Complementary Role of Sheep in Less Favoured Areas

It is particularly important that traditional grazing, appropriate stocking densities and managed hefted flocks are maintained to allow for a species rich environment

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Group Chairman's Introduction

George Milne

As Chairman of the group set up to deliver this publication may I take this opportunity to welcome you. I hope you will find the report interesting and informative. We have tried to present it in a way that is easily understood. It contains a wealth of information which reveals the many hidden benefits that sheep production and grazing delivers.

As a sheep farmer with 450 breeding sheep, I am also Development Officer for the National Sheep Association Scottish Region and a past Chairman of NSA Scottish Region. Part of my role with the NSA is to attend the policy stakeholder group meetings; they include topics such as Climate Change, Animal Health and Welfare, and CAP Reform. In recent months we have discussed issues such as Farming for a Better Climate, maintaining the environment and delivering public goods. It was clear to me that sheep farming actually delivers all these benefits and has done for many generations. In fact sheep production plays a vital role in delivering much more than that to the rural areas across the United Kingdom. The insight gained from participating in these discussions was invaluable in planning this paper and in bringing together a group of knowledgeable people with a wide range of expertise to contribute to this publication.

The UK has a sheep industry to be proud of which is the legacy of many generations of farmers with a commitment to their industry

The UK has an immense variation in land quality from high mountains and hills to low ground meadows, but the one common factor which links all the different structures and systems together is sheep production. There are many different breeds of sheep in the UK, however, a dozen or so mainstream breeds make up the backbone of our industry. They can be divided into hill, upland and lowland breeds. The hill breeds generally produce crossbred females which maintain upland and lowland prime lamb production. This stratified

sheep production system is vitally important in delivering a productive and profitable national flock.

The less favoured area (LFA) covers a large proportion of the UK. It can be best described as an area with natural handicaps which face significant physical and climatic disadvantages, a short growing season, exacerbated by difficult access to suppliers and markets. Many of these areas suffer from depopulation.

The UK has a sheep industry to be proud of which is the legacy of many generations of farmers with a commitment to their industry.

The purpose of this report is to raise awareness of the importance of maintaining a viable sheep industry in the Less Favoured Areas.

I hope you will find this document helpful and informative.

Food and Fibre

Population Growth and the Need for a Sustainable Food Source

UK exports have grown steadily from 24% of production in 2004 to 32% of production in 2010

UK and EU sheepmeat production has declined over the past decade. Since 2005 EU sheepmeat production has fallen by 30% and UK production by 10%. Over the same period the human population has been increasing; by 2.5% across the EU and 5.3% in the UK. Globally, the population is forecast to grow from a current 7 billion to 9 billion people by 2050. There is a healthy demand for UK sheepmeat and this demand looks set to continue as food security becomes ever more important.

There is continuing demand for the produce of UK sheep production. If this demand is not met by an adequate supply, increased imports are an inevitable consequence, to the detriment of the balance of trade and the environment. Furthermore, demand from Europe has made the UK sheep meat sector an export success story. Exports have grown steadily from 24% of production in 2004 to 32% of production in 2010. Almost 100% of this trade is with EU member states.

Nevertheless, although farm gate prices for lamb, wool and cull ewes have all increased substantially since 2009, extensive hill sheep production systems fail to achieve a positive margin from the marketplace. Without the continued support of CAP payments, particularly in LFA's, there is further risk of destocking with negative impacts on landscape, biodiversity and communities. UK sheep meat's role in sustainably feeding a growing population is likely to become even more important over the coming decades.

Food Security

The growth in exports means that only around 60% of the sheepmeat consumed in the UK is sourced from UK producers

Leading on from a growing UK and global population is the question of food security. In recent years, the growth in exports means that only around 60% of the sheepmeat consumed in the UK is sourced from UK producers. Even if the UK exported no sheepmeat we would still only be 91% self sufficient. While it may be argued that 100% self sufficiency is not required in a global marketplace we do need a basic level of self sufficiency to secure a minimum level of food security.

In a global context the the Food and Agriculture Organisation (FAO) forecasts the world population growing to around 9bn people by 2050 with the requirement for sheepmeat growing by around 75% between 2010 and 2050.

Photo © Hannah Thorley

Sheep & The Ideal Way of Turning Low Value Vegetation into High Value Protein

Photo © Kath Birkinshaw

Hill ewes are particularly adept at converting low quality forage into high protein human food

Ruminant animals, and particularly sheep, play a valuable role in sustainable agricultural and food production systems. Hill ewes are particularly adept at converting low quality forage into high protein human food in the form of lamb and mutton.

Red Meat and Omega 3

Grass fed lambs not only had higher levels of omega 3 in their meat, but also a more desirable ratio of omega-3 to omega-6 fatty acids

The meat produced from the UK hill sheep flock is produced in forage based systems with minimal use of concentrate feed. Sheep are one of the few species capable of turning the heather, rough grazing and permanent pastures of the hills and uplands into food (sheepmeat) for human consumption. A consequence of the sheep's diet is that the meat produced is high in Omega 3 content.

Long-chain polyunsaturated fatty acids, or omega 3, are known to enhance human health through beneficial effects on brain function and anti-inflammatory properties. Research also indicates that they can prevent the hardening of arteries, the precursor to heart disease. Academic research[1] has indicated the omega 3 content of red meat to be higher when ruminants are grass fed as opposed to grain fed. A 2006 study commissioned by Hybu Cig Cymru (HCC)[2] in Wales found a significant difference between the fatty acid composition of meat from lambs reared on grass and those fed a cereal-based diet. Grass fed lambs not only had higher levels of omega 3 in their meat, but also a more desirable ratio of omega-3 to omega-6 fatty acids which offer additional health benefits to those who consume lamb.

[1] McAfee, 2010. Red meat from animals offered a grass diet increases plasma and platelet n-3 PUFA in healthy consumers. *British Journal of Nutrition* 105, 80-89

[2] Richardson, Ian. 2006. Producing Welsh Lamb High in Omega 3 Fatty Acids. Accessed at: http://www.hccmpw.org.uk/medialibrary/publications/Omega-3lambfinalreport[1].pdf

Wool Production

Photo © Kath Birkinshaw

Wool has been recognised as one of the world's most versatile fibres since time immemorial. There has been a renewed interest in wool globally in part as a result of the Campaign for Wool but also as the price of crude oil increases, wool becomes more price competitive with the oil based synthetic fibres. This has also had the effect of increasing price of such products with a spin off beneficial result for other fibre including wool and the realisation that oil is a finite resource (in terminal decline).

In global terms, over the last half century wool's importance has dropped from the point where it supplied just under 10% of the natural fibre available to just over 1.5%. A new enthusiasm has been generated for wool to become once more a fibre of consequence, with the growing awareness of the need for a fibre which is renewable, natural and sustainable.

As a result of the resurgence of interest, moves are already being made to draw attention to the fact that there is no other natural fibre which has the versatility of wool, not only in fashion, but also as beautiful, hard-wearing floor and wall coverings, and insulation for our homes. Furthermore, and of paramount importance, is the fact that wool is naturally fire retardant, a matter for consideration when compared to synthetic fabrics which being oil based have a predisposition to flare and give off poisonous fumes when burned.

There is no other natural fibre which has the versatility of wool

Photo © Hannah Thorley

Environmental Benefits

The characteristic landscape mosaics of the semi-natural habitat of the UK uplands are what many people treasure. The UK uplands play host to a vast amount of plant and animal diversity and the upland peats store vast amounts of carbon, and if in good condition these peatland areas can capture carbon from the atmosphere and help with the mitigation of greenhouse gas emissions.

Upland landscapes are renowned for their increasing biodiversity which can be termed as the variety of wildlife species, and the habitats they rely on. Upland areas include a large expanse of heather moorland (including wet and dry upland heath, and acid grassland) blanket bog; upland hay meadows, upland calcareous grassland, different types of upland woodland and scrub and in the highest areas montane habitats. The moorland areas are highly valued and recognised as an important habitat for birds, many of which have experienced declines over recent years. Together the uplands provide the largest extent of terrestrial semi-natural habitats in the UK. Many of these areas are highly valued, the habitats recognised through designation as being of national importance - Sites of Special Scientific Interest (SSSI) and European importance - Special Areas for Conservation (SAC). More specifically the UK has 75% of the world's resource of heather moorland, highly valued in providing habitats for birds.

Habitat loss and fragmentation is linked with reductions in biodiversity and there are now growing concerns over insufficient livestock grazing of an appropriate type in upland and marginal areas which is leading to rank invasive grass spread, and scrub and bracken encroachment. Grazing livestock helps to sustain the delicate balance of plant, insect, bird and other species in the uplands, which makes these areas unique. Without the grazing management provided by sheep in conjunction with cattle, deer and other wild herbivores, the habitat would be very different and there would be a tendency for large areas to become dominated by a smaller number of aggressive plant species thus reducing the level of biodiversity. For that reason it is particularly important that traditional grazing, appropriate stocking densities and managed, hefted flocks are maintained to allow for a species-rich environment.

Maintaining hill farming with appropriate stocking densities and managed, hefted flocks is important to allow for a species-rich environment, which also provides other environmental benefits such as clean water and carbon storage.

Maintenance and enhancement of the rich and varied environment associated with livestock farming continues to depend on viable sheep and beef units and grazing management. However due to increasing pressure on farming in these areas, there is a significant risk of agricultural land abandonment leading to a reduction in biodiversity.

Upland peat areas store vast amounts of carbon, these areas capture carbon from the atmosphere and help with the mitigation of greenhouse gas emissions

Photo © Kath Birkinshaw

Maintaining the Landscape Mosaic

There are good examples where farmers are working successfully to sustain a viable business whilst creating good environmental habitats

To maintain a diverse open habitat, it is vital to maintain appropriate stocking densities in moorland and upland areas. The correct stocking level can vary on a small scale and therefore should be set at a farm level. The stocking level needs to take account of all grazing pressures, from domestic stock and from wild grazers such as deer, goats, rabbits and hares.

The removal of sheep from the hills not only reduces farm incomes and threatens the viability of farms but it also results in unmanaged, rank vegetation that is unpalatable to stock. This leads to sheep congregating in small areas of palatable vegetation, which are soon overgrazed. As well as damaging the habitat, this increases the risk of spreading animal disease and diminished animal welfare.

Balancing the running of a hill farming business with having a sheep

To maintain a diverse open habitat, it is vital to maintain appropriate stocking densities in moorland and upland areas

stocking level that allows habitats to flourish may be challenging but there are good examples where farmers are working successfully to sustain a viable business whilst creating good environmental habitats.

A recent project carried out by the English Beef and Lamb Executive (EBLEX) looked at the impact of removing livestock and what the outcome would be on our countryside. The result shows the changes to our landscapes over 3, 10 and 30 years and can be seen in their publication 'Landscapes without Livestock'. This report clearly shows the potential damaging impact on our countryside without managed livestock production (see: www.eblex.org.uk/publications/corporate.aspx).

Photo © Kath Birkinshaw

Peatland and Carbon

The management of peatland has assumed a greater importance with the realization of the value of the carbon stored within peat in greenhouse gas mitigation. UK upland agriculture is characterised by high carbon content in the soil of the peatland. For example, some 300 million tonnes of carbon are stored in English peatlands, which are located mainly in the uplands. Peat rich soils are important as carbon stores, with the realisation that peat plays a significant role in climate change mitigation.

It is estimated that most peatlands are losing carbon dioxide through drainage and drying of the peat. If peat dries, it will not be capable of generating new peat and therefore storing more carbon, there is then a much greater risk of a fire burning into the peat which would release large amounts of carbon back into the atmosphere. The important role of sheep in the management of peatland as a carbon store is to graze the vegetation and substantially reduce the risk of damage to the peat from wildfires.

Supporting hill farmers, as part of their sheep farming business, to carry out restoration of blanket bog to secure and increase carbon storage is key. Combining this restoration with a viable sheep farming business has been achieved by hill farmers in northern England for example.

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Managing Heather

Heather moorland is highly valued and internationally recognised as an important habitat for wildlife, but management of these areas is essential to maintain them in a favourable condition for all interests. Unmanaged heather quickly becomes rank. In this condition, the grazing value of the plant diminishes, the level of biodiversity reduces with heather monoculture, the risk of large-scale loss of the heather to disease or pest (e.g. heather beetle) increases, and the risk of damage as a result of wildfires increases.

Heather needs to be managed through a combination of grazing, burning and cutting. Well-managed heather has a varied age structure, and offers the greatest opportunities for biodiversity. It is more robust at withstanding fire, disease, pests and mismanagement.

Heather needs to be managed through a combination of grazing, burning and cutting. Well-managed heather has a varied age structure, and offers the greatest opportunities for biodiversity

There is a popular misconception that sheep should not graze heather, but the origins of this are thought to lie in the overgrazing that took place when CAP payments were headage based. Heavy grazing during winter months can be particularly damaging. However, when heather grazing is properly managed, it does not need burning or cutting as often. The key is to ensure that the stocking levels are managed to meet the carrying capacity of the land at all times of the year.

Sheep have an important role to play in the management of heather moorland and offer the most sustainable management method, especially in conjunction with permitted burning which can be supplemented by cutting where burning is not possible.

Bracken

It is generally accepted that the area of bracken in the UK is increasing as herbivore activity diminshes and, as the plant prefers reasonably fertile ground this expansion is reducing the amount of grazing land. This often at the expense of important in-bye land that is an essential component of hill farms, being used for lambing and over-wintering stock.

Sheep and other livestock can have a controlling effect on bracken through the trampling of the plants and the root system (rhizomes) but the recent decline in stock numbers has reduced this and will lead to a further expansion in bracken cover.

The recently announced ban on the main chemical bracken control agent, Asulam, is of great concern to farmers, as it removes the ability to selectively control bracken on a large scale from the air. Aerial application of Asulam is the only really effective control technique on hill ground, which is often steep or inaccessible to vehicles. Re-registration of Asulam is being pursued but this will not be possible before 2016. In the short term it is hoped that it may be possible to maintain a supply of Asulam under a 120-day Emergency Authorisation each year (see: www.brackencontrol.co.uk). If it proves to be necessary to look for alternative control techniques, the role of livestock will become even more important.

In many situations, bracken has become so dense that there is no grass growth under it. This means that a valuable source of winter grazing has disappeared, and in many cases this is a consequence of under stocking.

Control of bracken on open hills and areas of shared grazing is seen to be an essential component of management. Control will boost the area available for grazing, add variety to the landscape by avoiding the development of monoculture, maximise the level of biodiversity, maintain access routes for hill walkers, and reduce the incidence of tick borne diseases that are a threat to human health and pose a risk to wild and domestic stock.

Its carcinogenic properties are well known and yet there has only been limited research on the links between an increase in bracken and an increase in cancer

Photo © Hannah Thorley

Controlled Burning

Photo © Kath Birkinshaw

Burning is an important management tool for controlling heather and increasing the amount of forage available for grazing livestock. Management of moorland and upland areas through controlled burning is therefore an essential benefit for sheep farmers and also encourages new growth of young grasses. Each part of the UK has its own regulations that controls the date that burning can be carried out and separate Codes of Practice have been published to provide guidance for practitioners on the regulations and give guidance on how to carry out burning.

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Wildfires

Wildfires are an increasing risk if moorland and upland vegetation is not properly grazed and managed. Rank vegetation has a much higher fuel load, which increases the risk. For example, if the depth of vegetation doubles, the fire intensity increases by a factor of four. A hotter fire causes more damage to vegetation, soils and seed banks, and after a hot fire it will take longer for the land to recover. In 2011, 29 wildfires broke out across the north-west Highlands. One of the largest scale wildfires occurred at Torridon, in the Scottish Highlands where it destroyed about 10 square miles of vegetation.

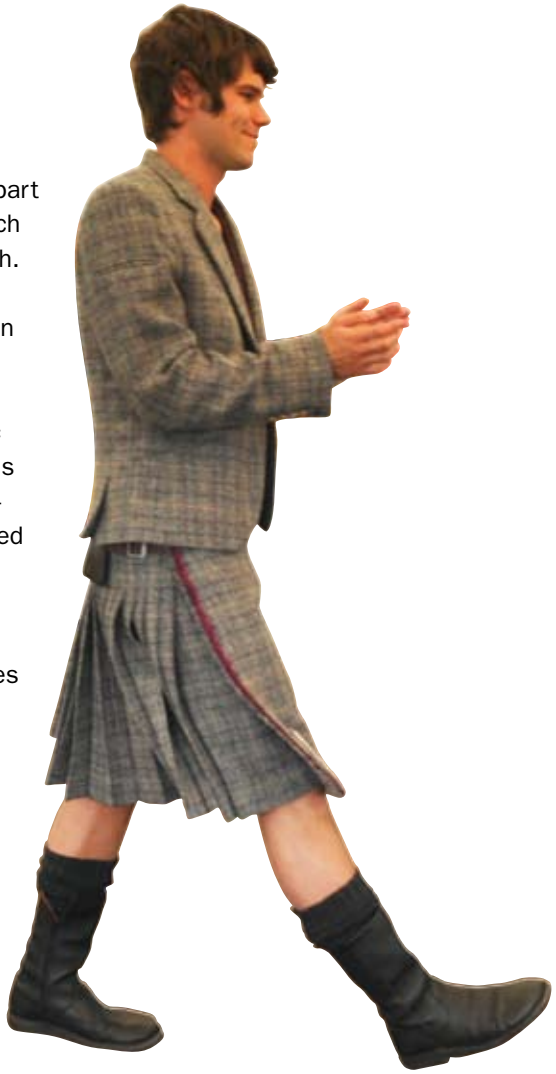
Sheep play a vitally important role in controlling the vegetation on hillsides which reduces the risk and frequency of out-of-control fires.

A wildfire on peatland, can result in huge environmental damage that has a long lasting impact on the natural landscape. There are many examples throughtout the UK of this long term damage one of which would be the large-scale fire that occurred on Bleaklow in the northern Peak District in April 2003.

Wildfires at Torridon

Photo © Steve Carter

Wool as a Carbon Sink



Pure organic carbon makes up 50% of the weight of wool, higher than cotton (40%) or wood pulp-derived regenerated cellulostics such as viscose (24%)[3]. Converted carbon into CO_2 equivalents ($CO_{2\text{-}e}$), 1kg of clean wool equates to 1.8 kgs of $CO_{2\text{-}e}$ stored in a durable, wearable form.

Wool is readily biodegradable, unlike most synthetic fibres. Wool clothing and processing wastes are routinely recycled into other durable forms of textile. The carbon in wool is derived from carbon in the pasture, sequestered from the atmosphere. Wool is produced in extensive pasture systems, where the diet is grasses and herbs. These plants convert CO_2 from the atmosphere into organic compounds using light energy, as part of the photosynthesis process which underpins most processes on earth. Thus, when you purchase a wool garment, you are purchasing carbon sequestered from the atmosphere 1-2 years earlier. In contrast, the carbon in the widely-used synthetic fibres such as polyester or acrylic is extracted from fossil fuels thus de-sequestering carbon originally stored millions of years ago.

Wool as a carbon sink could help to combat the increase in the concentrations of greenhouse gases caused mainly by human activities.

[3] Swan, P: *Wool as a carbon sink: a comparative analysis.* Dec 2009

Upland Sheep & Forestry, Farming as Part of an Integrated System

In the recent past trees have competed with sheep for hill and upland territory. To be precise the best grazing ground in a hill situation is also the most productive area for growing trees. Examples of this can be seen in many areas where the lower slopes of a hill are planted and the tops are left bare. The tops of these hills could still be used for grazing sheep in the summer months but because there is nowhere for the sheep to graze in the winter and no way of access to the tops, the grazing is wasted.

In Scotland the government have set targets to plant 10,000 ha per year of timber for the next 10 years, and this has once again put pressure onto the better hills which in many cases are now being bought for planting. Once planted this land will never return to grass again and a suitable way forward must be found which will allow for planting to continue whilst maintaining sheep production.

There must be a means of creating a better incentive to farmers which allows for trees and sheep to work together i.e. making use of trees as shelter belts or plantations to help create hill paddocks. The use of which would greatly help the husbandry of hill ewes for winter feeding and lambing purposes. Neighbours could work collectively to plant on boundaries to generate larger blocks and also double up as boundary fences.

In situations where a whole farm is sold for planting then grants should only be available to plant a percentage of that farm and encouragement should be given to allow a new entrant to sheep farming to run a productive business on the remaining acres.

Photo © Hannah Thorley

Enhancement of Bird Life

As far as upland bird conservation is concerned, the benefits of grazing are greatest where it helps to create a mosaic of habitats in which there is species and structural diversity, thereby providing for a range of breeding, cover and foraging needs

Livestock grazing - by both cattle and sheep - is essential for the maintenance of many important semi-natural habitats and has a valuable role to play in the conservation of many upland bird species. In the UK, High Nature Value (HNV) farming is almost entirely associated with extensive livestock systems based on semi-natural grazing and low intensity grassland systems.

As far as upland bird conservation is concerned, the benefits of grazing are greatest where it helps to create a mosaic of habitats in which there is species and structural diversity, thereby providing for a range of breeding, cover and foraging needs.

Many upland breeding bird species show preferences for heterogeneous mixes of tall and short vegetation. For example, snipe and curlew prefer the tall vegetation as it provides nesting habitats, whilst short open swards allow easier access to ground and soil-dwelling prey and ease mobility for chicks.

The important role played by sheep in the lifecycle of dung acting invertebrates should also be remembered, important for many insect eating birds, bats and mammals. This emphasises the essential importance of sheep to the ecology of LFA and marginal areas.

Photo © Kath Birkinshaw

Delivering Public Benefits

Water Management

Annual average rainfall in the uplands is typically four times that of the drier eastern lowlands, with a ten-fold difference in the extremes of the range (Met office website - annual average rainfall amount 1971-2000). Upland catchments therefore have a crucial role to play in water supply, but are also the source of floodwaters that can affect lower-lying risk areas including cities, towns and villages. Run-off from uplands is largely a factor of topography, but is influenced by the roughness of a catchment and the capacity of the soil and vegetation to absorb water.

Vegetation has an important role in regulating run-off, as water is stored in plant material and returned to the atmosphere through evapo-transpiration, thereby increasing the water storage capacity of soil. It also intercepts rainfall directly and slows run-off[4]. It is therefore necessary to graze at levels that maintain vegetation height and structure.

[4] Worrall F, Armstrong A and Adamson J.K (2007) The effects of burning and sheep grazing on water table depth and soil water quality in upland peat. *Journal of Hydrology*, 399 (1-2). 1-14.

Protecting Water Supplies

Upland catchments provide about 70% of UK drinking water. The role of the uplands is likely to become even more important as climate change leads to further reduction in summer rainfall and increased temperatures. Water quality is also generally better in the uplands, and in some areas is improving, in part down to changes in land use and more environmentally sensitive use of fertiliser and pesticides.

Reduced run-off and increased storage capacity, promoted through appropriate grazing levels, also helps regulate the seepage of water to reservoir feeder streams, maintaining water supplies in periods of low flow.

Water quality can be affected by heavy grazing, through increased sedimentation from soil erosion. There also appears to be a link between grazing and sulphate levels in watercourses[5]. This emphasises the need to graze catchments appropriately, maintaining vegetation structure. Too little grazing may however result in dense or rank vegetation, increasing fire risk or the role of burning in vegetation management, which also impacts on water quality.

[5] Clay, D. G., Worrall, F & Fraser, E. D. G., 2009. Compositional changes in soil water and runoff water following managed burning on a UK upland blanket bog. *Journal of Hydrology*. 380, 135-145

Flood Management

Sheep and other forms of livestock production can work in conjunction with flood management and controlled situations. One of the best examples of this would be the Lyth Valley.

The Lyth Valley in the South Lakes area of Cumbria covers some 3500 hectares. In its upper reaches the soil is dark and fertile - in the lower reaches beside the coast sandy and free draining. The valley land has been managed for generations in an interdependent relationship with the surrounding fells, in the same way that in bye land is part of upland farming only on a larger scale. Producing valuable hay and silage for winter feeding, and high quality grazing at an important time of the production calendar, the valley is also abundant in wildlife. Wading birds such as lapwing and curlew both nest and overwinter, and large numbers of ducks and geese overwinter on nutritious grasses. The effectiveness of this valley, both for wildlife and farming, depends on managed water levels. Original gravity drainage systems were created as far back as the 1800's and more recently pumps were installed and managed by what was then the River Board. In 1985 the responsibility for managing the levels and the pumps fell to the Environment Agency but now, as part of the 'public cost cutting controls' the EA are planning to stop pumping and decommission the pumps in 2015.

The value of this land is immense and without managed water levels it would revert to a condition that would destroy its contribution to farming productivity, and severely alter its role in ecology. A report carried out by the NFU suggested that the Lyth Valley supported £20 million worth of food produced even though an EA report had suggested decommissioning the pumps would lead to a 3% drop in productivity.

Photo © Hannah Thorley

Social Benefits

Maintain the People & the Social Fabric

What needs now to be recognised and acknowledged is that the family farm with all its diverse means of training youngsters lies at the heart of maintaining hill production. The sheep industry undoubtedly provides the main basis for the maintenance of the social fabric in the Less Favoured Areas. Yet European legalisation continues to impose a culture of bureaucratic controls on what are essentially practical people looking after the countryside.

Managing sheep requires hardworking knowledgeable people who have the ability and determination to see a more sustainable farming system and who are prepared to make real commitment to work with others to identify a sustainable way forward. This is often at odds with the culture of bureaucracy which is alien to practical people and introduces unnecessary difficulties.

A thriving grazing livestock sector requires the skills, knowledge and experience of hill farming communities. Culturally, farming and crofting play a fundamental role in the life of many more remote rural areas, not least through a strong link between individual farming families, their land and their way of life.

Joint training and development schemes in the range of skills needed to deliver all the services we expect from our ecosystems should be promoted and these should involve relevant public sector staff organisations.

Agricultural colleges should also play an active role as the hubs of regional and sub-regional skills development.

Maintaining sheep production in rural areas is essential for the social fabric. The fact that sheep are being kept directly means that people have to be there living, working and supporting the local communities.

The sheep industry undoubtedly provides the main basis for the maintenance of the social fabric in the Less Favoured Areas

Employed shepherds living in remote areas with their families is a much greater benefit to the area socially and economically rather than their houses or cottages be used as holiday homes. These working families provide support whether it is for local shops or post offices, schools, tourism and hotels all year round and remain at the heart of the remote rural communities.

Many shepherding families and their skills have been lost as a result of declining sheep numbers. We would draw attention to the fact that once a family leaves a hill farming situation it becomes very difficult to attract them back in the future.

Photo © Kath Birkinshaw

Sheep Management Skills and Opportunities for New Entrants

In many hill areas as the ewe population declines, the people with the traditional knowledge and the work skills to work on the hills are disappearing. This is resulting in a lack of people competent to manage the sheep, to gather stock on extensive hills and to manage the landscape.

Maintaining sheep production in the LFA situation keeps the skills alive and allows for knowledge transfer within a business or a family which are specific to that farm and its terrain.

Sheep farming provides real opportunities for new entrants into agriculture. The ingoing capital costs, once the breeding stocks have been purchased, are relatively low compared to other types of agricultural production. If a new entrant has the opportunity to rent grazing ground then it allows that person to start a farming business.

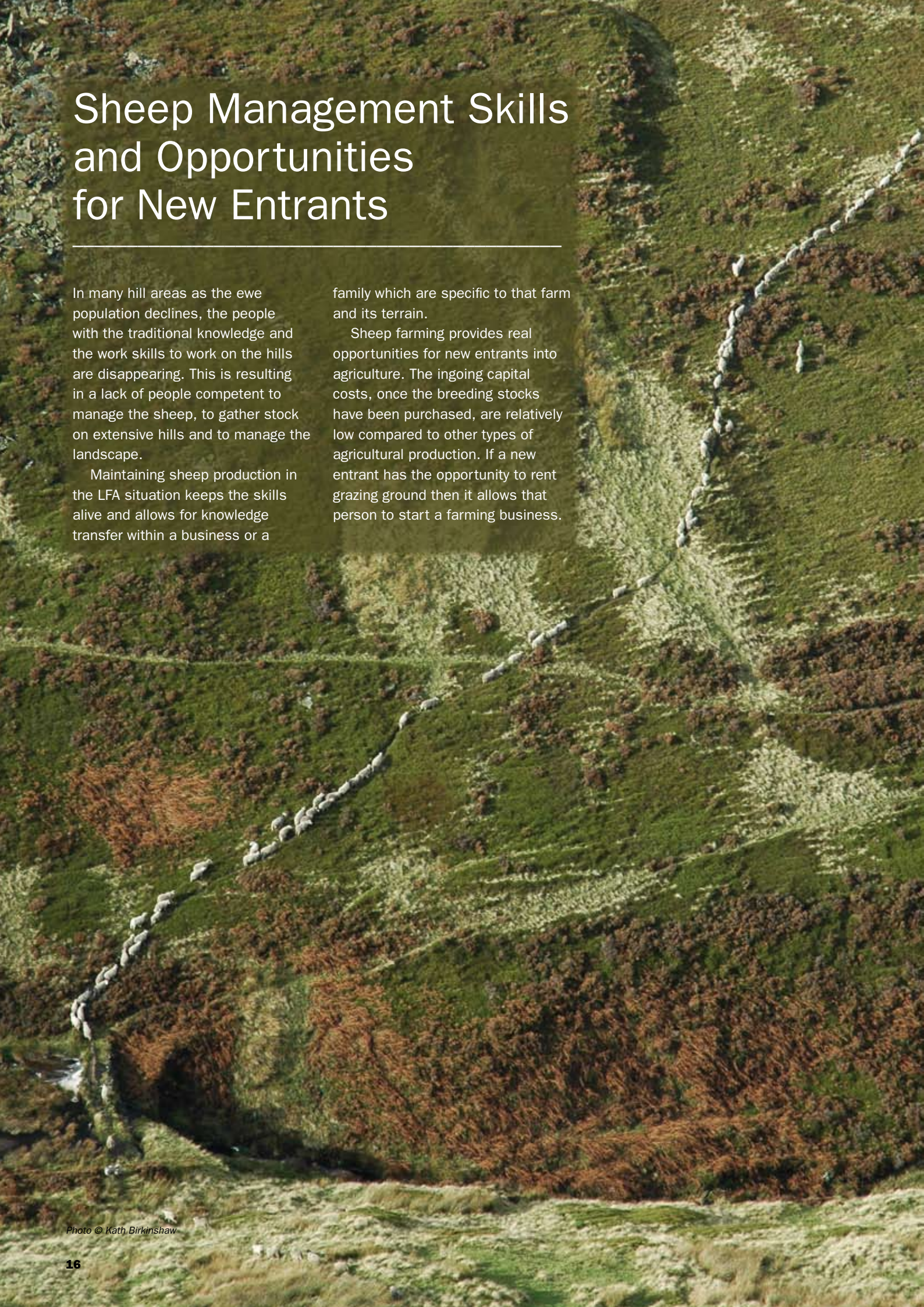


Photo © Kath Birkinshaw

Sporting Benefits

Grouse shooting and deer stalking are traditional sports of many upland areas. Coupled with sheep grazing, the management of grouse and deer estates maintains the heather-grass mosaics of extensive areas of open moorland which has persisted for the last 150-200 years. Sheep are used as part of grouse management in the control of parasites and the heather.

Grouse

Grouse shooting contributes some £30m and around 950 full time job equivalents to the Scottish economy and significant amounts in other parts of the UK. Where sheep were removed from some sporting estates in line with misguided technical and economic advice a growing number of estate managers are now re-introducing sheep flocks to grouse moors so as to assist in the management of both habitat and ticks (see Grouse and Ticks). The three legged stool of some important traditional upland economies, sheep, deer and grouse, are re-emerging as important economic drivers and the introduction of sheep back onto grouse moors has started to contribute to a reversal in the general decline in sheep numbers and shepherding jobs.

Grouse & Ticks

Dipping of sheep to control ticks reduces the incidence of louping ill in red grouse. The use of sheep as 'tick-mops' is one of the most important means available to reduce tick biting rates on grouse chicks. In red grouse the virus is responsible for high levels of mortality, with 79% of infected grouse chicks dying from the virus in normal field conditions. It is because of its devastating impact on red grouse chick survival that work has been carried out on the control of louping ill since the late 1970s.

Experience has shown that where sheep were put off a hill to try and improve grouse numbers, the opposite in fact happened and sheep had to be returned to that hill to re-create the right conditions for grouse to thrive. This is not as simple as it first sounds, as before removal the sheep would have been hefted to their hill, so replacing already abandoned breeding sheep requires a great deal of extra shepherding and management.

Sheep are used as part of grouse management in the control of parasites

Photo © Kath Birkinshaw

Deer

Photo © The Heather Trust

Deer stalking provides some 2,500 full time job equivalents in Scotland alone. Many of these jobs are maintained in the most fragile rural economies in the north and west of Scotland. The 2006 Public and Corporate Economic Consultants (PACEC) reported that some £105M million was annually delivered into rural economies as a direct result of deer stalking and venison production.

Many deer stalking jobs are combined with the role of sheep farming or shepherding. The labour peaks in both activities are complementary allowing key operations to be undertaken by the same personnel. The economic viability of both stalking and sheep husbandry elements of many of these positions are only secured by both activities contributing income to both employment roles. The loss of either element would have a negative effect and almost certainly render some of these posts redundant. Sheep and deer utilise hill grazing in a very different way and in the correct balance they enjoy a symbiotic relationship using some of the poorest hill land to best advantage.

In recent years the significant reductions on both sheep and deer numbers in many areas but particularly the north and west of Scotland have seen vast areas being undergrazed. This has resulted in vastly increased fuel loads build up from the ungrazed herbage and the Spring of 2011 saw a number of devastating wildfires throughout the Highlands. Correct grazing regimes and enhanced wildfire planning is required to prevent and manage these events which can have a devastating effect on heather and woodlands, not to mention property and risk to human life. There is also a serious threat to Carbon, which is stored within our raised peatland and blanket bogs.

Sheep and deer utilise hill grazings in a very different way and in the correct balance they enjoy a symbiotic relationship using some of the poorest hill land in Scotland to best advantage

Photo © Hannah Thorley

Tourism

Tourism and recreational activity is highly dependent on the open, grazed landscape created by traditional upland farming systems. It is highly unlikely that these benefits would continue in their desired state without farming because it is the livestock management that produces and maintains the landscape, largely through grazing. It is also livestock which creates the tracks used by growing numbers of people who walk on the hills and uplands of the UK.

In most areas where sheep have been removed there has been a considerable increase of bracken, gorse and scrub. On higher hills moorland heather has also become overgrown leading to access problems for walkers and ramblers and in some cases health problems for those affected by tick bites. In areas where large numbers visit the uplands they are obliged to use the same paths in areas where there is extensive growth. Managed livestock in these areas allow tourists to roam over a greater area, this would be beneficial to reduce erosion and damage to the landscape.

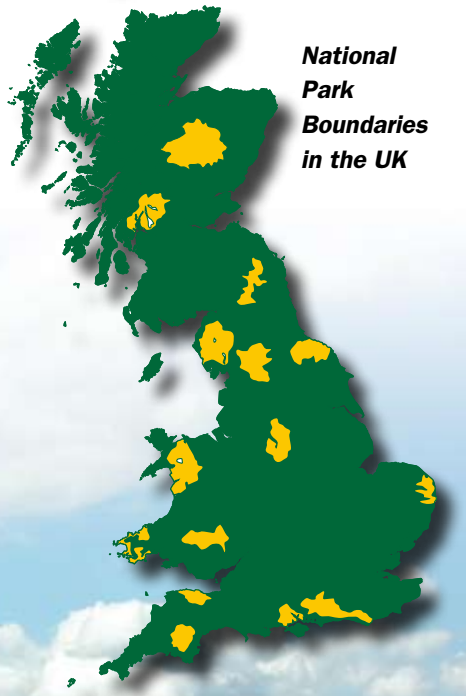
Many hill and upland farms have diversified into tourism to boost income for the family farm, but without sheep grazing the appeal of these areas could be severely affected. The public would no longer get to see the traditional breeds of sheep associated with tourist hot spots e.g., Lake District and the Herdwick sheep, Scottish Glens and the Blackface Sheep, the Welsh Mountain sheep of Wales, the Traditional Blackface of the Glens of Antrim, and the Dartmoor and Exmoor Horn breeds of the SW uplands. In many cases it is the hill sheep industry which provides the basis for year round tourist facilities.

Eleven of the UK's fourteen National Parks coincide with or overlap Less Favoured Area boundaries. Millions of people visit designated National Parks every year (16 million visit the Lake District for example) and most come for the special qualities of the landscape. Sheep and livestock farming have played a crucial role in shaping the landscape, its patterns of walls and hedges and vernacular buildings. It has created a cultural landscape through traditional livestock husbandry on common land, for example.

There is clear and growing evidence that visitors make a real connection between the landscape and the farming activity that has shaped the land. People want to buy local products and produce, such as locally reared lamb and associated products.

Visitors expect high quality local produce in their hotels and guesthouses and initiatives such as "Taste of Cumbria" can promote the best of our locally grown, reared or made food and drink.

Less Favoured Areas in the UK



National Park Boundaries in the UK

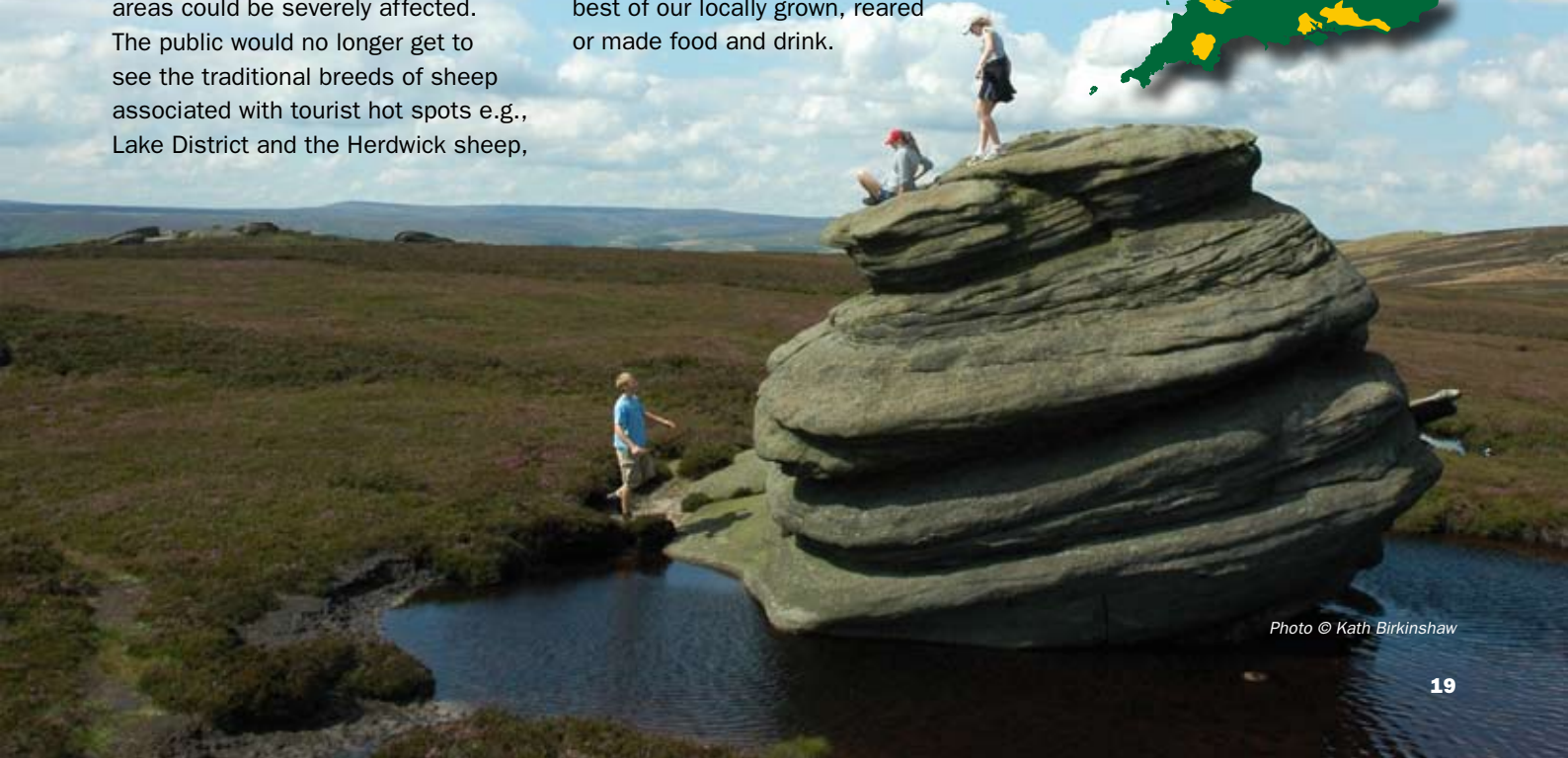


Photo © Kath Birkinshaw

Health of the People

Meat Quality

Some nutritionists are now starting to recognise the health giving benefits of meat produced from high levels of grass and herbage, and species rich or indigenous grasses - typical of sheep grazing in LFA areas. Such meat is likely to be typically closer to the quality of wild game, it is higher than grain fed meat in beta carotene, a powerful anti-oxidant that plays a role in preventing cancer cell growth and cardiovascular disease. Grazing indigenous grasses is likely to result in saturated fat levels being lower and grass fed meat is higher in Omega 3 fatty acids and lower in Omega 6. The result is a far more natural balance between the two fatty acids and one that is almost the ideal ratio required by our bodies. In addition, grass fed meat is higher in conjugated linoleic acid (CLA) and in vitamin E.

Food Related Illnesses

E. coli bacteria occur naturally in the digestive system of ruminants. The pH of ruminants grazing grass and herbage is naturally around 6.4, contrasting to a more acidic human stomach. Grain and concentrate levels fed to ruminants result in more acidic conditions and *E. coli* can adapt to survive in these conditions. Once adapted *E. coli* can thrive in the more acidic human stomach and consequently the higher and more natural grazing conditions typical of LFA areas may lead to a reduced risk of food related illness caused by *E. coli*.

Ticks

Ticks present a serious health risk for people visiting and enjoying LFA regions and participating in activities that are themselves beneficial for health. Ticks can carry and transmit Lyme disease, which is extremely difficult to treat if not caught early enough and can cause disabilities and even fatalities. The ideal habitat for ticks to survive and breed is moist deep layered decaying plant material such as rank grass, bracken, old heather and scrub. Properly dipped sheep are recognised to be helpful in controlling ticks, a) through effective grazing to minimise tick harbouring habitats, and b) because sheep dipped in a suitable substance effectively 'mop up' and dispose of ticks through being treated with veterinary products that kill biting ticks. They will feed on treated sheep (via biting and sucking blood) and be killed in the process. These useful aspects of sheep grazing in LFAs will help reduce the risks to the public making use of these beautiful areas.


Photo © The Heather Trust

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Economic Benefits

Local Economic Benefits

Sustaining economic activity in any region has pull-through effects for the community and its viability locally and nationally.

Livestock farming in hills and uplands is a complex business that helps support a wide range of auxiliary businesses and services. This is through demand for the provision of services to the sector both upstream and downstream for example livestock markets, abattoirs, meat processors, vets, animal feed processors, agricultural merchants and hauliers. This interaction is referred to as the multiplier effect. Farming also creates indirect activity through its need, for example, local transport, schools, health services, retail shops etc. Furthermore the environmental and cultural heritage associated with rural communities whether that be landscape management, agricultural shows, regional events such as Highland games, fell-walking and running or dances depends on maintaining viable communities.

Where there are livestock there must be people to look after them

The environmental and cultural heritage associated with rural communities whether that be landscape management, agricultural shows, regional events such as Highland games, fell-walking and running or dances depends on maintaining viable communities

Photo © Hannah Thorley

The Multiplier Effect

The true multiplier effect of farming in rural in areas, where no comparable user of inputs and generator of outputs exists, cannot be over-estimated. The economic prosperity of most Less Favoured Areas will continue to rely on the financial viability of farming businesses. The removal of current financial support for LFA farming would also affect a range of other farming-related sectors leading to reductions in output and employment in a range of upstream and downstream sectors due to the inter-sectoral linkages of LFA agriculture.

Establishing multipliers purely for the sheep sectors is not easy but ruminant livestock production has a clear multiplier effect through its demand for agricultural inputs, particularly animal feed, auction market, haulage and veterinary services. The output of the sector creates income and employment opportunities for all aspects of the processing sector.

An Organisation for Economic Co-operation and Development (OECD) report[6] quotes work done for the Scottish executive, based on the 2004 input-output tables, showing the importance of agriculture to the economy; ranking 12th (out of 123 sectors) for income multiplier with a value of 2, ranking 16th for output multiplier at 1.6, 24th for Gross Value Added (GVA) multiplier at 1.8 and 29th for employment multiplier at 1.7.

Shwarz (2006)[7] [8] concluded in his review of the contribution of LFA farm types to the Scottish economy and looking at their economic linkages and multiplier effect, prepared for the Scottish Government *"The strong dependencies of Scottish agriculture on LFA farming and the linkages with other sectors in the wider Scottish economy indicate that the potential implications of future LFA policy changes would go beyond LFA farming and have a stronger impact on the rural economy. The removal of current financial support for LFA farming would also affect a range of other farming-related sectors leading to reductions in output and employment in a range of upstream and downstream sectors due to the inter sectoral linkages of LFA agriculture. The multiplier model indicates that animal feeds, fertilisers, veterinary services as well as the meat processing sector are amongst the most affected sectors of any future LFA policy changes."*

The removal of current financial support for LFA farming would affect a range of sectors leading to reductions in output and employment

NB We would conclude that there are no mitigating factors to suggest that the statement which refers directly to the Scottish LFA should be any different in the LFA's of the rest of the UK.

[6] Hill B. *"The role of agriculture and farm household diversification in the rural economy of the UK"* - OECD 2009

[7] http://baitas.lzuu.lt/~mazylis/julram/22/140.pdf

[8] Schwarz, G. et al. (2006) *Less Favoured Area Support Scheme in Scotland: Review of the Evidence and Appraisal of Options for the Scheme Post - 2010* (FF/05/21), Report for Scottish Executive Environment and Rural Affairs Department (October 2006).

Legislation, Cross-Compliance & Bureaucracy

It is vitally important going forward that we have a sheep industry that is not over burdened by legislation which could result in further declining sheep numbers. It is important that European Commissioners take immediate notice of the relevant facts contained within this document and look at any future legislation carefully to allow for a sensible and workable system of production in the future.

Currently the sheep industry has to work with legislation in connection with electronic identification of sheep which is not practical at ground level and does require immediate attention.

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Photo © Hannah Thorley

Continued Support Vital

Need for Support to Continue, Better Regulation

The hill sheep industry needs and deserves financial support to cover the high costs of operating in these difficult areas

It is a clear conclusion of this report that the hill sheep industry with all its varying functions needs and deserves the financial support to cover the high costs of operating in these difficult areas. We would argue that such support produces massive immeasurable collateral benefit. But there is a need for criteria which specifies periodic inspections has got to make practical sense in its application to these large extensive hill units. The practical difficulty and cost of gathering these sheep in off the hills cannot be overestimated and regulations must be flexible. Weather can change in a matter of minutes and it is vital that the health and welfare of the personnel involved is taken into consideration.

Sustainable sheep farming, which combines sheep production and environmental management into a viable business, can provide a wide range of public benefits (or ecosystem services). These include sheep production, which is the prime interest for the farmer, and also carbon storage in peat/peaty soils, drinking water quality, combating soil erosion, cultural landscapes and recreation.

Risks to the future supply of these various public benefits will affect food security and the impact of climate change. Hill and upland sheep farmers have a pivotal and unique role to play in securing and improving sheep production, while at the same time securing and improving key services for people. Developing support mechanisms that enable farmers to combine this into sustainable farming will help secure both the future of hill and upland sheep farming and the supply of these many services that flow from the hills and uplands. Learning from the experience of farmers who are already delivering this as part of a viable farm business is key and can help design future hill farming support and agri-environment schemes for the next Rural Development Programme period starting in 2014.

Photo © Catherine MacGregor

Summary

1. There is a strong symbiotic relationship between a healthy, successful rural population in the remote hill and upland areas of UK and a thriving, viable sheep business.

2. Maintaining and modernising the traditional sheep farming business in the LFA's contributes substantially to viable successful rural communities and makes a positive input to safeguarding the rural population.

3. It is important that regulations and red tape are truly proportionate to the actual risks involved. Over regulation adds unnecessary cost and bureaucracy and supresses innovation and enterprise. This is currently particularly relevant to sheep identification

4. A properly functioning stratified sheep business is an integral part of the future UK farming business as it will be a source of many intrinsic benefits. These include:-

a. Soil fertility - vitally important as artificial, oil based, fertiliser becomes more expensive and potentially in shorter supply.

b. The growing population will need to be provided with food from whatever resources that are available. The contribution from the hills will be supplied most effectively by sheep.

c. The newly identified demand for natural, renewable and sustainably produced fibre is more likely to come from sheep than any other source. Not only is wool now being valued for its durability, beauty and comfort but the importance of its fire retardant qualities are being recognised.

d. The carbon sequestration values of sheep production systems are also being seen as important, not only with wool where it is ahead of all the alternatives but also in the ability of the sheep to contribute positively to the environment by enabling the herbage on peat to be grazed safely, thus ensuring that wild fires are kept to a minimum and that the peat deposits continue to grow.

e. The value of sheep to biodiversity and bird life is also being recognised as well as the contribution they make to human health by acting as a means to control ticks (a source of the potentially fatal Lymes Disease).

5. Academic Research has confirmed that the meat from grass fed animals has higher content of the health giving Omega 3 fatty acids than those which are fed on grain. Grass fed lambs also have a higher ratio of Omega 3 to Omega 6 fatty acids which provide additional benefits to those who consume grass fed lamb. Important also to note that the carbon footprint of such lambs is likely to be significantly lower.

6. In the 'Sheep versus Trees' discussion it is arguable that a strategic integration of the two is likely to provide the most acceptable advantage to both. This is particularly important when we are likely to be looking for increased food production from diminishing land area as well as a reduction in artificial fertilizer with the need to capitalize on the opportunity for shelter belts to be used to enhance grassland production.

7. Hill sheep production is at the very beginning of a huge "multiplier" effect which not only influences local supplies upstream and downstream of the business itself but also provides product to retailers which allows very considerable businesses to be affected, these include the butchery businesses, but almost uniquely amongst farmed animals it also includes natural high fashion in clothing as well as in interiors, upholstery and carpets.

It is quite clear that these are only a part of the positive attributes of the sheep world and the wide variety of benefits it has spawned. It is easy to see the very important role it has played in the whole of civilisation of man since history shows it was the first of the domesticated animals.

Maintaining its place and position is now a priority which is a matter for everyone interested in the future to take into consideration.

It is vital that a new package of measures be introduced for the sheep sector to encourage investment. The UK has seen a period after 1947 when policies were focused on food production. Fast forward to the 80's and 90's and policies were introduced which were geared to environmental protection issues, with little consideration for food production. NSA recommends to policy makers that lessons of the past should be clearly remembered and act to ensure that future policies be far more joined up and holistic. We take the view that this should deliver societies key needs of food security within sustainable resources and an environment that promotes public well being