | 0.31 | 7 | 5800 |
| Store cattle | 0.43 | 5 | 4460 |
| Sheep housing | 0.27 | 8 | 4740 |
| Other uses | | No meaningful average (1) | |
| All uses | 0.55 | 62 | 5040 |

(1) Small numbers of diverse types

Note: Current construction costs for various types of farm buildings are to be found in:

(a) Farm Management Pocketbook by John Nix, Farm Business Unit, Wye College.
(b) Farm Building Cost Guide 1975, pub. by Scottish Farm Buildings investigation Unit, Bucksburn, Aberdeen.
(c) Farm Buildings Digest, pub. by Farm Buildings Centre, Kenilworth, Warwickshire.

TABLE 12 FIELD BOUNDARY MAINTENANCE - HEDGE, DITCH AND FENCE MAINTENANCE(1)

| | |
|---|---|
| Number of farms for which details were obtained | 102 |
| Total acreage adjusted for rough grazings | 64428 |

| Machinery inventory | Number of machines |
|---|---|
| Hedger and hedger-ditchers | 63 |
| Large flail type hedgers | 6 |
| Ditchers | 3 |
| Post drivers/hole diggers | 5 |

| | Per 100 acres |
|---|---|
| Approximate investment in machines at 1974 new prices (2) | £75 |
| Contractors charges per year (at 1974 rates) | £6 |
| Tractor hours per year | 24 |
| Labour hours per year(3) | 71 |
| Seasonal distribution of labour hours (periods of fairly uniform labour time) | % |
| October | 8 |
| November | 25 |
| December to February | 49 |
| March to May | 10 |
| June to September | 8 |
| | 100 |

| Estimated field boundary maintenance costs at 1975 values | £ per acre |
|---|---|
| Capital charge for depreciation and repairs to machines. £75 + price index change (say 45%) @ 15% = | 0.16 |
| Contract charges (+30%) = | 0.08 |
| Tractors 24 hours per 100 acres @ £0.70 per hour = | 0.17 |
| Labour 71 hours per 100 acres @ £1.25 per hour = | 0.89 |
| Total | 1.30 |

(1) Major works of replacement etc have not been included
(2) The capital cost of fencing (and materials for fence maintenance) are not included.
(3) Fencing carried out by stockmen has been included in livestock labour time and not here.

SECTION V : THE OUTLOOK FOR GRASSLAND BASED ENTERPRISES - C. Ritson

The profitability of an agricultural enterprise is determined by a complex set of inter-related factors, but it is possible to classify these factors into two broad groups, namely technological factors and financial factors. Thus, if we are to attempt to forecast some longer term changes in the relative profitability of alternative agricultural enterprises, such changes will be on account of either:

(a) The introduction of a new technology which improves the profitability of a particular agricultural enterprise for any given set of input and product prices, or

(b) A movement in relative input or product prices which alters the relative profitability of agricultural enterprises for given technological conditions of production.

One of the best examples of the way technological change can alter the relative profitability of agricultural enterprises was the dramatic increase in cereal yields experienced in the U.K. after the Second World War. In the case of wheat a yield that averaged a little under 20 cwts. per acre in the 1930's and 1940's was transformed in ten years into one that has averaged well over 30 cwts. per acre since 1962. These yield increases were due to many factors, including the introduction of better varieties, the control of soil fertility by the use of artificial fertilizers, the development of plant protecting herbicides, and mechanization which allowed farmers to gain a reasonably good crop when previously bad weather would have meant a poor one. All these factors come within our technological change" category and D.B. Wallace* argues strongly that farmers have not given sufficient credit to the contribution of the crop scientist to improving the financial position of farming after World War II; but these technological changes undoubtedly did make cereal production more profitable and the total U.K. cereal acreage was about double its pre-war level by the late 1960's.

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* D.B. Wallace. "The Crop Scientist and the Farmer in England 1940-1960" Journal of Agricultural Economics. Vol.XXVI No.1.

Looking to the future, it seems unlikely that U.K. farming will again be affected by a technological revolution as dramatic as that which raised cereal yields. On a smaller scale, however, we must continue to expect individual crops to be affected by the introduction of new techniques, such as recent developments in silage making.

One example of a more general technological impact upon the relative profitability of grassland based enterprises would occur if there was a general "levelling up" in the application of existing technology to grassland production. There is a view expressed both in this report and elsewhere* that there is considerable scope for improvements in the average level of grassland management. It appears that the range of performance in grassland is greater than that experienced with most other forms of farming.

Technological changes which alter the relative profitability of farm enterprises, except in as much as they involve the more widespread adoption of existing techniques, are however virtually impossible to predict. Against this, their impact is the positive one of improving the profitability of a particular enterprise, and a new practice will normally be introduced gradually throughout the agricultural sector allowing individual farmers time to adjust their systems to a new environment. In contrast, price changes, even when these predominately reflect long term shifts in relative prices rather than shorter term disturbances, have the unfortunate habit of occuring quite suddenly;, although the underlying factors influencing a change in relative prices may build up gradually over a period of years, agricultural markets often have the effect of concentrating the full weight of such factors into price changes over a matter of months or even weeks. In addition price changes can of course alter the relative position of agricultural enterprises by <u>reducing</u> the profitability of a particular enterprise. It is for these reasons that greater anxiety tends to be caused by uncertainty over future price movements than by questions of technological change, and this section therefore concentrates upon the "outlook" for prices affecting grassland based enterprises.

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* See for example "U.K. Farming and the Common Market: Grass and Grass Products" A report by the Economic Development Committee for Agriculture" National Economic Development Office. Nov. 1974.

The first question to ask is "why should the balance of agricultural prices change through time"? The price of a product equates the quantity of it supplied to and demanded from a market per time period. If there is a change in the quantity that sellers are prepared to supply or buyers are prepared to purchase at a particular price, the price will move in order to re-establish equilibrium.

The main influence on demand which might alter the balance of agricultural prices is income changes; as incomes rise, people tend to alter the composition of their food purchases. On the supply side, the major factor affecting price changes is again technological improvement, both within the farming sector and within input and processing industries. But agricultural prices are also influenced by Ministerial decision. The Governments of Western Europe exercise a considerable degree of control over the prices received by farmers for their produce and the prices they pay for their inputs. Many factors are taken into account when a Government decides to aim for a particular level of farm prices, or to allow a particular price change, but it is possible to detect two main, and sometimes conflicting objectives. These are:

(a) Questions of "fairness". Agricultural Price changes affect the standard of living of both those who produce and those who consume food. In the past, agricultural policy has operated predominately so as to attempt to secure acceptable income levels for the farming population. More recently, Governments in Western Europe have become involved in policies to offset the worst effects of rising food prices on consumers.

(b) To achieve some desired level of production in individual agricultural products. In essence this objective has tended to involve a price level which follows world market trends, as this allows the nation to achieve its food supply at lowest cost. This policy has, however, been tempered to a greater or lesser extent by the desire for national self-sufficiency in food supplies.

In the case of the U.K. the influence of these two factors is complicated by the operation of the Common Agricultural Policy of the E.E.C.; the farm prices likely to apply in the U.K. in the future will increasingly need to be viewed in the context of both "fairness" in a European - wide sense, and self sufficiency for the European Community as a whole. It seems probable that, whereas in the shorter term questions of fairness relating to farm incomes can have a predominant influence upon farm prices, in the longer run it is a Government's attitude towards national self-sufficiency in individual agricultural products which is responsible for chages in the balance of agricultural prices. The European Community is now more or less self sufficient in most agricultural products and will find it increasingly difficult in the future to justify a level of farm prices which diverges significantly from prices on world markets. Therefore, it is the overall world balance between supply and demand for individual agricultural products which must be the central feature of the "outlook" for U.K. farm prices.

In the context of the present study, there are three areas in which a longer term forecast of relative agricultural product and input prices is relevent to the outlook for grassland based enterprises. These are:

(a) The relative profitability of grassland based enterprises compared with alternative enterprises used as a break in a predominantly cereal rotation.

(b) The relative profitability of grassland based enterprises compared with cereals, which influences the appropriate balance between grass and cereals in a predominately cereals rotation.

(c) The relative profitability of alternative grassland based enterprises.

(a) Taking the first of these, there do not appear to be any substantial grounds for suggesting that non-grass break crops will tend to become more or less attractive in relation to grassland based enterprises than at present. Most break crops are either fodder crops or are used as constituents in proprietary animal feeding stuffs. These crops therefore have in common with

grass breaks that, in the longer term, whether or not they are profitable is dependent upon conditions in the livestock sector of farming. A buoyant livestock industry will make the grass break more attractive but will also improve the market for other break crops. In the shorter term, of course, there can be wide divergences in the movements of livestock and feed prices. A rapid rise in feed prices, such as that experienced by British farmers in 1973/74, can put the farmer with a livestock enterprise at a severe disadvantage vis-a-vis the producer of a feed crop for off-farm sale.

Of the break crops not directly linked to livestock production (some 11 to 12 per cent of all break crops including grass, according to a survey carried out in the southern region of England*) potatoes and sugar beet are likely in any case to continue to be regulated by quota and will tend to present relatively profitable opportunities for those farmers who obtain a quota.

(b) The most significant event of recent years on world agricultural markets has been the rapid rise in cereal prices. The weight of evidence at present points to the conclusion that, although world cereal prices will continue to fluctuate, nevertheless the world has experienced a major long term shift in the balance between supply and demand for cereals and that we must therefore expect cereal prices to be higher relative to other agricultural product prices in the 1970's and 1980's than they were in the 1960's.

Since the Second World War, there has been a gradual increase in cereal acreage and reduction in grass acreage in the U.K. The two major reasons for this trend have been technological - the rapid rise in cereal yields already mentioned, and the introduction of new techniques for intensive livestock production using purchased cereal-based feedingstuffs. The development of intensive livestock systems has meant that movements in relative product prices of cereals and livestock products have not in themselves had very much affect on the balance between grass and cereal acreage; a rise in cereal prices improves the relative

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* J.A.L. Dench et al "Break Crops: An economic study in Southern England". University of Reading, Department of Agricultural Economics and Management 1972.

profitability of both cereal production and grass based (as opposed to grain based) livestock enterprises. For example, studies of the likely impact on U.K. farming of adopting the Common Agricultural Policy, made prior to membership of the E.E.C. (when it appeared that membership would imply a rise in U.K. cereal prices relative to most other agricultural prices) indicated that the impact of higher cereal prices on the profitability of cereal production was just about offset by the corresponding improvement in the profitability of grassland livestock enterprises.* The upshot is that cereal prices can change quite substantially without this affecting the relative profitability of cereals and grass in a predominately cereal farm incorporating a grass break.

(a) It is in connection with the third "outlook" question - which livestock enterprise? - that it seems most likely that the future might see some variations in relative profitability. The British Government recently issued a White Paper** examining the prospects for U.K. food production over the next five to ten years. This forecasts increases in output from the three main grassland based enterprises - milk, beef, and sheep - but comes down decidedly in favour of dairy production rather than lowland sheep or beef. This conclusion appears to have been arrived at by a straightforward application to U.K. agriculture of projections of the existing E,E.C. prices to which the U.K. is adjusting. However, it was mentioned earlier in this section that questions of the overall balance between supply and demand for agricultural products are likely to become the more important influence upon price formulation as the time horizon is lengthened. The outstanding characteristic of the present E.E.C. dairy policy is the extent to which dairy product prices under the C.A.P. are in excess of the prices at which supplies are available from world markets. Whereas most C.A.P. prices can now be defended as realistic in relation to world market conditions it seems only possible to justify present dairy product prices on account of the important contribution that milk prices make to supporting the incomes of many European small farmers. But the growth of butter stocks and the immense potential for further increases in milk oupput within the E.E.C. makes it

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* See for example Brian Davey "Trade and the Changing Structure of Farm Production" in "Burdons and Benefits of Farm Support Policies". Trade Policy Research Centre, 1972.

** "Food from Our Own Resources" Cmnd. 6020 H.M.S.O. April 1975.

most unlikely that the European Community will be able to sustain milk prices at their existing level relative to livestock prices. This author's view therefore is that the outlook for dairy production is somewhat less attractive in the longer term than indicated by the Government White Paper. Better prospects apply to meat production but in view of the likely continuing strength of world cereal prices, particularly attractive are livestock enterprises which are predominately based on grass. For the first time for many years the outlook for lowland sheep production looks favourable in relation to other livestock enterprises.

# APPENDIX I

## DEFINITION OF FARM GROUPINGS

1. By soil type

   (a) Chalk/limestone - farms situated in parishes where the soils are predominently derived from chalk or limestone formations.

   (b) Other soils - farms situated in parishes where the predominent soil types are derived from other parent natural than chalk or limestone.

2. By grazing livestock enterprise

   (a) Farmers without sheep or dairy cows:

      (i) Single suckle - those having a single suckle cow herds, with or without some other farm of beef enterprise e.g. fattening.

      (ii) Other Cattle - mostly farms without any beef cows although some have doublesuckle herds or cows for multiple suckle calf rearing.

   (b) Dairy - farms having a dairy herd including some with sheep and/or beef cows and other beef cattle.

   (c) Sheep - farms carrying sheep only.

   (d) Cattle & Sheep - farms having combinations of cattle and sheep enterprises including some single suckle cow herds but not dairy cows.

   (e) No L/S - farms having over 20 acres of temporary grass in 1970 but no livestock of their own.

## APPENDIX II

## SURVEY OF GRASSLAND ON CEREAL FARMS - DATA FROM 174 FARMS

### TABLE I GEOGRAPHICAL DISTRIBUTION

| Livestock group | Single Suckle | Other Cattle | Dairy | Sheep | Cattle & Sheep | No L/S | All Types |
|---|---|---|---|---|---|---|---|
| Berkshire | 5 | 9 | 7 | 4 | 8 | 6 | 39 |
| Buckinghamshire | 2 | 7 | 3 | 4 | 11 | 1 | 28 |
| Hampshire | 8 | 16 | 12 | 6 | 6 | 2 | 50 |
| Oxfordshire | 4 | 17 | 4 | 6 | 18 | 6 | 55 |
| Other counties | 1 | 1 | - | - | - | - | 2 |
| Total | 20 | 50 | 26 | 20 | 43 | 15 | 174 |

### TABLE 2 DISTRIBUTION BY SOIL TYPE AREA

| | Chalk Limestone | Other Soils | All Types |
|---|---|---|---|
| Single Suckle | 11 | 9 | 20 |
| Other Cattle | 20 | 30 | 50 |
| Dairy | 13 | 13 | 26 |
| Sheep | 13 | 7 | 20 |
| Cattle & Sheep | 11 | 32 | 43 |
| No Livestock | 5 | 10 | 15 |
| Total | 73 | 101 | 174 |

TABLE 3 CROPPING 1970 BY SOIL TYPE AREA

| | Chalk Limestone | | | Other Soils | | | All Types | | |
|---|---|---|---|---|---|---|---|---|---|
| Number of farms | 73 | | | 101 | | | 174 | | |
| | Acres | Acres per farm | % | Acres | Acres per farm | % | Acres | Acres per farm | % |
| Cereals | 33328 | 457 | 63.5 | 38350 | 380 | 62.9 | 71678 | 412 | 63.2 |
| Other Cash Crops and Fallow | 4066 | 56 | 7.8 | 3683 | 36 | 6.0 | 7749 | 45 | 6.8 |
| Fodder Crops | 1127 | 15 | 2.1 | 1103 | 11 | 1.8 | 2230 | 13 | 2.0 |
| Temporary Grass | 8712 | 119 | 16.6 | 10286 | 102 | 16.9 | 18998 | 109 | 16.7 |
| Permanent Pasture and Rough Grazings | 5260 | 72 | 10.0 | 7575 | 75 | 12.4 | 12835 | 74 | 11.3 |
| Total | 52493 | 719 | 100.0 | 60997 | 604 | 100.0 | 113490 | 653 | 100.0 |
| Arable area | 47233 | 647 | 90.0 | 53422 | 529 | 87.6 | 100655 | 579 | 88.7 |

Percentage of arable area

| | | | |
|---|---|---|---|
| Wheat | 22.8 | 25.5 | 24.2 |
| Barley | 44.9 | 41.0 | 42.8 |
| Oats | 2.7 | 5.1 | 4.0 |
| Other Cereals | 0.2 | 0.2 | 0.2 |
| All Cereals | 70.6 | 71.8 | 71.2 |
| Temporary Grass | 18.4 | 19.3 | 18.9 |

TABLE 4 CROPPING 1972 BY SOIL TYPE AREA

| | Chalk Limestone | | | Other Soils | | | All Types | | |
|---|---|---|---|---|---|---|---|---|---|
| Number of farms | 73 | | | 101 | | | 174 | | |
| | Acres | Acres per farm | % | Acres | Acres per farm | % | Acres | Acres per farm | % |
| Cereals | 35619 | 488 | 63.2 | 40615 | 402 | 63.1 | 76234 | 438 | 63.1 |
| Other Cash Crops and Fallow | 2590 | 36 | 4.6 | 2618 | 26 | 4.1 | 5208 | 30 | 4.3 |
| Fodder Crops | 1252 | 17 | 2.2 | 991 | 10 | 1.5 | 2243 | 13 | 1.9 |
| Temporary Grass | 10675 | 146 | 18.9 | 11238 | 111 | 17.4 | 21913 | 126 | 18.1 |
| Permanent Pasture and Rough Grazings | 6236 | 85 | 11.1 | 8935 | 88 | 13.9 | 15171 | 87 | 12.6 |
| Total | 56372 | 772 | 100.1 | 64397 | 637 | 100.0 | 120769 | 694 | 100.0 |
| Arable area | 50136 | 687 | 88.9 | 55462 | 549 | 86.1 | 105598 | 607 | 87.4 |

Percentage of arable area

| | | | |
|---|---|---|---|
| Wheat | 23.5 | 28.1 | 25.9 |
| Barley | 44.7 | 40.6 | 42.6 |
| Oats | 2.8 | 4.4 | 3.6 |
| Other Cereals | - | 0.1 | 0.1 |
| All Cereals | 71.0 | 73.2 | 72.2 |
| Temporary Grass | 21.3 | 20.3 | 20.8 |

TABLE 5 CROPPING 1970 BY TYPE OF LIVESTOCK ENTERPRISE

| | Single Suckle | Other Cattle | Dairy | Sheep | Cattle & Sheep | No L/S | All Types |
|---|---|---|---|---|---|---|---|
| | | | Number of farms | | | | |
| Chalk/Limestone | 11 | 20 | 13 | 13 | 11 | 5 | 73 |
| Other Soils | 9 | 30 | 13 | 7 | 32 | 10 | 101 |
| Total | 20 | 50 | 26 | 20 | 43 | 15 | 174 |
| | | | Acres | | | | |
| Average Farm Size | 672 | 485 | 1138 | 439 | 686 | 531 | 652 |
| | | | Percentage of farm area | | | | |
| | % | % | % | % | % | % | % |
| Cereals | 61.4 | 66.4 | 59.7 | 68.4 | 61.4 | 70.0 | 63.2 |
| Other Cash Crops and Fallow | 10.8 | 6.2 | 8.5 | 4.4 | 3.7 | 10.4 | 6.8 |
| Fodder Crop | 0.6 | 1.0 | 2.1 | 2.6 | 3.4 | 0.4 | 2.0 |
| Temporary Grass | 13.4 | 14.7 | 18.2 | 17.0 | 19.2 | 13.8 | 16.7 |
| Permanent Pasture and Rough Grazing | 13.8 | 11.7 | 11.5 | 7.6 | 12.3 | 5.4 | 11.3 |
| | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Percent Arable | 86.2 | 88.3 | 88.5 | 92.4 | 87.7 | 94.6 | 88.7 |
| | | | Percentage of arable area | | | | |
| Wheat | 23.3 | 23.9 | 24.1 | 26.6 | 24.4 | 24.3 | 24.2 |
| Barley | 43.0 | 47.0 | 39.3 | 43.6 | 41.4 | 46.9 | 42.8 |
| Oats | 5.0 | 4.0 | 4.0 | 3.8 | 4.0 | 2.6 | 4.0 |
| Other Cereals | - | 0.2 | - | - | 0.3 | 0.1 | 0.2 |
| All Cereals | 71.3 | 75.1 | 67.4 | 74.0 | 70.1 | 73.9 | 71.2 |
| Temporary Grass | 15.6 | 16.7 | 20.5 | 18.3 | 21.8 | 14.6 | 18 |

TABLE 6 CROPPING 1972 BY TYPE OF LIVESTOCK ENTERPRISE

| | Single Suckle | Other Cattle | Dairy | Sheep | Cattle & Sheep | No L/S | All Types |
|---|---|---|---|---|---|---|---|
| | | | | Number of farms | | | |
| Chalk/Limestone | 11 | 20 | 13 | 13 | 11 | 5 | 73 |
| Other Soils | 9 | 30 | 13 | 7 | 32 | 10 | 101 |
| Total | 20 | 50 | 26 | 20 | 43 | 15 | 174 |
| | | | | Acres | | | |
| Average Farm Size | 792 | 500 | 1222 | 449 | 727 | 529 | 694 |
| | | | | Percent of farm area | | | |
| | % | % | % | % | % | % | % |
| Cereals | 59.9 | 66.5 | 59.3 | 67.8 | 61.5 | 75.3 | 63.1 |
| Other Cash Crops and Fallow | 5.5 | 3.9 | 5.2 | 4.1 | 2.7 | 5.9 | 4.3 |
| Fodder Crops | 1.2 | 0.4 | 2.3 | 1.9 | 3.3 | 0.4 | 1.9 |
| Temporary Grass | 14.8 | 17.8 | 20.8 | 18.9 | 18.6 | 13.2 | 18.1 |
| Permanent Pasture and Rough Grazing | 18.6 | 11.4 | 12.4 | 7.3 | 13.9 | 5.2 | 12.6 |
| | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Percent Arable | 81.4 | 88.6 | 87.6 | 92.7 | 86.2 | 94.8 | 87.4 |
| | | | | Percent of arable area | | | |
| Wheat | 24.5 | 25.4 | 26.7 | 28.2 | 25.1 | 27.4 | 25.9 |
| Barley | 45.6 | 46.1 | 37.0 | 42.2 | 42.9 | 46.4 | 42.6 |
| Oats | 3.4 | 3.5 | 3.9 | 2.7 | 3.3 | 5.6 | 3.6 |
| Other Cereals | 0.1 | 0.2 | 0.2 | - | 0.1 | - | 0.1 |
| All Cereals | 73.6 | 75.2 | 67.8 | 73.1 | 71.4 | 79.4 | 72.2 |
| Temporary Grass | 18.1 | 20.0 | 23.8 | 20.4 | 21.6 | 13.1 | 20.8 |

TABLE 7 ROTATIONS

(a) Number of rotations reported in 1972 survey

| | Chalk L'stn | Other Soils | All Farms |
|---|---|---|---|
| | | Number | |
| Number of Farms | 73 | 101 | 174 |
| Rotations Including Leys | 84 | 120 | 204 |
| Rotations having other break-crops only | 7 | 14 | 21 |
| Total rotations reported | 91 | 134 | 225 |
| Farms stating that part or whole area is under: | | | |
| (i) No set rotation | 11 | 13 | 24 |
| (ii) Continuous cereals | 1 | 12 | 13 |
| (of which continuous barley) | (-) | (7) | (7) |

(b) Place of leys in the rotation

| Crop preceeding the ley | No. | % | No. | % | No. | % |
|---|---|---|---|---|---|---|
| Wheat | 3 | 3 | 4 | 3 | 7 | 3 |
| Barley | 73 | 84 | 102 | 85 | 175 | 85 |
| Cereals (type not specified) | 3 | 3 | 4 | 3 | 7 | 3 |
| Oats | 4 | 5 | 9 | 8 | 13 | 6 |
| Oilseed rape | 1 | 1 | - | - | 1 | 1 |
| Fodder roots | 1 | 1 | 1 | 1 | 2 | 1 |
| Potatoes | 2 | 2 | - | - | 2 | 1 |
| | 87** | 100 | 120 | 100 | 207 | 100 |
| **Crop following the ley** | | | | | | |
| Wheat | 63 | 73 | 104 | 87 | 167 | 81 |
| Barley * | 15 | 17 | 11 | 9 | 26 | 13 |
| Cereals(type not specified) | 3 | 3 | 4 | 3 | 7 | 3 |
| Oats | 2 | 2 | - | - | 2 | 1 |
| Oilseed Rape | 2 | 2 | - | - | 2 | 1 |
| Fodder Roots | 2 | 2 | - | - | 2 | 1 |
| Potatoes | - | - | 1 | 1 | 1 | .. |
| | 87** | 100 | 120 | 100 | 207 | 100 |

(c) Length of wheat runs following the ley

| Number of successive years wheat | Percentage of the rotations reported | | |
|---|---|---|---|
| 0 | 14 | 5 | 9 |
| 1 | 36 | 36 | 36 |
| 2 | 48 | 56 | 53 |
| 3 | 2 | 3 | 2 |
| | 100 | 100 | 100 |

* In approximately 50% of these instances one barley crop following the ley was followed by wheat.

** Three long rotations reported included two ley breaks.

TABLE 8 LENGTH OF ROTATIONS AND LENGTH OF LEY BREAK

| Length of Rotations | Length of Ley | Chalk and Limestone | | | | | | Other Soils | | | | | | All Farms | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | % | 1 | 2 | 3 | 4 | 5 | % | 1 | 2 | 3 | 4 | 5 | % |
| | 3 | o | - | - | - | - | 1 | - | - | - | - | - | - | o | - | - | - | - | 1 |
| | 4 | o | - | - | - | - | 1 | * | o | - | - | - | 7 | oo | o | - | - | - | 5 |
| | 5 | * | * | o | o | - | 16 | * | ** | o | - | - | 19 | * | ** | o | o | - | 18 |
| | 6 | ** | ** ** | oo | o | - | 35 | ** | ** | * | - | - | 28 | ** | ** * | * | o | - | 31 |
| | 7 | * | * | ** | o | - | 25 | o | * | * | o | - | 16 | oo | * | ** | o | - | 20 |
| | 8 | o | * | oo | o | - | 10 | oo | * | * | oo | - | 16 | o | * | * | o | - | 13 |
| | 9 | - | - | oo | o | - | 4 | o | o | oo | o | - | 6 | o | o | oo | o | - | 5 |
| | 10 | oo | oo | o | o | - | 8 | o | o | o | oo | o | 8 | o | oo | o | oo | o | 7 |
| | % | 26 | 44 | 23 | 7 | - | 100 | 30 | 33 | 28 | 8 | 1 | 100 | 28 | 38 | 26 | 7 | 1 | 100 |

Number of rotations = 100% (87) (120) (207)

TABLE 9 LENGTH OF CEREAL RUNS AFTER A LEY BREAK*.

| Number of years cereals | Length of Ley | Chalk and Limestone | | | | | | Other Soils | | | | | | All Farms | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | % | 1 | 2 | 3 | 4 | 5 | % | 1 | 2 | 3 | 4 | 5 | % |
| | 0 | o | - | o | o | - | 3 | o | - | - | - | - | 1 | o | - | o | o | - | 2 |
| | 1 | o | - | - | - | - | 1 | - | - | o | - | - | 1 | o | - | o | - | - | 1 |
| | 2 | * | o | o | o | - | 8 | o | o | o | - | - | 4 | oo | o | o | o | - | 6 |
| | 3 | * | ** | oo | o | - | 20 | * | ** | ** | o | - | 27 | * | ** | * | o | - | 24 |
| | 4 | * | ** | ** * | o | - | 43 | * | ** * | ** | oo | - | 32 | * | ** | ** | o | - | 36 |
| | 5 | * | * | oo | o | - | 16 | ** | * | * | o | o | 20 | * | * | * | o | o | 18 |
| | 6 | oo | oo | o | o | - | 8 | o | * | oo | oo | - | 11 | o | oo | o | o | - | 10 |
| | 7 | - | - | - | - | - | - | o | - | - | - | - | 2 | o | - | - | - | - | 1 |
| | 8 | - | o | - | - | - | 1 | o | o | o | - | - | 2 | o | o | o | - | - | 2 |
| | % | 26 | 44 | 23 | 7 | - | 100 | 30 | 33 | 28 | 8 | 1 | 100 | 28 | 38 | 26 | 7 | 1 | 100 |

Number of rotations = 100% (87) (120) (207)

Symbols:

- \- means nil
- o " less than 2%
- oo " greater than 2% but less than 4%
- * " " " 4% " " " 8%
- ** " " " 8% " " " 12%
- ** * " " " 12% " " " 16%
- ** ** " " " 16%

* Including Oats

TABLE 10 REASONS FOR GROWING TEMPORARY GRASS, 1970 and 1972

(a) By Livestock Group

| | Single Suckle | | Other Cattle | | Dairy | | Sheep | | Cattle & Sheep | | No L/S | | All Types | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1970 | 1972 | 1970 | 1972 | 1970 | 1972 | 1970 | 1972 | 1970 | 1972 | 1970 | 1972 | 1970 | 1972 |
| Number of farms | 20 | | 50 | | 26 | | 20 | | 43 | | 15 | | 174 | |
| Reasons | Replies as percent of the number of farms * | | | | | | | | | | | | | |
| As a "cash crop" for the income generated | 45 | 40 | 36 | 30 | 35 | 35 | 40 | 40 | 16 | 16 | 53 | 40 | 34 | 30 |
| Weed control | 50 | 35 | 48 | 52 | 35 | 38 | 35 | 40 | 35 | 47 | 40 | 53 | 41 | 45 |
| A short duration crop in place of a fallow | 20 | 15 | 22 | 14 | 12 | 15 | 15 | 10 | 19 | 26 | 33 | 27 | 20 | 18 |
| Cereal disease and pest control | 65 | 65 | 46 | 40 | 54 | 46 | 30 | 35 | 47 | 49 | 20 | 27 | 45 | 44 |
| To maintain soil structure | 55 | 65 | 64 | 68 | 57 | 65 | 60 | 65 | 84 | 86 | 47 | 53 | 65 | 70 |
| To keep fertilizer costs down | 35 | 25 | 32 | 24 | 23 | 15 | 25 | 25 | 42 | 44 | 20 | 20 | 32 | 28 |
| To improve cereal yields | 90 | 85 | 78 | 58 | 77 | 73 | 85 | 80 | 72 | 72 | 67 | 67 | 78 | 70 |
| Other reasons | 45 | 55 | 22 | 36 | 35 | 23 | 20 | 25 | 53 | 53 | 13 | 13 | 33 | 37 |
| Including: (As a wheat entry) | (10) | (10) | (2) | (12) | (12) | (12) | (5) | (10) | (14) | (14) | (7) | (7) | (8) | (11) |
| (For livestock feed) | (15) | (20) | (10) | (8) | (12) | (12) | (10) | (10) | (28) | (28) | (-) | (-) | (14) | (13) |

(b) By Soil Type Area

| | Chalk/Limestone 1970 | Chalk/Limestone 1972 | Other Soils 1970 | Other Soils 1972 | All Types 1970 | All Types 1972 |
|---|---|---|---|---|---|---|
| Number of farms | 73 | | 101 | | 174 | |
| Reasons | Replies as percent of number of farms * | | | | | |
| As a cash crop for the income quoted | 38 | 34 | 31 | 28 | 34 | 30 |
| Weed control | 39 | 41 | 42 | 49 | 41 | 45 |
| A short duration crop in place of a fallow | 18 | 21 | 21 | 16 | 20 | 18 |
| Cereal disease and pest control | 51 | 47 | 42 | 43 | 45 | 44 |
| To maintain soil structure | 63 | 67 | 66 | 72 | 65 | 70 |
| To Keep fertilizer costs down | 37 | 29 | 28 | 27 | 32 | 28 |
| To improve cereal yields | 85 | 74 | 72 | 67 | 78 | 70 |
| Other reasons | 30 | 32 | 36 | 42 | 33 | 37 |
| Including: (as a wheat entry) | (8) | (11) | (8) | (12) | (8) | (11) |
| (for livestock feed) | (11) | (8) | (17) | (17) | (14) | (13) |

* Percentages add to over 100 because grass is usually grown for several reasons.

TABLE 11

REPLIES TO THE QUESTION "WHY DO YOU HAVE THIS PROPORTION OF TEMPORARY GRASS ON YOUR FARM?"

| Livestock Group / Soil type area | | Rotational Reasons | | | Livestock Requirements | | | Other Reasons | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Chalk L'stn. | Other Soils | All Types | Chalk L'stn. | Other Soils | All Types | Chalk L'stn. | Other Soils | All Types |
| Single Suckle | Number | 7 | 5 | 12 | 4 | 3 | 7 | 2 | 1 | 3 |
| | % of group* | 64 | 56 | 60 | 36 | 33 | 35 | 18 | 11 | 15 |
| Other Cattle | Number | 9 | 19 | 28 | 11 | 15 | 26 | 4 | 3 | 7 |
| | % of group* | 45 | 63 | 56 | 55 | 50 | 52 | 20 | 10 | 14 |
| Dairy | Number | 5 | 7 | 12 | 9 | 10 | 19 | - | - | - |
| | % of group* | 38 | 54 | 46 | 69 | 77 | 73 | - | - | - |
| Sheep | Number | 10 | 5 | 15 | 4 | 4 | 8 | 2 | - | 2 |
| | % of group* | 77 | 71 | 75 | 31 | 57 | 40 | 15 | - | 10 |
| Cattle and Sheep | Number | 7 | 22 | 29 | 8 | 19 | 27 | - | 3 | 3 |
| | % of group* | 64 | 69 | 67 | 73 | 59 | 63 | - | 9 | 7 |
| No L/A | Number | 1 | 7 | 8 | - | - | - | 3 | 2 | 5 |
| | % of group* | 20 | 70 | 53 | - | - | - | 60 | 20 | 33 |
| All Types | Number | 39 | 65 | 104 | 36 | 51 | 87 | 11 | 9 | 20 |
| | % of group | 53 | 64 | 60 | 49 | 50 | 50 | 15 | 9 | 11 |

* The number of affirmative replies expressed as a percentage of the number of farms in the particular livestock group situated in the given soil-type area e.g. 7 as a percentage of the number of single suckle farms in chalk/limestone areas is 64%.

TABLE 12 DISADVANTAGES AND PROBLEMS CREATED BY INCLUDING GRASS IN THE CROPPING SEQUENCE

(a) By Livestock Grouping

| | Single Suckle | Other Cattle | Dairy | Sheep | Cattle & Sheep | No L/S | All Types |
|---|---|---|---|---|---|---|---|
| Number of Farms | 20 | 50 | 26 | 20 | 43 | 15 | 174 |
| Principal Problems or Disadvantages | Replies as percent of number of farms * | | | | | | |
| Technical/Managerial | 35 | 28 | 35 | 25 | 39 | 40 | 33 |
| Capital | 35 | 24 | 27 | 25 | 30 | - | 25 |
| Weeds | 10 | 26 | 26 | 25 | 23 | 7 | 22 |

(b) By Soil Type Area

| | Chalk Limestone | Other Soils | All Types |
|---|---|---|---|
| Number of Farms | 73 | 101 | 174 |
| Principal Problems or Disadvantages | Replies as percent of number of farms * | | |
| Technical/Managerial | 26 | 39 | 33 |
| Capital | 21 | 29 | 25 |
| Weeds | 22 | 22 | 22 |
| Cereal Crop Diseases | - | 6 | 3 |
| Pests | 4 | 8 | 6 |

(c) Composition of Replies Stating Technical/Managerial Problems

| | % |
|---|---|
| Fencing for livestock | 24 |
| Difficulties in ley establishment/undersown cereals give poor yields | 12 |
| Labour requirements for conservation | 10 |
| Difficulties in making profitable use of grassland/livestock enterprise unprofitable | 9 |
| Livestock management | 5 |
| Water supplies for livestock | 5 |
| Ploughing out leys in dry seasons | 5 |
| Grassland management | 5 |
| Labour peaks for livestock and conservation | 3 |
| Poor market prices for hay | 3 |
| Farm layout makes grassland/livestock management difficult | 3 |
| Various other problems | 16 |
| | 100 |

(d) Composition of replies stating capital problems

| | |
|---|---|
| For livestock | 82 |
| For fencing | 11 |
| For water and fencing | 5 |
| For buildings as well as livestock | 2 |
| | 100 |

* A number of farmers expressed more than one type of problem so that the proportion expressing no problems was much greater than the balance required to make a total of 100% in these tables.

TABLE 13 STRUCTURE OF LIVESTOCK ENTERPRISES

(a) Forage Area

| | Single Suckle | Other Cattle | Dairy | Sheep | Cattle & Sheep | No L/S | All Types |
|---|---|---|---|---|---|---|---|
| | | | Total acres in the sample | | | | |
| Adjusted acres of forage grass * | 4405 | 6905 | 10125 | 2238 | 9515 | 1426 | 34614 |
| Add: | | | | | | | |
| Fodder crops | 186 | 112 | 594 | 202 | 733 | - | 1827 |
| Purchased fodder and keep-acreage equivalent | 71 | 126 | 134 | 57 | 322 | - | 710 |
| | 4662 | 7143 | 10853 | 2497 | 10570 | 1426 | 37151 |
| Subtract: | | | | | | | |
| Keep let off | 75 | 90 | 230 | 117 | 152 | 616 | 1280 |
| Use for horses etc. | 110 | 76 | 186 | 1 | 130 | 37 | 540 |
| Use for pigs | - | 75 | 20 | 24 | 161 | - | 280 |
| Hay sold - acreage equivalent | 116 | 520 | 129 | 214 | 966 | 773 | 2718 |
| Total Forage Acres for Cattle and Sheep | 4361 | 6382 | 10288 | 2141 | 9161 | - | 32333 |
| Forage acres per grazing livestock unit | 1.62 | 1.61 | 1.55 | 1.45 | 1.60 | - | 1.58 |

(b) Average grazing livestock numbers per 100 acres of forage grassland

| | | | | | | |
|---|---|---|---|---|---|---|
| Cattle | | | | | | |
| Dairy cows | - | - | 34 | - | - | - |
| Single suckle cows | 36 | - | 2 | - | 12 | - |
| Double suckle cows | - | 3 | •• | - | 1 | - |
| Multiple suckle cows | - | | | - | | - |
| Dairy bulls | - | - | •• | - | - | - |
| Beef bulls | 1 | •• | •• | - | •• | - |
| Other cattle under 6 months | 21 | 18 | 13 | - | 12 | - |
| " " 6 to 12 " | 21 | 24 | 12 | - | 14 | - |
| " " 1 to 2 years | 19 | 46 | 18 | - | 20 | - |
| " " over 2 " | 2 | 12 | 5 | - | 2 | - |
| | 100 | 103 | 86 | - | 61 | - |
| Sheep | | | | | | |
| Ewes | - | - | 18 | 295 | 88 | - |
| Rams | - | - | 0.4 | 7 | 2.4 | - |
| Sheep 0 to 6 months | - | - | 15 | 209 | 71 | - |
| " 6 to 12 " | - | - | 4 | 43 | 37 | - |
| " over 12 " | - | - | •• | 33 | 22 | - |
| | - | - | 38 | 587 | 220 | - |
| Outdoor Pigs | | | | | | |
| Sows | - | 1 | 2 | 2 | 5 | - |
| Boars | - | •• | •• | •• | •• | - |
| Pigs under 4 months | - | •• | •• | •• | 20 | - |
| " over 4 " | - | •• | •• | •• | - | - |
| | - | 1 | 2 | 3 | 25 | - |

Symbols: - means nil
•• means less than 0.4

* Adjusted for value of rough grazings.

TABLE 14 FORAGE AREA PER FARM AND ITS COMPOSITION

| | Single Suckle | Other Cattle | Dairy | Sheep | Cattle & Sheep | No L/S | All Types |
|---|---|---|---|---|---|---|---|
| Adjusted acres of forage grass* per farm | 220 | 138 | 389 | 112 | 221 | 95 | 199 |
| Percent of farm area | 28 | 28 | 32 | 25 | 30 | 18 | 29 |
| Total forage acres per farm | 233 | 142 | 417 | 125 | 246 | 95 | 214 |
| Composition: | % | % | % | % | % | % | % |
| Forage grass | 94 | 96 | 93 | 90 | 90 | 100 | 93 |
| Fodder crops | 4 | 2 | 6 | 8 | 7 | - | 5 |
| Acreage equivalent of purchased fodder and keep | 2 | 2 | 1 | 2 | 3 | - | 2 |
| | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Utilization: | | | | | | | |
| Keep let | 2 | 1 | 2 | 5 | 1 | 43 | 3 |
| Horses | 2 | 1 | 2 | .. | 1 | 3 | 2 |
| Pigs | - | 1 | .. | 1 | 2 | - | 1 |
| Hay sold (acreage equivalent | 2 | 7 | 1 | 8 | 9 | 54 | 7 |
| Grazing livestock enterprise | 94 | 90 | 95 | 86 | 87 | - | 87 |
| | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Forage acres per farm used by grazing livestock | 218 | 128 | 396 | 107 | 213 | - | 186 |
| As percentage of farm area | 28 | 26 | 32 | 24 | 29 | - | 27 |

Symbols:

- means nil

.. means less than 0.5

* Adjusted for value of rough grazings.

TABLE 15 COMPOSITION OF TEMPORARY GRASS AREA

(a) By Livestock Group

| Duration of Ley | Single Suckle acres | % | Other Cattle acres | % | Dairy acres | % | Sheep acres | % | Cattle & Sheep acres | % | No L/S acres | % | All Types acres | % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 year | 493 | 21 | 917 | 21 | 790 | 12 | 490 | 29 | 639 | 11 | 662 | 63 | 3991 | 18 |
| 2 years | 885 | 38 | 1790 | 40 | 2635 | 40 | 854 | 50 | 1542 | 26 | 59 | 6 | 7765 | 35 |
| 3 years | 740 | 32 | 958 | 22 | 1839 | 28 | 308 | 18 | 1784 | 31 | 259 | 25 | 5888 | 27 |
| Over 3 years | 218 | 9 | 752 | 17 | 1343 | 20 | 45 | 3 | 1844 | 32 | 68 | 6 | 4270 | 20 |
| Total | 2336 | 100 | 4417 | 100 | 6607 | 100 | 1697 | 100 | 5809 | 100 | 1048 | 100 | 21914 | 100 |

(b) By Soil Type Area

| Duration of Ley | Chalk Limestone Acres | % | Other Soils Acres | % | All Types Acres | % |
|---|---|---|---|---|---|---|
| 1 year | 2386 | 22 | 1605 | 14 | 3991 | 18 |
| 2 years | 4432 | 42 | 3333 | 30 | 7765 | 35 |
| 3 years | 3254 | 30 | 2634 | 23 | 5888 | 27 |
| Over 3 years | 603 | 6 | 3667 | 33 | 4270 | 20 |
| Total | 10675 | 100 | 11239 | 100 | 21914 | 100 |

TABLE 16 LEY ESTABLISHMENT

Percentage of the temporary grass area* established by undersowing to a cereal

(a) By Livestock Group

| Duration of Ley | Single Suckle | Other Cattle | Dairy | Sheep | Cattle & Sheep | No L/S | All Types |
|---|---|---|---|---|---|---|---|
| | % | % | % | % | % | % | % |
| 1 year | 92 | 73 | 87 | 91 | 98 | 87 | 88 |
| 2 years | 92 | 74 | 73 | 90 | 83 | 100 | 80 |
| 3 years | 43 | 71 | 58 | - | 73 | 100 | 64 |
| Over 3 years | 37 | 92 | 41 | - | 97 | 100 | 73 |
| All Leys | 73 | 77 | 61 | 86 | 87 | 90 | 76 |

(b) By Soil Type Area

| Duration of Ley | Chalk Limestone | Other Soils | All Farms |
|---|---|---|---|
| | % | % | % |
| 1 year | 90 | 85 | 88 |
| 2 years | 92 | 69 | 80 |
| 3 years | 73 | 54 | 64 |
| Over 3 years | 84 | 70 | 73 |
| All Leys | 86 | 68 | 76 |

TABLE 17 SEED MIXTURES (BY SOIL TYPE AREA)

| Mixture or Species | Chalk Limestone | Other Soils | All Farms |
|---|---|---|---|
| | Percent of temporary grass area (*) | | |
| Italian Ryegrass | 8.8 | 11.6 | 10.2 |
| Italian Ryegrass with Red Clover | 7.2 | 2.7 | 4.9 |
| Italian & Perennial Ryegrass | 10.9 | 15.2 | 13.1 |
| Italian & Perennial Ryegrass with clover and/or other grass | 14.1 | 12.3 | 13.3 |
| Perennial Ryegrass | 16.8 | 14.4 | 15.6 |
| Perennial Ryegrass, Timothy and Clover | 11.5 | 7.2 | 9.3 |
| Perennial Ryegrass, Fescue, Timothy and Clover | 13.0 | 9.2 | 11.1 |
| Other Mixtures Containing P.R.G. | 9.9 | 7.4 | 8.6 |
| Non Ryegrass Mixtures with or without Clover | 5.0 | 14.8 | 9.9 |
| Not specified | 2.8 | 5.2 | 4.0 |
| | 100.0 | 100.0 | 100.0 |

* See Table 15 for areas.

TABLE 18 LEY MIXTURES (BY DURATION AND LIVESTOCK GROUP)

| Mixture or Species | Single Suckle | Other Cattle | Dairy | Sheep | Cattle & Sheep | No.L/S | All Types |
|---|---|---|---|---|---|---|---|
| | Percent of temporary grass area * | | | | | | |
| **1 year leys** | | | | | | | |
| I.R.G. only or with Clover | 88 | 64 | 46 | 46 | 39 | 33 | 51 |
| I.R.G. + P.R.G. only or with other species | 6 | 31 | 24 | 12 | 45 | 38 | 30 |
| P.R.G. only or with other non-Ryegrass species | 6 | 5 | - | 42 | 16 | - | 10 |
| Non-Ryegrass mixtures | - | - | 15 | - | - | 13 | 4 |
| Not Stated | - | - | 15 | - | - | 16 | 5 |
| | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| **2 year leys** | | | | | | | |
| I.R.G. only or with Clover | 8 | 13 | 16 | 18 | 3 | - | 12 |
| I.R.G. + P.R.G. only or with other species | 12 | 37 | 26 | 37 | 44 | 20 | 36 |
| P.R.G. only or with other non-Ryegrass species | 62 | 50 | 41 | 38 | 53 | 80 | 43 |
| Non-Ryegrass Mixtures | - | - | 8 | 7 | - | - | 4 |
| Not stated | 18 | - | 9 | - | - | - | 5 |
| | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| **3 year leys** | | | | | | | |
| I.R.G. only or with Clover | - | - | - | - | - | - | - |
| I.R.G. + P.R.G. only or with other species | 18 | 17 | 33 | 100 | 20 | 25 | 24 |
| P.R.G. only or with other non-Ryegrass species | 82 | 61 | 58 | - | 78 | 75 | 68 |
| Non-Ryegrass mixtures | - | 16 | - | - | 2 | - | 4 |
| Not stated | - | 6 | 9 | - | - | - | 4 |
| | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| **Leys over 3 years duration** | | | | | | | |
| I.R.G. only or with Clover | - | - | - | - | - | - | - |
| I.R.G. + P.R.G. only or with other species | - | 10 | 13 | - | 10 | - | 16 |
| P.R.G. only or with other non-Ryegrass species | 100 | 59 | 74 | - | 29 | 36 | 50 |
| Non-Ryegrass mixtures | - | 26 | 13 | 100 | 61 | 64 | 34 |
| Not Stated | - | 5 | - | - | - | - | 1 |
| | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

* See Table 15 for areas.

TABLE 19 GRASSLAND MANAGEMENT BY TYPE OF GRASSLAND - ON 159 FARMS HAVING LIVESTOCK

| Type of grassland | 1 Year Leys | 2 Year Leys | 3 Year Leys | Leys Over 3 yrs. duration | Permanent Pasture |
|---|---|---|---|---|---|
| Number of farms having the grassland type and for which management details were given (i.e. the number = 100%) | 62 | 74 | 66 | 31 | 114 |
| Acreage of grassland involved | 3259 | 7512 | 5873 | 3683 | 10786 |
| | Farms reporting for whole or part of their grass area as percent of the number of farms | | | | |
| Cutting/Grazing Management | | | | | |
| Alternate cutting & grazing through the season | 15 | 34 | 21 | 39 | 23 |
| Separate blocks for part of the season | 26 | 41 | 48 | 52 | 35 |
| Cut only | 55 | 15 | 17 | 10 | 2 |
| Grazed only | 6 | 34 | 24 | 10 | 46 |
| Zero grazed | - | - | 2 | - | - |
| Grazing Management | | | | | |
| Set stocking | 23 | 41 | 38 | 55 | 54 |
| Rotational paddocks | 8 | 34 | 29 | 29 | 17 |
| Rotational paddocks in large blocks or fields | 3 | 9 | 11 | 6 | 10 |
| Forward creep (for sheep) | 2(5)* | 1(3)* | 2(5)* | - | 1(2)* |
| Sideways creep (for sheep) | - | - | - | - | - |
| Rotational strips with a back fence | 2 | 1 | 2 | - | 1 |
| Rotational strips without a back fence | 2 | 7 | 2 | 6 | 5 |
| No system | 2 | 7 | 9 | 16 | 16 |
| Not stated | 6 | 4 | 6 | 3 | 6 |

* Percent of farms having sheep.

TABLE 20 GRASSLAND MANAGEMENT BY LIVESTOCK GROUP - ON 159 FARMS HAVING LIVESTOCK

| | Single Suckle | Other Cattle | Dairy | Sheep | Cattle & Sheep | All Farms with Livestock |
|---|---|---|---|---|---|---|
| Number of farms ( = 100%) | 20 | 50 | 26 | 20 | 43 | 159 |
| | | Farms reporting for whole or part of their grass area as percent of the number of farms | | | | |
| Cutting/Grazing Management | | | | | | |
| Alternate cutting and grazing through the season | 45 | 30 | 38 | 45 | 37 | 37 |
| Separate blocks for part of the season | 35 | 44 | 65 | 30 | 51 | 47 |
| Cut only | 40 | 44 | 42 | 15 | 33 | 36 |
| Grazed only | 45 | 54 | 58 | 55 | 42 | 50 |
| Zero grazed | 5 | - | - | - | - | 1 |
| Grazing Management | | | | | | |
| Set stocking | 30 | 56 | 77 | 40 | 67 | 57 |
| Rotational paddocks | 30 | 28 | 69 | 40 | 26 | 36 |
| Rotational paddocks in large blocks or fields | 20 | 12 | 8 | 5 | 16 | 13 |
| Forward creep (for sheep) | - | - | - | 10 | 2 | 2 |
| Sideways creep(for sheep) | - | - | - | - | - | - |
| Rotational strips without a back fence | - | 2 | 27 | - | 7 | 7 |
| Rotational strips with a back fence | - | - | 8 | - | 5 | 3 |
| No system | 15 | 14 | 4 | 20 | 14 | 13 |
| Not stated | 15 | 10 | 8 | 15 | 5 | 9 |

TABLE 21 CROPS FOR CONSERVATION

| Livestock Group | Single Suckle | Other Cattle | Dairy | Sheep | Cattle & Sheep | No L/S | All Types |
|---|---|---|---|---|---|---|---|
| (a) Grassland and Lucerne | | | | Acres | | | |
| Total adjusted acres grassland and lucerne | 4405 | 6916 | 10192 | 2238 | 9515 | 1458 | 34724 |
| | | | | Cumulative acreage cut * | | | |
| Hay | 1339 | 3189 | 2444 | 900 | 2902 | 879 | 11653 |
| Silage | 796 | 608 | 2036 | - | 215 | - | 3655 |
| Haylage | - | - | 299 | - | 70 | - | 369 |
| Dried grass | - | - | - | - | 600 ** | - | 600 |
| (b) Other Fodder Crops | | | | Actual acreage | | | |
| Oat and vetch silage | - | - | 70 | - | - | - | 70 |
| Cereals for silage | - | 3 | 16 | - | - | - | 19 |
| Maize for silage | - | - | 61 | - | - | - | 61 |
| Herbage seed straw(acreage from which fed) | 185 | 64 | 70 | 15 | 50 | - | 384 |
| Oat and pea straw | - | 10 | - | - | - | - | 10 |

* Including any areas mown for second or subsequent cuts.
** The acreage set aside for drying (not cumulative acreage) on one farm - mostly for sale.

TABLE 22 FODDER FROM BY-PRODUCTS AND CATCH CROPS *

| Livestock Group | Single Suckle | Other Cattle | Dairy | Sheep | Cattle & Sheep | No L/S | All Types |
|---|---|---|---|---|---|---|---|
| (a) By-product Grazing | | | | Actual acreage | | | |
| Herbage seed grazed | 250 | 352 | 56 | - | 73 | - | 731 |
| Cereals grazed in spring | - | 18 | - | 553 | 155 | - | 726 |
| (b) Catch Crops (stubble crops etc) | | | | | | | |
| Stubble turnips | - | 99 | 50 | 196 | 210 | - | 555 |
| Italian ryegrass | - | 167 | 200 | - | 55 | - | 422 |
| Rape and turnips | - | - | 63 | 85 | 87 | - | 235 |
| Rape | - | - | 98 | 23 | 50 | - | 171 |
| Mustard or rape and mustard | 100 | 10 | - | 50 | 22 | - | 182 |
| Kale or rape and kale | 5 | - | - | - | 10 | - | 15 |
| Weedy stubbles | - | - | - | - | 35 | - | 35 |
| Other stubble crops (Rye and ryegrass) (Trefoil ) (Fodder raddish ) | - | - | 20 | 38 | 15 | - | 73 |
| | 105 | 276 | 431 | 392 | 484 | - | 1688 |

* The acreage of these crops has not been included in any calculations of forage area or forage acres per livestock unit.

TABLE 23 FODDER CROPS

(a) By Livestock Group

| Crop | Single Suckle Acres | % | Other Cattle Acres | % | Dairy Acres | % | Sheep Acres | % | Cattle & Sheep Acres | % | No L/S Acres | % | All Types Acres | % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kale | 96 | 50 | 36 | 35 | 321 | 45 | 80 | 47 | 201 | 19 | - | - | 734 | 33 |
| Kale with rape or mustard | - | - | 20 | 20 | 67 | 9 | - | - | 52 | 5 | - | - | 139 | 6 |
| Kale and cabbage | - | - | 3 | 3 | - | - | - | - | | | - | - | 3 | .. |
| Kale and swedes | - | - | - | - | - | - | - | - | 11 | 1 | - | - | 11 | .. |
| Swedes | - | - | 2 | 2 | - | - | - | - | 31 | 3 | - | - | 33 | 1 |
| Turnips and swedes | - | - | 1 | 1 | - | - | - | - | 23 | 2 | - | - | 24 | 1 |
| Turnips | - | - | - | - | - | - | - | - | 105 | 10 | - | - | 105 | 5 |
| Mangolds | - | - | 2 | 2 | - | - | - | - | 6 | 1 | - | - | 8 | .. |
| "Roots" (mixed or unspecified) | - | - | - | - | - | - | 70 | 41 | 261 | 25 | - | - | 331 | 15 |
| Rape and turnips | - | - | - | - | - | - | - | - | 60 | 6 | - | - | 60 | 3 |
| Rape | - | - | - | - | - | - | - | - | 36 | 4 | - | - | 36 | 2 |
| Rape and ryegrass | - | - | - | - | - | - | - | - | 30 | 3 | - | - | 30 | 1 |
| Mustard (*) | 40 | 20 | 23 | 23 | 16 | 2 | - | - | 166 ** | 16 | - | - | 245 | 11 |
| Cereals for silage | - | - | 3 | 3 | 16 | 2 | - | - | - | - | - | - | 19 | 1 |
| Oats and vetches for silage | - | - | - | - | 70 | 10 | - | - | - | - | - | - | 70 | 3 |
| Maize for silage | - | - | - | - | 61 | 9 | - | - | - | - | - | - | 61 | 3 |
| Rye for fodder | 57 | 30 | - | - | 97 | 14 | 20 | 12 | 50 | 5 | - | - | 224 | 10 |
| Lucerne | - | - | 11 | 11 | 67 | 9 | - | - | - | - | 32 | 100 | 110 | 5 |
| Total | 193 | 100 | 101 | 100 | 715 | 100 | 170 | 100 | 1032 | 100 | 32 | 100 | 2243 | 100 |

(b) By Soil-type Area

| Crop | Chalk Limestone Acres | % | Other Soils Acres | % | All Types Acres | % |
|---|---|---|---|---|---|---|
| Kale | 374 | 30 | 360 | 36 | 734 | 33 |
| Kale with rape or mustard | 127 | 10 | 12 | 1 | 139 | 6 |
| Kale and cabbage | 3 | .. | - | - | 3 | .. |
| Kale and swedes | - | - | 11 | 1 | 11 | .. |
| Swedes | 1 | .. | 32 | 3 | 33 | 1 |
| Turnips and swedes | - | - | 24 | 2 | 24 | 1 |
| Turnips | 105 | 8 | - | - | 105 | 5 |
| Mangolds | 3 | .. | 5 | 1 | 8 | .. |
| "Roots" (mixed or unspecified) | 205 | 16 | 126 | 13 | 331 | 15 |
| Rape and turnips | - | - | 60 | 6 | 60 | 3 |
| Rape | 36 | 3 | - | - | 36 | 2 |
| Rape and ryegrass | - | - | 30 | 3 | 30 | 1 |
| Mustard (*) | 72 | 6 | 173 ** | 18 | 245 | 11 |
| Cereals for silage | - | - | 19 | 2 | 19 | 1 |
| Oats and vetches for silage | 70 | 6 | - | - | 70 | 3 |
| Maize for silage | 20 | 2 | 41 | 4 | 61 | 3 |
| Rye for fodder | 204 | 16 | 20 | 2 | 224 | 10 |
| Lucerne | 32 | 3 | 78 | 8 | 110 | 5 |
| Total | 1252 | 100 | 991 | 100 | 2243 | 100 |

Symbols:

- \- mean nil
- .. means less than 0.5%

* Some grown for ploughing in as green manure.

** 150 acres on one farm let for grazing.

## APPENDIX III

Structure of livestock sales and input in the five livestock enterprise groups(See definitions Appendix I page(58)

### SINGLE SUCKLE GROUP - 20 FARMS

| Sales | Number of farms | Input (origin of cattle sold) | |
|---|---|---|---|
| | | Home bred single-suckle calves only | Home bred single suckle calves plus other inputs * |
| | | Number of farms | |
| All fat 18 months old or less | 4 | 4 | - |
| All fat over 18 months old | 1 | - | 1 |
| All fat at various ages | 2 | - | 2 |
| All stores 18 months old or less | 6 | 5 | 1 |
| Fat and store 18 months or less | 2 | - | 2 |
| Store and for breeding(50% or over) | 2 | 2 | - |
| Fat and for breeding(50% or over) | 3 | 3 | - |
| | 20 | 14 | 6 |

* Other inputs

| | |
|---|---|
| Purchased calves | 3 farms |
| " young stores | 2 farms |
| " Stores over 12 months old | 1 farm |
| | 6 |

### OTHER CATTLE GROUP - 50 FARMS

| Sales | Number of farms | Input (origin of cattle sold) | | | |
|---|---|---|---|---|---|
| | | Calves | Stores 12 months or less | Stores over 12 months | Other* |
| | | Number of farms | | | |
| All fat 18 months old or less | 11 | 5 | 2 | - | 4 |
| All fat over 18 months old | 19 | 2 | 4 | 9 | 4 |
| All fat at various ages | 2 | 1 | - | - | 1 |
| All stores 18 months old or less | 6 | 5 | - | - | 1 |
| All stores over 18 months old | 3 | 2 | 1 | - | - |
| Fat and store 18 months or less | 2 | 2 | - | - | - |
| Fat and store over 18 months | 4 | - | 1 | 2 | 1 |
| Fat and breeding heifers(over 50%) | 2 | 1 | - | - | 1 |
| Store and breeding heifers(over 50%) | 1 | - | 1 | - | - |
| | 50 | 18 | 9 | 11 | 12 |

* Other inputs

| | |
|---|---|
| Home bred calves from own beef cows | 6 |
| Purchased calves and strong stores | 6 |
| | 12 |

DAIRY HERD GROUP - 26 FARMS

| Cattle Sales | Not selling dairy heifers | Selling dairy heifers** | Input (origin of cattle sold): Own dairy calves only | Own dairy calves plus other inputs* |
|---|---|---|---|---|
| | Number of farms | | Number of farms | |
| Fat 18 months old or less | 2 | - | - | 2 |
| Fat over 18 months old | 4 | 1 | 2 | 3 |
| Fat at various ages | 2 | 1 | 2 | 1 |
| Stores 18 months old or less | 2 | - | 2 | - |
| Calves | 5 | 4 | 7 | 2 |
| Calves and stores under 18 months | 2 | - | 2 | - |
| Calves and fat 18 months or less | - | 2 | 2 | - |
| Fat and store 18 months or less | 1 | - | - | 1 |
| | 18 | 8 | | |
| | 26 | | 17 | 9 |

* Other inputs

| | |
|---|---|
| Home bred calves from single suckle beef cows | 4 farms |
| Purchased calves | 3 farms |
| Purcahsed 19 months old dairy heifers | 1 farm |
| Purchased yearling stores | 1 farm |
| | 9 |

** Farms from which between 10% and 40% of cattle sales are dairy heifers over 18 months old.

| Sheep Sales | Number of farms | Input (origin of sheep sold): Lambs from own ewe flock only | Purchased store lambs only |
|---|---|---|---|
| | | Number of farms | |
| All fat under 6 months old | 3 | 3 | - |
| All fat 6 months old and over | 3 | 1 | 2 |
| | 6 | 4 | 2 |

SHEEP GROUP - 20 FARMS

| Sales | Number of farms | Input (origin of sheep sold): Lambs from own ewe flock only | Lambs from own ewe flock plus rearing purchased ewe lambs. | Purchased ewe lambs only |
|---|---|---|---|---|
| | | Number of farms | | |
| All fat lambs under 6 months old | 4 | 4 | - | - |
| All fat lambs 6 months old or over | 1 | 1 | - | - |
| All fat lambs at various ages | 3 | 3 | - | - |
| All as store lambs | 3 | 3 | - | - |
| All as thaves | 1 | - | - | 1 |
| Fat lambs and thaves | 3 | - | 2 | 1* |
| Store, fat and breeding (ewe) lambs | 1 | 1 | - | - |
| Store and fat lambs | 4 | 4 | - | - |
| | 20 | 16 | 2 | 2 |

* Rearing ewe lambs, selling approximately half as lambed thaves and their lambs fat.

CATTLE AND SHEEP GROUP - 43 FARMS

Cattle Sales

| | Number of farms | Input (origin of cattle sold) Home bred single suckle calves only. | Purchased calves (including one double suckle herd) | Purchased weaned calves or stores | Other* |
|---|---|---|---|---|---|
| | | | Number of farms | | |
| All fat 18 months old or less | 4 | 2 | 1 | - | 1 |
| All fat over 18 months old | 15 | 1 | 4 | 7 | 3 |
| All fat at various ages | 7 | 1 | 3 | - | 3 |
| All stores 18 months old or less | 9 | 3 | 5 | 1 | - |
| Fat and store at various ages | 4 | 1 | 2 | 1 | - |
| Fat and for breeding | 2 | 2 | - | - | - |
| Store and for breeding (over 50%) | 1 | 1 | - | - | - |
| All for breeding | 1 | - | - | 1 | - |
| | 43 | 11 | 15 | 10 | 7 |

* Other inputs

| | |
|---|---|
| Home bred single-suckle calves plus purchased stores under one year | 3 farms |
| Purchased calves and stores over 18 months old | 3 farms |
| Purchased calves and stores 18 months old or less | 1 farm |
| | 7 |

Sheep Sales

| | Number of farms | Input (origin of sheep sales) Lambs from own ewe flock only | Purchased ewe lambs only | Purchased store lambs only | Lambs from own ewe flock plus purchased stores or ewe lambs |
|---|---|---|---|---|---|
| | | | Number of farms | | |
| All fat lambs under 6 months old | 7 | 7 | - | - | - |
| All fat lambs 6 months old or over | 7 | 3 | - | 4 | - |
| All fat lambs at various ages | 11 | 8 | - | - | 3 |
| All as store lambs | 3 | 2 | - | 1 | - |
| All as thaves (50% with lambs) | 1 | - | 1 | - | - |
| Fat lambs and thaves or ewe lambs | 4 | 1 | 1* | 1 | 1 |
| Store lambs and thaves | 1 | - | 1* | - | - |
| Store and fat lambs | 9 | 9 | - | - | - |
| | 43 | 30 | 3 | 6 | 4 |

* Rearing ewe lambs and selling part or all as lambed thaves and their lambs fat or as stores

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