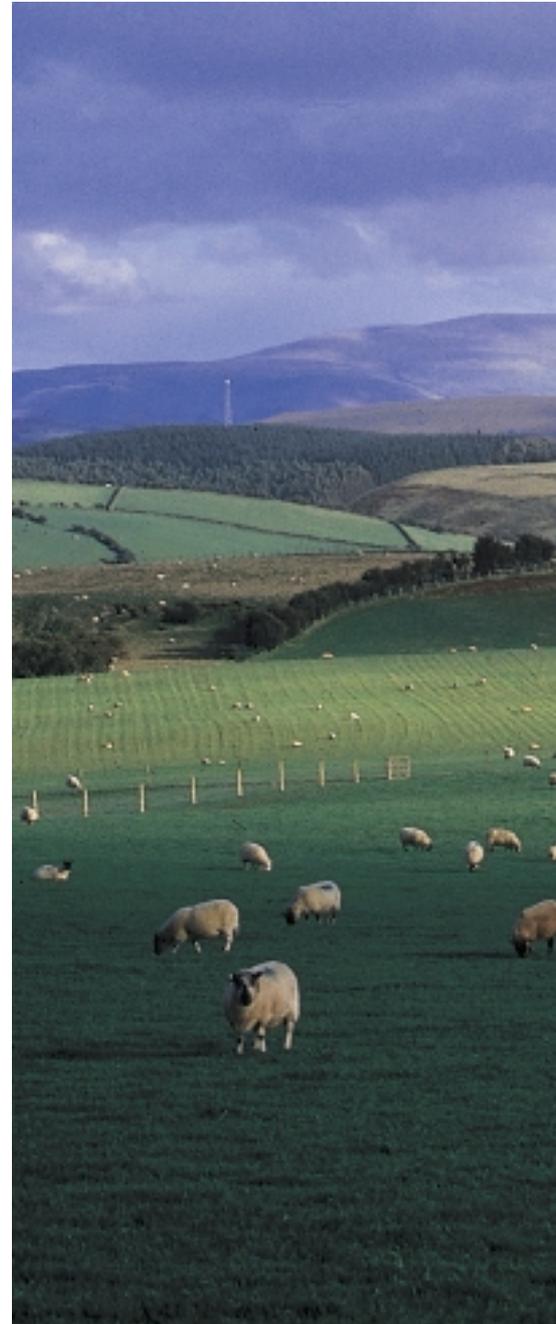

Efficient use of Upland Pastures

*Arthur Davies, Mick Fothergill
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Technical advances

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Conclusions



EFFICIENT USE OF UPLAND PASTURES

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Livestock farming in the hills and uplands occupies almost 9 million hectares, 48% of agricultural land in the UK. Sheep and beef cattle are the main enterprises with over 12 million breeding ewes and 1.2 million suckler cows carried, both representing 60% of the UK totals. The hills and uplands are classified as Less Favoured Areas (LFAs) because of limitations on agricultural productivity imposed by climate, soil and physical features such as slope and aspect. Agricultural land in the LFAs can be divided into two categories: rough grazing (semi-natural) or grassland (improved pasture). For the UK as a whole, the ratio of grassland to rough grazing is 1:2. However, there is considerable regional variation which is reflected in the numbers of animals carried (Table 10.1). Although improved grassland accounts for only a third of total LFA land, it contributes 85% of the output. EU and UK government policy for the LFAs aims to (a) ensure that livestock farming flourishes, thereby helping to maintain viable rural communities and (b) conserve landscape and wildlife habitats.

In line with these policies, IGER carries out research to improve the efficiency, cost-effectiveness and

sustainability of livestock farming in the uplands. Our aim is to achieve these objectives through the production of quality meat from grazed and conserved forage. Experimental work takes place on our 230 hectare farm, Bronydd Mawr near Brecon in Powys (Figure 10.1), which lies between 240 and 400 metres above sea level.

Technical advances

Work at Bronydd Mawr over the past 15 years indicates that the key to viable farming in the LFAs depends on four factors:

1. The use of new plant varieties

Reseeding gives the farmer the opportunity to benefit from advances made by plant breeders. We have identified the characteristics needed for grasses and clovers to be of use in the uplands. Winter hardiness, seasonality of growth and compatibility with white clover are desirable attributes of perennial ryegrass along with yield, feed quality and persistence. In a large-scale experiment over 6 years we showed that lamb production from perennial ryegrass varieties differed by up to 20%. In another study, a similar level of difference was observed between pastures containing different varieties of

Table 10.1 Less Favoured Area (a) area of grassland and rough grazing (M Ha) and (b) livestock numbers (M)

	England	Wales	Scotland	Northern Ireland	UK
(a) Grassland	0.59	0.82	0.82	0.54	2.77
Rough Grazing	1.15	0.47	3.91	0.20	5.73
(b) Breeding ewes	3.4	4.0	3.7	1.0	12.1
Suckler cows	0.29	0.19	0.45	0.25	1.18



Figure 10.1 View over Bronydd Mawr Research Station

white clover. White clovers bred at IGER with improved winter survival have given much better growth in spring than less hardy varieties.

2. Careful use of fertilizers

One of the main reasons for the decline in the productivity of improved grassland is the loss of the sown species due to lack of nutrients. Many upland pastures receive little or no lime and fertilizer after reseeding. We are investigating the long-term effects of not applying nutrients to improved pastures. Four treatments are being compared: lime, phosphate, potash and nitrogen (CaPKN); lime, phosphate and potash (CaPK); lime alone (Ca) or no nutrients (nil) (Figure 10.2). Elimination of nutrient inputs has had a major impact on plant populations. The proportions of perennial ryegrass and white clover declined rapidly on the nil treatment to be replaced by weed grasses. Animal productivity also showed a rapid and dramatic fall after cessation of nutrient inputs.

3. Good grazing management

Development of grazing management based on sward surface height is a major technological advancement. By managing pastures at specific sward heights, high levels of use with optimum herbage growth and intake are achieved. This development arose from detailed studies by crop physiologists and animal nutritionists at IGER and at the Macaulay Land Use Research Institute



Figure 10.2 Relative stock carrying capacity (May - November) of permanent pastures receiving different nutrient inputs.

(MLURI). At Bronydd Mawr, we have studied the effect of contrasting sward heights on the reproductive performance of ewes and on growth of weaned lambs. The results show the importance of providing adequate grass (sward height of 5 cm) to ewes at mating time. Sward height can be used as a management tool to control the growth of weaned lambs. As a result, the date of achieving finished target weights can be manipulated.

The combined use of cattle and sheep can lead to more effective sward use and improved animal performance. For example, grazing by suckler cows and calves rather than by ewes and lambs in spring (May to July) helped to maintain a higher content of clover in the sward (Figure 10.3). This resulted in superior growth of lambs when they subsequently grazed the swards during August and September.

4. Use of white clover

White clover is the cornerstone to improving the productivity of upland pastures. Through biological nitrogen fixation, clover fixes around 100 kg of nitrogen per hectare annually. We have obtained similar lamb output from grass/clover pastures to that from grass swards fertilized with 200 kg N per hectare. Higher digestibility and intake on grass/clover compensated for lower herbage productivity. Use of grass/clover swards is regarded as the best way of improving the efficiency of livestock systems in the uplands. Since 1988, we

have focused our attention on developing such systems for sheep. By using sward height decision rules to adjust the grazing area, with the surplus area conserved as silage, we can decide whether a system is self-sufficient in providing enough winter feed. Our work has shown that low input sheep systems based on white clover are productive and economically attractive although supporting rather lower stocking rates than N-fertilizer based systems (Table 10.2).

Use of rough grazings

Semi-natural rough grazing (Figure 10.4) is a valuable resource on many farms. However, careful consideration must be given to ensure its use is properly integrated with that of the improved pastures. Nowadays, account has to be taken of environmental as well as nutritional consequences. These unimproved grazings are characterized by low productivity and poor feeding value which is made worse by low utilisation resulting in the build-up of dead material. However, systems of management have been developed which integrate the use of improved grassland and rough grazings. A major feature involves providing good nutrition at critical times of the year, (i.e. at mating, late pregnancy and early lactation) by grazing improved pastures.

Table 10.2 Outputs from grass/clover swards at different stocking rates (ewes per ha.) and fertilizer level (kg N per ha.), mean of 4 years

	200 N		50 N		
	18	15	15	12	9
Ewes/ha					
Lamb output (kg/ha)	801	693	649	542	449
Silage made (kg DM/ewe)	98	147	103	179	322
Gross margin (£/ha)	1040	883	891	774	728
Gross margin less subsidies (£/ha)	482	418	426	402	449

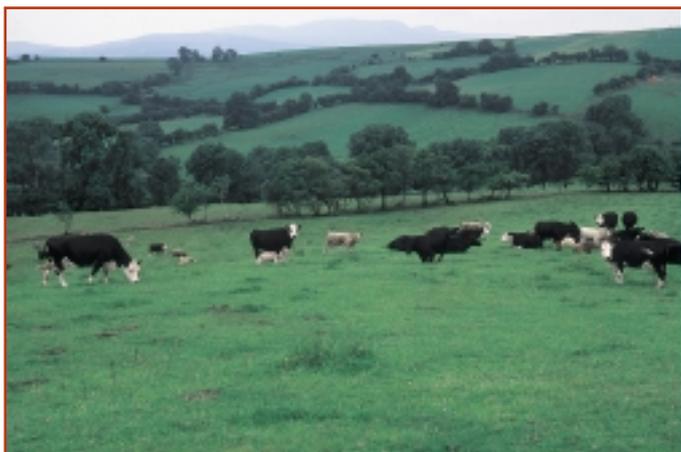


Figure 10.3 Cattle grazing can improve the clover content of swards.

Conclusions

Our research at IGER is helping to underpin the policy of maintaining viable rural communities in the LFAs based on livestock farming. By using this technology, farmers can increase the contribution of grazed and conserved forage for beef cattle and sheep production. This enables profits to be maintained by reducing expenditure on nitrogen fertilizer and bought-in concentrate feeds. Furthermore, livestock producers in the LFAs are in a good position to supply the ever-increasing consumer demand for meat that has been produced

in a sustainable and extensive way.

Whilst agri-environmental concerns are likely to lead to ever-increasing demands for farmers to reduce grazing pressure on the semi-natural vegetation in order to retain or recreate diverse habitats, it can be argued that such demands can only be successfully met by more efficient use of the improved grassland in the uplands. Furthermore, maintenance of the landscape and protection of wildlife in the LFAs depends in the long run on the profitability of livestock farming.

The research at Bronydd Mawr is a collaborative effort between IGER and MLURI. Funding comes from the Ministry of Agriculture, Fisheries and Food and the Scottish Office Agriculture Environment and Fisheries Department. This work is featured in more detail in IGER's Technical Advisory Report No. 2 - *Improved Upland Pastures : The Bronydd Mawr Story*. Copies available from the IGER Business Office, or the Publications Section

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Figure 10.4 Sheep on semi-natural rough grazing.