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Grassland in the British economy

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THE PRESENT IMPORTANCE OF GRASS AND GRASSLAND PRODUCTS

Large areas of the UK, particularly the wetter regions of the west, are well suited to the growth of grass and it is the Kingdom's most important single crop. In addition to the cultivated pastures, there are large areas of rough grazings in the hills and uplands which provide feed for some of the hardier breeds of cattle and sheep. Arable land also makes a contribution to animal production by providing grains, forage crops and by-products. Together, the grassland, rough grazings and arable land contributed feed to produce 71% of the milk, 85% of the beef and veal, 58% of the mutton and lamb and 29% of the wool purchased by UK consumers in 1978.

Table 1 shows the areas covered by the three forms of land use and Table 2 lists the quantities and farmgate values of the products.

Table 1
Areas of types of land use – June, 1978 (ha)

	Rough grazings	Temporary grass	Permanent grass	Tillage
England	760 974	1 129 346	3 169 331	4 129 636
Wales	403 406	163 204	782 349	107 734
Scotland	4 385 967	499 249	560 585	611 318
N Ireland	195 955	276 853	489 550	83 802
UK	5 746 303	2 068 651	5 001 815	4 932 491

Sources: MAFF, 1979; DAFS, 1980; DANI, 1979.
Note: Due to rounding, the UK figures are not exact column totals.

Table 2
Quantities and farmgate values of cattle and sheep products – UK, 1978

Commodity	Quantity	Value (£ million)
Beef and veal	1 048 kt	1 257
Mutton and lamb	411 kt	300
Wool	169 kt	33
Milk	15 090 Ml	1 621
		£3 211
All farm products		£7 142

Source: MAFF, 1980.

THE SYMPOSIUM

The aims of the symposium were to consider the future demand for grassland products, describe the present position and the possibilities for change, and to discuss the future in relation to socio-economic and political forces.

Papers were prepared under three general headings:

(i) The demand for grassland products – Papers 7 to 14;
(ii) An analysis of the current position – Papers 16 to 23;
(iii) Possibilities for change – Papers 25 to 33.

Participants represented a wide variety of disciplines and the papers were distributed for reading before the symposium. Lazenby and Doyle (2) opened the proceedings with an overview of the subject and a consideration of the consequences for grassland farmers of various possible responses to future cost/price changes. Giles (6), Tayler (15) and Wilkins *et al.* (24) presented summaries of the distributed papers. Greenhalgh (3) and Marsh (4) discussed some future technical and political possibilities with the aim of stimulating wide consideration in the debate. Spedding's paper (5) aimed to widen the outlook even further, showing the importance of grassland on a global scale.

For discussion, delegates were divided into ten groups, dealing with the following aspects of the future of grassland in the British economy:

A The effects of changes in social, economic and dietary factors. Chairman – Dr J E Duckworth.

B The effects of changes in physical, technical and economic input/output relationships. Sheep production. Chairman – Professor J M M Cunningham.

C The effects of changes in physical, technical and economic input/output relationships. Milk production. Chairman – Professor P N Wilson.

D The effects of changes in physical, technical and economic input/output relationships. Beef production. Chairman – Dr D F Osbourn.

E, F, G The effects of competition for land use between livestock, crops, forestry, recreation, conservation, amenities and other interests including integrated land usage. (Three groups working independently.) Chairmen – Dr J Phillipson, Professor G R Dickson and Mr J M Stansfield.

H The effects of biological constraints (excluding animal diseases). Chairman – Professor J D Hayes.

I The effects of animal diseases. Chairman – Professor J M Payne.

J The effects of national and international political constraints. Chairman – Mr M Whitby.

The chairmen of these groups met after the symposium to consider the outcome of the discussion and to plan the present paper, summarising the discussion in the context of the contributed papers and highlighting the conclusions.

The term 'grassland' is taken to include all temporary and permanent pastures and rough grazings. The products involved are largely beef, mutton, milk and milk derivatives. The services are amenities such as landscape beauty, wildlife conservation, access paths and grassland areas for tourism and recreation. Most of the text and discussion is limited to grass and grassland products in the UK, though the consequences of the wider EC market and competition from other countries are also considered.

THE FUTURE DEMAND FOR GRASSLAND PRODUCTS

Projection for main grassland products

Looking into the future is, at best, informed guesswork; at worst it is wishful thinking. Hallam (11) distinguishes three types of forward viewing; the target (a desired state), the forecast (prophetic) and the projection (the likely consequences of specific assumptions). The symposium was concerned with the projection and this was provided initially by Chapman & Warwick (12) for UK consumer demand by 2000 AD. After a careful statement of their assumptions, the authors project that there will be little change in consumption of liquid milk, a rise in demand for cheese and falls in demand for butter and condensed milk. As regards meat, they suggest that beef consumption may remain static or rise by up to 15% whilst the outlook for lamb is for a significant reduction.

In discussion, participants tended to accept these projections though also to suggest others on the basis of changed assumptions. For instance the present trend of lamb sales may be the result of a fall in New Zealand imports rather than a growing aversion to lamb. The present demand for liquid milk is partly dependent on the maintenance of the household delivery system and a

change to selling through supermarkets could cause a dramatic reduction in demand. Some suggested that consideration of human dietary needs might have an increasing effect in future (see Hollingsworth (9)).

However, the social and economics discussion group considered that the likely demand situation did not warrant the production scientists' enthusiasm for ever more output and increasing intensification of production, regardless of cost. The increased output can only be justified if it results in a cheaper product. This resolved into a call for more aggressive marketing policies and a realisation that substantial areas of grassland might be released for other purposes (see pages 541 and 547).

Other demands on grassland

The demand for grassland for purposes other than food production stimulated much interest and participants seemed to agree that there would be increasing pressure for more amenity areas (see Tranter & Tranter (13)), wildlife conservation (Appendix VII), scenic beauty and land for building roads. However, the impact of these demands will vary greatly over the country with more amenity areas being needed near the conurbations but less pressure on the more remote parts as the cost of travel increases with fuel prices. The amount of land now in grass, which may be required for these purposes up to the year 2000, was estimated by one group to be between 5% and 8% of the present grassland area depending on the degree of multiple land use. Such a loss was considered to be small in relation to the capacity of farmers to compensate by increased productivity.

The demands of forestry are of a different order and, as will be shown later, the production of timber does appear to be a strong contender for land when the output of grassland products exceeds demand.

LINKING DEMAND AND PRODUCTION

> 'Paradoxically, a study of the UK's demand for grassland products cannot be equated with a study of the demand for British grassland. This is so for two particular reasons: the first is that, with changes in technology and price, some products that today we consider to be grassland products may not be supplied from grassland in the future; the second is that, because of the possibilities of trade, British grassland is neither the sole supplier of British demand nor is it constrained to supply only British demand'. (Swinbank (7)).

There was widespread agreement that, within the present political climate, the UK farmer should regard the EC as his real market and that competition from third countries is unlikely unless the UK withdraws from the Community. Two main observations followed:

(i) That demand for animal products in other EC countries is not necessarily moving in the same direction as in the UK. For instance, the demand for lamb is increasing in Germany and France. An overall EC demand projection is therefore needed.
(ii) Production opportunities for British agriculture can only be linked with trends in EC consumer demand if the UK industry is able to compete effectively in the EC market.

Recent experience with such commodities as bacon, apples and potatoes, together with the growing threat of imports to the liquid milk market, suggest some inadequacies in UK competitive strengths. Within their home market, producers are facing competition from others in the EC who are exporting highly selected fractions of their total product quality range, and whose marketing efforts and services are co-ordinated by well-established national organisations such as CMA (Germany) and SOPEXA (France). Against this the UK industry has to market its entire product range through a very fragmented marketing infrastructure.

This symposium has again focused attention on the great potential for increased productivity from British grassland. Any increased exploitation of this potential must be accompanied by expansion of market shares at home and overseas or by a reduction of the area devoted to grass. Producers will have to ensure that systems are cost competitive, that their products are appropriate to market requirements and efficiently channelled to consumers in suitable forms. Equally there is an urgent need for greater co-ordination of national efforts to improve market exploration, development, promotion and standards.

Responsibility for such development rests not only with the producers but with Government, the statutory organisations and the private trade sector. It is therefore recommended that, in addition to encouraging producers to accept a greater degree of marketing responsibility, Government should examine ways of achieving the necessary co-ordination across the existing structure as an initial step towards developing a unified, comprehensive national body with similar capabilities to those of our major competitors. However, not all participants accept this viewpoint, some considering that a call for action does not require yet another organisation but a stimulation and co-ordination of existing bodies.

It was proposed that both the production and grading of lamb and beef carcasses should be brought in line with consumer demand for leanness. The UK meat industry was thought to be backward in improving its marketing image and some of the blame was placed on HLCA's for encouraging the keeping of ewes and cows rather than stimulating productivity and competitiveness.

As Doyle (23) and CAS (1980a) have indicated, the UK farmer's image of

his own efficiency, in comparison with his EC partners, is hard to substantiate and possibly exaggerated. The UK government must share any blame for this lack of competitiveness in that inappropriate technologies and overcapitalisation have been encouraged by past farming support systems.

PRODUCTION

The clear message from many of the papers and from much of the discussion is that the technology is available to more than double the output of UK grassland. Failure to adopt this technology, particularly on the areas of permanent pasture, requires further investigation, both of the appropriateness of the technology and the sociological, financial and structural factors determining its uptake by farmers.

Initially most important is the supply of nitrogen which can be provided as fertiliser or by the inclusion of legumes in pastures. Since the price of N fertiliser is rising in real terms with that of fossil fuels, there is good reason to concentrate a major R & D effort on the legume. However, many participants consider that uptake, on any scale, of a legume-based technology is unlikely for at least a decade.

Making better use of grass also offers one of the best means of improving overall farm profits whether the price of fertiliser rises twice as fast as the price of concentrates or only half as fast – scenarios which should cover the full range of possibilities. However, the difficulties presented by feeding systems relying heavily on grass in place of concentrates should not be underestimated (Lazenby & Doyle (2)).

There is considerable opportunity for using forage to better effect. Tayler (15) identifies the major problem, that of reconciling the relatively inflexible demand of the livestock for feed with the fluctuating and sometimes unreliable growth of the forage. He summarises effective grassland usage as requiring an appropriate combination of stocking rate, conservation and alternative reserve feeds.

On the technical aspect of grass improvement many participants commented on the apparent lack of progress by plant breeders in comparison with their successes with cereals. However, there was strong support for continued work, particularly on legumes, and it is recommended that plant breeders should maintain their concern for those qualities required by the animal nutritionists when planning breeding programmes. Relevant factors are those which affect voluntary forage intake and those interacting with the ruminant digestive process, such as protein degradability and legume tannin content.

The use of chemicals to improve the predictability of forage yields and pattern of growth is considered possible, but it is thought unlikely that

manufacturers will develop chemicals specifically for the specialised problems of grassland. Greenhalgh (3) discussed the possible control of water uptake to give growth when, and only when, required but this suggestion is thought to be highly speculative. The possibility of incorporating nitrogen fixing organisms into grasses and of transferring basic physiological attributes of tropical species to temperate species are also considered to be very speculative.

The more effective use of herbage involves some sacrifice in individual animal performance. Many comments reflected the concern of delegates with output parameters, such as yield of DM/ha, UME/ha, milk per cow or lambs per ewe which, valuable though they are for some purposes, are not always appropriate and are often misused. However, the problem of defining more suitable parameters was not solved at the symposium. Financial profit is important but there are clearly situations where other considerations, such as work satisfaction, predominate. The lack of suitable parameters for amenity uses, wildlife conservation and landscape quality were noted and it is considered that this lack allows undue influence to economic factors in national debate and policy formulation.

Even within the economic sphere, doubts were expressed as to which considerations influence farmers decisions. Though, in theory, food is produced for people to purchase and eat, in practice the farmer normally aims at the immediate market which determines his returns and the structures of that market may, or may not, be wholly relevant. The system of grading carcasses, particularly of lambs, has lagged behind consumer choice for many years. The purchase of milk on a total solids basis has been out-of-step with manufacturing requirements since UK output exceeded the demands of the liquid market (CAS, 1978). There are many examples of Government grants and subsidies distorting farmers aims and production methods. Overall, this is a fruitful area for further research which could lead to farmers being more directly influenced by true consumer demand. The proposal is directly relevant to that which calls for Government to look at the UK marketing strategy.

POLITICAL CONSIDERATIONS

The group concerned with the effects of political constraints produced observations on four main topics though they thought these to be rather inconclusive.

(i) *Price levels*

There is no probability of a real rise in farmgate prices within the foreseeable future. Indeed the more pertinent question is as to how fast they will fall.

(ii) *Physical production controls*

As political expedience will prevent price levels being lowered sufficiently to reduce surpluses, physical controls do seem a likely policy instrument.

(iii) *Land retirement*

Though not now politically fashionable, land retirement from grassland production may become a corollary of rapid increases in productivity. Alternatives are the production of crops for energy and other non-food uses, afforestation for timber and small areas for amenity and conservation purposes. Abandoning the land to natural fallowing seems unlikely.

(iv) *Extension versus research*

More effective use of existing information could be made by diverting public funds from research to extension work.

Some concern was expressed that policies designed to redistribute wealth might have unexpected, and perhaps undesirable, effects on the present structure of landownership which, in turn, would be reflected in farm size and grassland management operations. However, the members of the group were not aware of any conclusive evidence to support the view that large farms have an economic advantage.

DISEASE CONSTRAINTS

None of the contributed papers had considered veterinary aspects and thus it was inevitable that the group concerned with the effects of disease should issue a cautionary note. They listed seven classes of disease hazards which might develop into production problems with more intensive grassland output and use.

(i) *Hazards associated with increased use of fertilisers*

Dangers are foreseen in current trends. Changes in timing of fertiliser use involve applications of more N and K in mid-summer and less in spring, to even out grass production through the growing season. The lush growth of grass in the autumn may increase the incidence of hypomagnesaemia, ketosis, the fatty liver syndrome and milk fever.

Hypomagnesaemia is an especial hazard and the group noted with concern the increasing evidence that dietary supplementation with magnesium is not always effective. Moreover, concurrence of hypomagnesaemia with hypocalcaemia in milk fever presents a problem because such cases are difficult to prevent and treat.

(ii) *The hazard associated with increased use of clover*

Though the problem of bloat could be exaggerated, it is real. Research indicates that legume breeders should select for tannin content. Animal breeders could select for resistance to bloat on the basis of protein

composition of the saliva, but this has little practical application because of the slow rate of reproduction in cattle. However, a test for revealing susceptible stock might allow selection of stock for appropriate management.

(iii) *Hazards associated with mineral or trace element status in soils and herbage*

Appendix II suggests that reserves in pasture soils are adequate but it is not certain that all reserves are available for use. Regular monitoring of herbage and of blood chemistry is suggested.

(iv) *Hazards associated with wildlife*

As regards the spread of disease to domestic animals, there are well-defined problems with badgers (tuberculosis), deer (ticks and babesiosis) and foxes (rabies). In addition there are dangers to the general public using grassland as an amenity. These dangers include liver fluke disease, toxocara and echinococcosis.

(v) *Hazards associated with slurry and sludge*

Salmonellae (originating from contaminated protein in the feed) are excreted by 11% of dairy herds and 22% of pigherds. These and parasite eggs may survive in the slurry, especially when it is applied direct instead of being stored. The dangers may be exaggerated but outbreaks do occur.

(vi) *Hazards associated with parasites*

In general parasite hazards increase with stocking rate and are therefore important in any discussion of more intensive use of grassland. However, control strategies designed for past grazing and conservation practices, are not easily fitted into newer systems. Small changes in husbandry can have far-reaching effects. Farmers may not show sufficient concern for liver fluke burden as there is no financial penalty for condemned offal. The less obvious effects of lowered productivity seem insufficient stimulation to proper control.

Participants were also concerned by reports that tick contamination of pastures is increasing, especially in upland areas.

(vii) *Problems associated with grass as a complete feed for dairy cattle*

These problems are essentially due to seasonal changes in the composition of grass. In spring there is a *qualitative* deficiency of undegradable protein; in summer a *quantitative* deficiency in that herbage may be too fibrous or sparse for the high yielding cow; in autumn the DM of the herbage can be too low for adequate energy intake.

THE UPTAKE OF TECHNOLOGY BY FARMERS

There is a considerable time-lag between new technology becoming available and its adoption by most farmers. This problem was discussed at

the symposium from many angles; most participants do not expect the rate of uptake to change and many consider that the rate of improvement of output per ha will ease over the next 20 years (see Wragg (18)).

Discussion of this complex subject involved the following aspects:

(i) *Defining the real problem*

There is a strong suggestion that effort should be directed away from the purely technological side (which is already so far ahead) and concentrated on those factors which limit uptake. However, as Greenhalgh (3) observed, any self-respecting scientist who knew the right approach would be on his way already. Possibly researchers from other disciplines should be involved – from sociology and psychology, for instance.

Furthermore, as shown by Lazenby & Doyle (2), much research has been concentrated on specific objectives rather than whole farming systems; the practical relevance of results is questionable and the credibility of recent R & D has suffered in the eyes of many farmers. Some participants consider that the research emphasis should be turned towards predictability and reliability of yield rather than concentrating on improving the best.

(ii) *Teaching and applying the technology*

Opinion is strong that the development and advisory function should never be regarded as a 'second best' career after research. The research, development and advisory functions should be brought closer together and:

> '... we can only look with envy at the practical realism of the research programme in Northern Ireland, its achievements in improving animal production from grass and the obviously close and mutually beneficial relations existing between the research worker, adviser and farmer'. (Lazenby & Doyle (2)).

(iii) *Getting the market incentives right*

This problem has been considered above and the further question is raised as to whether the actual incentives to farmers are known sufficiently well for meaningful analysis.

(iv) *Getting government and CAP incentives right*

Grants, subsidies and other price support mechanisms distort free market incentives. Farmers can gain a reasonable livelihood without aiming for maximum economic production. Indeed there is doubt as to what are the true CAP aims. Is higher farm productivity really wanted or is the objective to dissuade rural workers and their families from seeking non-existent houses and jobs in the cities? This question should not be discussed for UK farmers in isolation from their EC counterparts.

Some subsidies, such as the HLCA's, appear to be deliberately designed to discourage productivity; others, such as 'improvement' grants

may lead farmers into production methods which are inappropriate. Doyle (23) suggests that UK farmers may now be in an overcapitalised situation and are not producing milk as efficiently as the Irish farmers, in spite of the latters' lower uptake of technology.

Bastiman & Johnson's paper on social and human factors (19) stimulated much interest amongst participants and there was a strong feeling that more study is required of this neglected area of farmers objectives. Maybe, in considering why farmers are slow to adopt new technologies, the answer is that the wrong questions are being asked. The tendency is to highlight the performance of the 'top' farmers in any economic study and to use this as a target for the rest. This may be a misleading approach as the majority of farmers do not always share the same objectives as the few, nor do they necessarily respond to stimuli in the same way.

THE USE OF LAND

Assuming that it is politically desirable to use the available technology for intensification of grassland usage in the UK, or in the EC as a whole, there are further important questions to be discussed. Clearly the EC does not require increases in total output of animal products. Indeed, a significant reduction of milk production seems necessary. The balance of production may vary between EC countries according to their relative competitiveness. In this, the UK may wish to increase its shares of the animal product markets but so do the other countries and it is reasonable to assume that success will not all be one-sided.

Some dairy farmers have been enticed out of milk production by generous grants but the alternatives available to them, without creating future surpluses in other products, are few. Participants in the symposium suggested that the main land product for which long-term future demand will be great and in which the EC is notably weak, is timber, whether for structural and paper uses or as a source of energy. This view came from many of the discussion groups, working independently. Furthermore, the general feeling was for an integration of forestry with farming rather than for separate development with large blocks of forest. Such an integration should include considerations of landscape, wildlife conservation and provision of amenities.

The problems associated with upland afforestation in the UK are discussed fully in *Strategy for the UK forest industry* (CAS, 1980b). There now appears to be a need for consideration of lowland afforestation. Existing technology is adequate for obtaining present output from only half the present 7 Mha of lowland grass. It is unlikely that any land will be required for additional cereal production unless the EC goes for a policy of exporting.

Small areas may be used justifiably for grain legumes or edible oil crops but the proposed new members of the EC, Greece, Spain and Portugal, will be strong contenders for this market.

Demand for land for urban and road development and for amenity purposes might take 7% of existing grassland (0.5 Mha) by the end of the century. Even if the uptake of technology reached only half the potential, it would be possible to consider the release of 1.6 Mha of lowland for afforestation. This would be 25% of the lowland grass farms, after allowing for losses to urban and amenity uses.

There are considerable difficulties, of course, in persuading grassland farmers to grow trees. Not the least is the question of capital availability and the delay in returns. The present proposal goes no further than to point out the technical possibility and to suggest a specific study on an EC basis.

Both Marsh (4) and Swinbank (7), suggest that, though governments may attempt to protect their farmers from outside economic forces, they cannot do so forever. The pressures for change, from other sections of the UK population as well as from other countries, grow too large; the requirements for support grow to exceed cash availability – as is happening now with milk in the EC; the transfer of resources from other sectors of the economy to unnecessary food production slows general economic development.

However, the suggestion that technological change must take place does not always imply high-cost or sophisticated technology. As with developing countries, the emphasis should be on appropriate change and many participants consider low-cost systems to offer advantages. Though researchers may demonstrate technological potential, given the necessary inputs, their suggestions may not equate with economic and social desirability. Indeed, the scientists' complaint of lack of uptake by the farmer may be matched by their own tardiness in appreciating the complexities of the associated policy and advisory problems.

CONCLUSIONS AND RECOMMENDATIONS

The symposium has shown the need for a more comprehensive consideration of grassland and its products. Even the broad approach adopted towards UK grassland farming was inadequate and should be widened to include the whole EC in future.

Long-term projections of EC demand for grassland products are required as these, rather than UK demands, indicate potential future markets for UK grassland farmers as well as for their EC partners.

UK farmers will only hold or increase their present shares of the market by becoming more cost-competitive and developing more effective marketing strategies. Government should examine ways of co-ordinating the existing

structures to develop a national body for marketing with similar capabilities to those of the UK's major competitors.

The technology exists for doubling output of meat and milk per ha but uptake of that technology by farmers is slow. Further research into the utilisation of pasture legumes, the applicability of current technologies to permanent pasture and into improvement of the grass and legume plants by breeding is recommended. Further investigations of farmers' aims and incentives, and a greater degree of co-ordination between research, development, and advisory work are required.

Since current EC production is more or less in line with demand, increased productivity per ha could result in a release of land and other resources from grass production. Afforestation is considered to be an appropriate alternative method of land use and it should be integrated with farming, conservation and amenity uses rather than developed separately.

Government and CAP incentives to farmers should be changed to encourage better, more integrated, land use and profitability of production. Many of the present incentives distort aims and production methods leading farmers into systems which may be unprofitable from the national viewpoint and leading the EC into unnecessarily high rates of expenditure.

ACKNOWLEDGEMENTS

The material for this chapter was provided by the discussion group chairmen but all do not necessarily concur with all the views expressed.

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