

North Pennines AONB High Nature Value Farming Research

A report for the North Pennines AONB partnership

European Forum on Nature Conservation and Pastoralism
and Cumulus Consultants Ltd.



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Executive Summary

Introduction

This report focuses on High Nature Value (HNV) farming in the North Pennines Area of Outstanding Natural Beauty (AONB). HNV farming refers to low-intensity farming systems which deliver biodiversity conservation as well as a multitude of other services for society. Semi-natural pastures and meadows are a critical part of HNV farmland and farmland biodiversity in Europe, and the North Pennines AONB contains outstanding examples of both habitats, on the inbye and on the open fell. However, farming in the area is marginal and difficult, agri-environment delivery often seems a burden to farmers and the biodiversity value of semi-natural meadows and pastures appears to be declining. There is a need for a new approach to support HNV farmland in the North Pennines and the wider Northern Upland Chain Local Nature Partnership.

The research aim and approach is to

- collate and summarise relevant information and data for three HNV farming areas within the North Pennines AONB;
- interview a representative sample of farmers from within each of the three areas;
- identify 'pinch points' or barriers where the existing situation is not working, for example in terms of biodiversity conservation or farm economics;
- arrange a seminar for farmers to seek their views on the information gathered and proposed recommendations;
- compile and summarise all findings into a format suitable for inclusion in a wider project report for the Northern Upland Chain Local Nature Partnership.

The research focuses on three different areas within the North Pennines AONB - Upper Weardale, Upper Tynedale and Upper Teesdale – totalling around 100 km² or about 5% of the AONB area. These areas were selected as they support some of the best examples of North Pennines habitats and their associated wildlife (in particular, upland hay meadows, breeding wading birds and black grouse) which in turn are known to be associated with traditional, low intensity farming.

Farming in the North Pennines AONB

Farming data for the North Pennines AONB has been derived from the Defra June Survey 2010 and the Farm Business Survey. The Utilisable Agricultural Area (UAA) of the North Pennines AONB totals 188,142 ha (95% of the AONB), of which 62% is on commercial holdings, 29% is common land and 9% is on smaller, non-commercial holdings. Virtually the whole area lies within a Severely Disadvantaged Area (Less Favoured Area). The main land uses are permanent grass (50%) and rough grazing (45%)

The majority of commercial holdings are LFA grazing livestock farms (86%), with many holdings over 100 ha (41%), occupying an estimated 87% of the land area. 40% of land by area is owner-occupied with the remainder rented. There is a total of 37,000 cattle (including 13,000 suckler cows) and 469,000 sheep (including 221,000 breeding ewes) on these commercial holdings. There has been a reduction in the total number of cattle and sheep over the past decade, particularly breeding stock. Cropping, comprising cereals and forage crops is limited to around 1,100 ha. Farm labour on commercial holdings totals 1,454; this has decreased over the past decade along with the proportion which is full-time and labour intensity over the agricultural area.

172,616 ha (91% of UAA) is entered into agri-environment (AE) schemes in the North Pennines AONB, with 166,499 ha (88% of UAA) in Environmental Stewardship. AE expenditure amounts to £12.6 million per year. Organic production is limited, likely to be in the range 2-3% of UAA.

Farm Business Income for LFA grazing livestock farms in the North East region, including the North Pennines AONB, averaged £40,012 in 2011/12 (an increase on previous years). Agricultural enterprises are very important in terms of income, however agricultural costs are also high. Most profit therefore comes from the Single Payment Scheme (SPS) and AE schemes rather than agriculture. Total agricultural output from the North Pennines is an estimated £54 million per year.

Biodiversity in the Upper Dales

The majority of the case study area, the upper dales, takes the form of semi-natural pastures - rough grazings. These include large areas of upland acid grasslands, dry heathland, wet heaths and rush pastures and blanket bogs, but they also support smaller areas of more uncommon and even more valuable habitats.

The North Pennines is particularly important for its blanket bog, which extends to around 90,000 ha, of which around 2,900 ha at 4,000 sites is bare or eroding. This is a habitat for which the UK has a particular European importance. The area includes features which are reminiscent of other more Boreal or Alpine countries, including examples of communities which are associated with long-lying snow patches. The high rainfall supports a range of wetland habitats, in addition to blanket bog, with higher levels of nutrients and water movement associated with springs and seepage areas. These include alkaline fens, important for species such as Marsh saxifrage. On drier areas, there are significant stands of calcareous grasslands. In drier acidic areas, juniper is present; Upper Teesdale has the second most extensive area of juniper scrub in UK. Calaminarian grassland, including plants which are tolerant of lead and other base metals, is a further feature of the area.

Species-rich hay meadows are particularly important in the inbye areas of the upper dales. They exhibit very limited effects of agricultural improvement, show good conservation of structure and function and include a range of rare and local species. 2,326 ha of meadow have been surveyed, of which 278 ha are very species-rich meadows and 950 ha are intermediate/medium species-rich meadows. The AONB also includes 1,645 ha of broad-leaved woodland of which 57% is ancient or semi-natural.

The area is notable for its extremely rich bird fauna, with a conjunction of declining and/or threatened lowland *and* moorland birds. The area is the most significant in England for the black grouse.

There are a number of designated sites in the study area. Many of the Sites of Special Scientific Interest are also Special Protection Areas (SPA) under the EU Birds Directive and/or Special Areas for Conservation (SAC) under the EU Habitats and Species Directive (for example, the North Pennines SPA, Moor House – Teesdale SAC and the North Pennine Dales SAC). Many of these sites are in unfavourable recovering condition, with the area in good condition varying from under 10% (upland bogs) to around 40% (acid grassland).

Ecosystem services delivered in the North Pennines AONB and study area

The North Pennines provides a wide range of ecosystem services in addition to food and fibre provision (from farming) and biodiversity. These include regulating services – such as water supply, water quality, flood control, carbon storage and sequestration, soil protection and pollination – and cultural services – such as outdoor recreation, field sports and tranquillity. These services link directly to the physical characteristics of the area such as high rainfall, geology, soils and the coverage of semi-natural habitats, but are also dependent on the land management practices associated with low-intensity farming. There is potential to maintain and enhance the provision of these services by guiding and supporting appropriate land management practices as part of HNV farming systems.

These ecosystem services have significant economic value. Indicative figures can be derived from calculations in other areas (these range from £1,000/ha/year for water supply to £5,000/ha/year for flood control) but further work would be required to assess the values specifically applicable in the North Pennines AONB. It is also possible to identify an indicative level of payments to farmers and landowners for changes in the delivery of certain ecosystem services under possible future Payment for Ecosystem Services (PES) schemes, based on experience elsewhere. However these schemes are at a very early stage in their development and work would need to be undertaken to develop such schemes in the North Pennines.

Farmer survey

25 farmers (representing 44% of all holdings in the study area) were interviewed as part of the research. There was a wide range of farm sizes, although the average farm size was 197ha, and around half of the farms were predominantly owner-occupied. 14 farmers also had access to common grazing rights. The dominant age category for the farmers interviewed was 50-60 years (42%); only 3 farmers were under 40. The 25 farm businesses supported 36.25 full time equivalent jobs; around half of the farmers, and a number of farmer's partners, had off-farm jobs.

The dominant land use on the farms was rough grazing, followed by fertilised and unfertilised pasture, and meadows. 20 out of the 25 farms (80%) were in Higher Level Stewardship (HLS), with the remaining farms being either small or relatively intensively managed. Meadows accounted for about 1/6 of the total farmed area in sole occupancy. Around two thirds received some form of fertilisation. 14 farmers (56%) buy and apply some inorganic fertiliser, and 6 farmers (24%) buy and apply lime. 11 farmers felt that their hay meadows were in poor condition, with the balance being happy with the condition. Issues and trends relating to hayfield quality include increased wetness and associated species, and an increase in species linked to reduced yield or feed quality. Limits on fertiliser application linked to AE schemes is believed to be one reason for this, but the loss of cattle, and hence manure, has also made a difference, especially in terms of bulk. Reduced liming is a further factor.

Inbye pastures cover a variety of different types of grassland. Around half of the pasture received at least some fertiliser. Some farmers had noted a deterioration in pasture quality in the form of increased rushes, tussockiness/coarseness, or docks and thistles. Several were concerned about their ability to control rushes; the loss of cattle grazing was also thought to be a contributing factor to the reduction in pasture quality.

Rough grazings including common land are traditionally cleared of stock during the winter. The main impact of AE schemes is therefore the length of the rest period. A recurring theme, as with the inbye, was the expansion of rushes and the farmer's inability to control them, especially when under AE restrictions, together with more tussocky and coarser pasture. The weather and stocking regimes are recognised to be key contributory factors.

Just over two thirds of the farms had both cattle and sheep, 7 farms had sheep only and 1 had no stock of its own. There were over 10,000 breeding ewes on the 25 farms. The Swaledale was the most popular breed (on 80% of holdings), although other breeds and crosses were also common, including continental breeds (Texel, Beltex). More lambs are being finished on farm than previously (80% of farms finish some of their lambs).

There are 427 suckler cows on 14 farms. Breeds varied but continental breeds are popular (Limousin, Belgian Blue X, Friesian). The majority of herds are spring calving with cattle housed in the winter months (for up to 6 months). Most calves are sold as stores at 6 – 12 months. A few farmers are fattening cattle.

Although the inwintering of some livestock seems to have been traditional on many farms, the scale of livestock housing seems to have increased substantially in recent years. This is influenced partly by AE schemes (directly and indirectly) and partly by other factors such as biosecurity. Intensification is one response taken by farmers to the pressures being faced and this is reflected not only in housing, and purchased fertilisers, but also the significant quantity of feedstuffs and bedding now being bought in.

Farm economics

While the data obtained must be read with care, it appears that there is a considerable variation in Farm Business Income (FBI) across the farms surveyed; 7 farmers indicated FBI of over £20,000, but over half (13) stated FBI of less than £10,000. The importance of SPS and AE payments to overall farm income was recorded, and subsequent analysis suggests that such scheme income is more important in the case study area than the Farm Business Survey sample for the North East region. Furthermore FBI appears to represent a relatively small proportion of overall output (at best, 9% on the eight farms analysed), indicating that small changes in costs or income could have a significant impact on profitability. Recently increased rents do not appear to reflect the limited profit being generated and the associated risks and uncertainties.

Farming policy and policy delivery

Agri-environment schemes were regarded both positively and negatively, depending on the farmer interviewed and the elements being considered. The ESA walling grants were appreciated (and missed), whereas the more rigid elements of the ESA such as banning all rush control and unvariable dates were not. The corresponding improvements in HLS were welcomed, although not the introduction of dates for mechanical operations. In general, HLS was seen as the more flexible scheme, allowing the farmer and the officer to come to the best solution together. Some farmers had however come up against the limits of this flexibility. Many experienced a feeling of pressure being in the scheme; with this being exacerbated, at times, by lack of knowledge and experience, misunderstandings and an insensitive attitude on the behalf of the AE officers.

Farmers' view of their farming situation

Farmers carried out a SWOT analysis of their own business: strengths were mostly related to their own personal strengths and that of the system they had created; many of the perceived threats were related to their capacity to carry on (health issues, lack of successor, lack of security). Weaknesses were in general things outwith their control (climate, soils, location; rents and the availability of land), while the opportunities were generally limited (and related in large part to the strengths – the ability to sell an even better product, for example) or were not connected to the farming operation (in a new lead mine; in the building trade).

10 farmers had plans which could broadly be described as 'Keep going' (40%), but within this there was a range of subtle shades. In 4 cases (16%), the pressure of ensuring succession or a good retirement was pushing the farmer towards change or at least worry that things were not bringing in enough income.

Many farmers were keen to improve the quality of what they were doing but without implying significant intensification. The lack of availability of land was a constraint to many interviewees and pushes those who 'want to do more' to increase the farm business income towards intensification.

Below the more aspirational statements of many of the respondents lie simple and in many cases probably unrealised needs – being able to save for a pension, maintain the capital infrastructure of the farm and having something to invest in the its future.

Conclusions

The High Nature Value farming perspective starts from the recognition that, whatever its weaknesses, the current nature conservation riches of the upper dales are to a significant extent the result of farming (and sporting) management over many generations. Environmental public goods are a by-product of a management rationale in which the function of the 'habitats' was agricultural and resulted from a whole system which somehow made social, economic and agronomic sense. If 'HNV farming' is to be a meaningful phrase, the system must remain rational from *all* these perspectives.

Against this background and in the light of the very high levels of ecosystem services which the area continues to provide, there were a number of concerns arising from the farmer interviews:

- *Confusion in agri-environment; a move away from the voluntary approach*

Messages from Government had in the past been very definite but in some cases had turned out at worst completely misguided or at best confused (concerning rush control, the use of lime and slag, cattle grazing on the fell and the relative role of rabbits and sheep, for example).

While farmers generally felt that there was more flexibility in the latest AE schemes, many still felt themselves to be in a weak position relative to the field officer, whose personal character and experience then assumes a central importance. The need for better understanding between farmers and field officers was clear. The apparent willingness to coerce farmers into AE participation on the field officer's terms by threatening compulsory purchase was extremely worrying.

- *Poor 'outcomes' for farmer and conservationist*

Ironically, there seems to be agreement that though there have been some positives (e.g. farmers having better productivity and the hill improving as stock was removed), things have moved in an unfavourable direction from both the agricultural and ecological perspective in many cases. Botanical quality is reported to be declining on many fields, while farmers complained of loss of both forage quality and quantity in their grass crop or on their fell pastures. In many cases, though not all, both sides were concerned with the same species which would seem to give a potential focus for collaboration and mutual understanding.

- *Lack of consideration of the farming system; lack of appreciation of farmer knowledge*

There seems to be a lack of consideration of the farming system and of the need for it to function in an ecologically *and* agronomically rational way at the same time. We noted the lack of mutual understanding of the 'visions' a farmer and a field officer might have for the same field. For example, dissociating the farmer's need for a certain bulk of crop from other aspects of 'condition' will lead to a feeling of alienation.

There are dangers in addressing the management of certain parcels independently of the system – all must fit together in an integrated whole. In the case study area, many farmers responded to the tight controls on both pastures and meadows not by reducing their livestock numbers, but rather by intensifying those few elements of the farming system under their full control. However the result is also likely to have direct impacts on the features under scheme management, as our estimates of nutrient inputs illustrate.

Greater appreciation of and consideration for the logic and needs of the farming system must be linked to a greater appreciation of the farmer's skills and knowledge. Schemes seem predicated on saving habitats from the impact of farming, rather than maintaining them through farming – these contrasting perspectives have obvious knock-on implications for the role of the farmer in

conservation. Do farmers know how farming – even farming in the past, before modern fertilisers and herbicides – delivered a suite of outcomes which includes biodiversity conservation? Farmers had never been asked. As well as creating a situation where aims and objectives are likely to end up in antagonism, this also relieves farmers of the responsibility for living up to their own image of themselves as the true guardians of the countryside.

- *No consideration of farm-scale economics*

Economic pressures have led many of the farmers to follow quite high-risk paths to increase their net incomes. An interviewee said that there is a price to be paid for being a HNV farmer. His implication was that that price was being paid not by the State, but by the farmer. Government does not seem to be considering whether the FBI of farmers delivering a range of ecosystem services and public goods for which there is no normal market is adequate, or even whether their reward per hour is above the minimum wage.

Some payments are available without any substantial activity or the incurring of significant costs by the claimant and are thus easily detached from farming per se. The implications of such flexibility for regions and systems where the delivery of public goods is dependent on at least some sort of coupling with agricultural activity does not seem to have been thought through.

- *Lack of joined-up wider policy*

We found a perception of wider policy incoherence - planning rules, changing fashions on apprenticeships, animal movement rules and the weaknesses of regional policy all contribute to weakening the social and economic infrastructure within which HNV farming operates, including that of the wider rural community in the area.

- *Lack of independent advice*

In a confusing and complex policy environment, the availability of easily-accessible, reliable, good-value independent advice is essential for the farmer.

Recommendations

The recommendations for future action are organised in three tiers – some should be carried out locally at local initiative; others, while they are best carried out locally, should ideally fit within a national framework. Some changes can only be implemented nationally, but the AONB, hopefully strengthened by an ever-improving relationship with local farmers, should be able to make informed comments on Government proposals on a range of issues.

1) At the local level

- *Building trust: a North Pennines Farming Forum*

Create a Farming Forum as a vehicle for a two-way conversation with farmers on a range of issues – information exchange, consultation, policy development.

- *Building trust: training of conservation professionals by farmers*

Build up understanding between farmers and nature conservation administrators and NGOs through on-farm training on hill farming, delivered by the farmers themselves.

- *Building trust: building bridges on understanding Favourable Conservation Status*

AONB should take the initiative to build understanding of the legal requirement on the State to fulfil its obligations under the EU Habitats Directive to bring Annex 1 habitats into Favourable Conservation Status on Natura 2000 sites, taking advantage of scope for joint effort against common problems (rushes, *Molinia*...) and scope for some flexibility within wider constraints (working towards more rather than less agriculturally-rational upland hay meadow communities, for example).

- *Building trust: raising the positive profile of farming*

Raising public awareness of farming to combat the lack of understanding of farming among the general public, be it in the context of worming walkers' dogs or the need for financial support. Initiatives from the AONB can support, catalyse and possibly co-ordinate action by farmers and other local businesses.

- *Strengthening farming communities: encouraging collaboration*

Support collaboration by farmers, if necessary through an independent 'match-maker' - might include buying co-ops or machinery rings, or could involve collaboration in marketing or livestock finishing, or land banking – acting as an independent matchmaker to free up access to land, not least for new entrants.

- *Strengthening farming communities: the planning process*

Better dialogue with the farming community on issues such as farm building conversion would be beneficial, even if only to clarify the AONB approach to commonly-arising questions. In addition, and more positively, the AONB could pro-actively set out those developments which they would support and/or encourage.

2) Locally, within a national framework

- *Building trust: delivering Favourable Conservation Status through collaboration*

Pursue the possibility of a Dartmoor Farming Futures type project under the RDPE umbrella in the North Pennines, in which farmers and conservation administrators collaborate on the delivery of biodiversity goals within a workable farming system.

- *Independent advice provision*

Independent, dependable advice should be locally-tailored and delivered locally. It is possible to combine public goods/ecosystem services-related advice and advice to overcome specific public goods issues with a paid-for service of assistance with partial budgeting and other business advice, livestock and grassland management, animal health and other regulations and CAP support payments.

- *Informing national policy: developing quantified case studies at system and field level*

Building on this report, the AONB partnership should endeavour to input real quantified examples into not only the current CAP consultations, but future policy shaping exercises. The opportunity should also be taken to involve farmers in the formulation of these messages. The data in this report can be made more robust (e.g. by actual accounts analysis, as opposed to asking farmers for percentages and bands). Specific aspects of the farm economy could also usefully be examined – the additional costs/income foregone on specific hay fields, for example (national schemes usually rely on national averages which are not necessarily relevant, let alone representative of upper dales conditions) or the economics of seasonal lets. The changing relationships between farming activity and scheme participation should be monitored.

- *Preparing for future Payment for Ecosystem Services schemes*

The North Pennines provide a wide range of valuable ecosystem services, many of which are influenced by and dependent on the activities of farmers. A number of pilot schemes have been developed around the country to demonstrate how PES could work in practice. These are identifying the desirable/necessary changes in environmental land management in a particular area, who the beneficiaries and payers might be; and the nature and level of payments, potentially, for participating farmers. The AONB may wish to be engaged with Defra and the development of PES at national level, consider the lessons being learned, and apply these locally. It could assess the potential benefits, explore the shape of future services, engage with possible beneficiaries and providers, and begin to consider scheme details. This would prepare the way for more detailed development and roll-out in due course.

3) At the national level

- *Improving policy: rewarding activity, disincentivising inactivity*

The project raised serious questions about the complete decoupling of activity from scheme payments, especially now that direct payment rules are not counteracting the incentive which already existed in AE schemes to be a slipper farmer. Minimum activity rules as part of the definition of an active farmer seem essential. Payment levels for farmers who carry out at least this minimum should reflect the real costs of working in the local area; farmers delivering public goods should at least receive the minimum wage for their labour. This implies carrying out calculations for each of the likely scheme combinations and, most importantly, working out the costs relating to the obligations made in each scheme.

- *Improving policy: improving agri-environment and other rural development delivery*

Whereas it may be desirable to deliver some or all agri-environment schemes locally, the AONB will need first of all to make comments on proposals for scheme design, delivery mechanisms, prescriptions, payments and so on at the national level. The AONB may wish to try to pin it down on how the goal of delivering multiple ecosystem services can and will be delivered in practice, and how publicly-funded schemes should be dovetailed with commercially funded PES schemes. There was a clear call in the upper dales for long-term funding for wall repair and restoration.

- *Other issues*

The AONB may want to put forward ideas on the delivery of the mandatory advisory service, on training, both for existing farmers and new entrants (including apprenticeships), on support for diversification both on-farm and for businesses which directly impact on farming communities. Support from rural infrastructure is also seen as a key issue for the retention of young people – things like rural broadband and even mobile phone coverage; this can also be funded through the RDPE. The AONB has an important role in highlighting the need for an integrated approach to rural development in the North Pennines, and working with the farming community and other partners to put forward proposals to address issues most relevant to the upper dales.



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1. Introduction

This section introduces the concept of High Nature Value (HNV) farming and its relevance to the North Pennines Area of Outstanding Natural Beauty (AONB). The aims of this study and the approach taken are also outlined.

1.1. HNV farming

The concept of High Nature Value (HNV) farming developed in the early 1990s from a growing recognition that the conservation of biodiversity in Europe depends on the continuation of low-intensity farming systems across large areas of countryside. Apart from conserving wildlife, these types of farming provide a multitude of other services for society, including ecosystem services such as carbon storage, clean water and fire prevention, and much of the rich social fabric and character of Europe's landscapes.

The HNV concept emphasises that biodiversity conservation goals in Europe cannot be met only by protecting particular habitats or species, or designating certain areas for their management. It asserts that the first priority in the case of semi-natural pastures and meadows is to maintain farmland of environmental value in active low-intensity farming use – i.e. to maintain the farming system and prevent its abandonment or intensification.

The approach takes full account of the socio-economic realities of farming systems and puts these at the heart of conservation strategies. While it recognises the budgetary realities which preclude the extension of a 'nature reserve' style of management by the State or NGOs to the vast areas of semi-natural habitats which occur in many countries – farmers are the only cost-effective managers – the HNV farming concept emphatically rejects the notion that farming is somehow 'second-best'. Its perspective is that conservation of semi-natural habitats is more likely to be effective and meaningful if embedded in the cultural and socio-economic activity of the communities which created and maintained them.

Thus, while traditional nature conservation policies have focussed more on 'protecting' discrete areas of farmland of biodiversity value, HNV farming stresses the need to maintain the beneficial farming system which provides the agronomic context in which they have survived thus far and in which they must somehow play a role in the future. Localised and comparatively small-scale agri-environment measures will not be enough to halt the decline of farmland biodiversity across large, contiguous areas of land. If they are to continue, the farming systems that maintain European biodiversity must be socially and economically viable. In most cases, this is only possible if society supports the incomes of the farmers in question in recognition of the environmental services they are providing, and that currently are not rewarded by the market.

1.2. HNV farming in the North Pennines AONB

Semi-natural pastures and meadows are one of the cornerstones of HNV farmland and European farmland biodiversity. The North Pennines contain outstanding examples of these habitats, both on the inbye and on the open fell, supporting:

- a significant proportion of the UK resource of species-rich upland hay meadows;
- virtually the entire English population of black grouse;
- some of the highest densities and most important populations of breeding wading birds in the UK.

This important biodiversity exists on extensively farmed, low-intensity grassland which is also providing important ecosystem services in terms of carbon storage, soil conservation, protection of

water resources and provision of habitat for invertebrate pollinators. Those who are farming these areas are delivering a fine example of HNV farming.

However, farming here is marginal and difficult – there is a constant pressure to improve (modest) farm incomes and to modernise. Despite the many benefits these farmers deliver on behalf of society, for them, delivery of these benefits often seems like a burden.

Despite the presence of agri-environment scheme incentives since the late 1980s, there is evidence that the biodiversity value of semi-natural pastures and meadows is declining, including in the North Pennines, where this loss of conservation status has even taken place on many areas of SSSI under management agreements¹. If these declines are to be halted, the knowledge and motivation of the people who are farming these lands must be harnessed and supported, both socially and economically. A new approach to supporting HNVF in the North Pennines and wider Northern Upland Chain Local Nature Partnership area needs to be developed.

1.3. Research aims

The aim of this research is to:

- collate and summarise relevant information and data for three High Nature Value (HNV) farming areas within the North Pennines AONB;
- interview a representative sample of farmers from within each of the three areas;
- identify ‘pinch points’ or barriers where the existing situation is not working, for example in terms of biodiversity conservation or farm economics;
- arrange two seminars for farmers to seek their views on the information gathered and proposed recommendations;
- compile and summarise all findings into a format suitable for inclusion in a wider project report for the Northern Upland Chain Local Nature Partnership.

1.4. Research approach

The approach used during this project included:

- Desk study of Defra statistics, including the Farm Business Study and agricultural census data, and published data on biodiversity and designated sites.
- Analysis of farmer questionnaires of c. 40% of active farmers in the upper dales – a set of quantitative farm data and farmer opinion/experience/fears and aspirations.
- Farmer meeting to present interim findings and gather feedback.

2. Study Area

This research focuses on three different areas within the North Pennines AONB:

- **Upper Weardale**

This area encompasses the upper reaches of the river Wear and is centred on the village of Cowhill. It extends from Killhope in the north-west to Westgate and the Rookhope Burn in the east.

- **Upper Tynedale**

This area encompasses the upper reaches of the river Tyne and extends south east from the village of Garrigill towards Tynehead Fell.

- **Upper Teesdale**

¹ Starr-Kedde, R E (in press) Upper Teesdale: changes in upland hay meadow vegetation over the past twenty to thirty years – results presented from botanical surveys. Natural England Commissioned Report

This area encompasses the upper reaches of the river Tees and is centred on the community of Harwood. It extends from Harwood Common in the north-west to High Force and Ettersgill in the south east. Shown in Figure 1, these areas total around 100 km² or about 5% of the AONB area.

The three areas were selected because they are known to support some of the best examples of North Pennines habitats and their associated wildlife, in particular, upland hay meadows, breeding wading birds and black grouse. These habitats and species are known to be associated with traditional, low intensity farming.

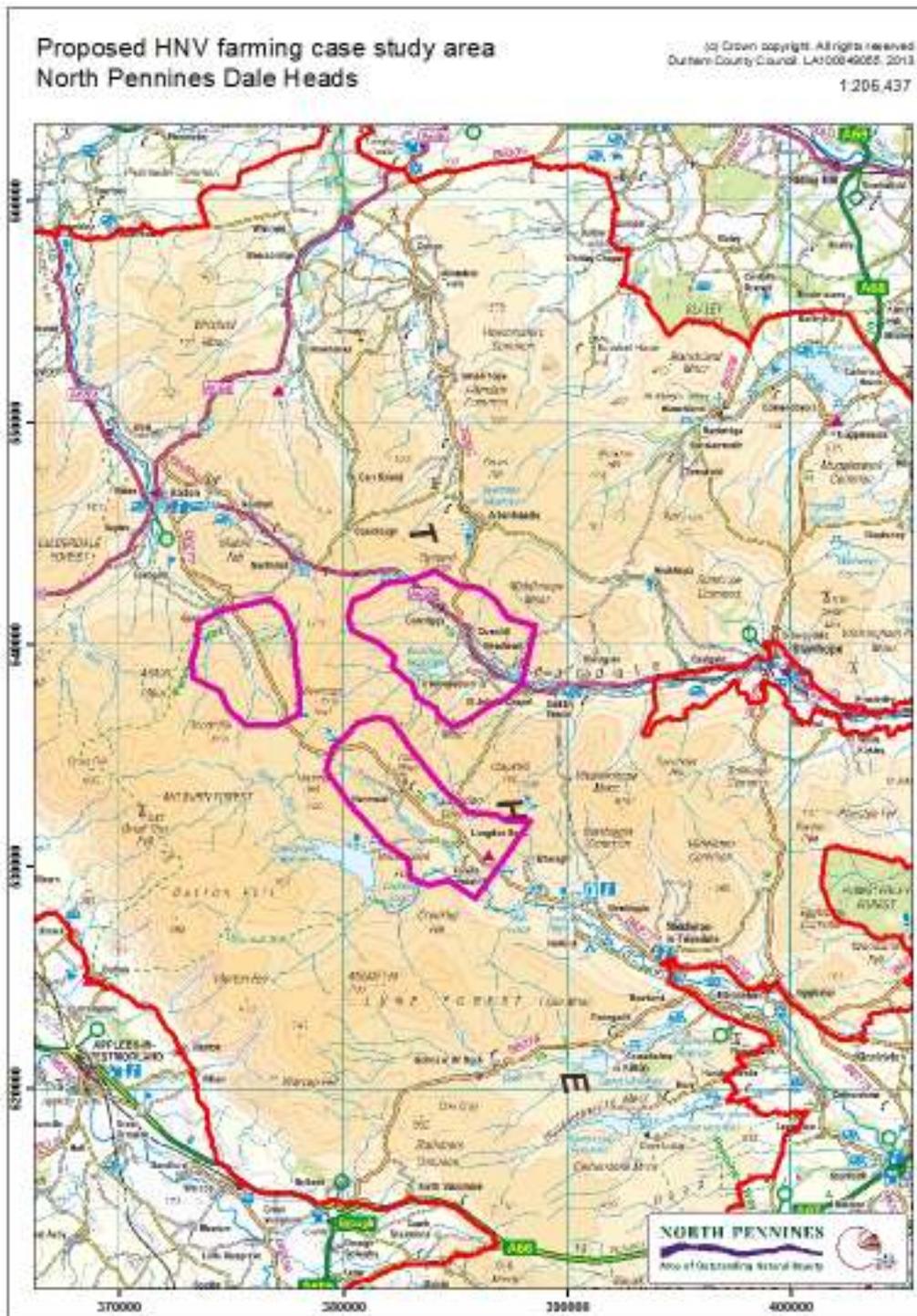


Figure 1: North Pennines Dale Heads

3. Farming in the North Pennines AONB

This section sets out key farming facts and trends for the North Pennines AONB. It is based on data from the Defra June Survey for the North Pennines AONB and the Farm Business Survey.

The way Defra June Survey data has been collected has changed over the years, for example data is available for all holdings up to 2008, but commercial holdings only from 2009 onwards. As a result data from different years may not be directly comparable. Trends for key indicators are shown subject to this caveat.

3.1. Land use

Agricultural land on commercial holdings in the North Pennines AONB comprises 116,089 ha according to the 2010 Defra June Survey (the most recent data available for the AONB). This equates to 58% of the AONB area of 198,500 ha, or 62% of the Utilisable Agricultural Area (UAA)² of 188,142 ha. The balance of UAA is likely to include common land (an estimated 55,381 ha³) and other, non-commercial holdings (an estimated 16,672 ha), see Figure 2.

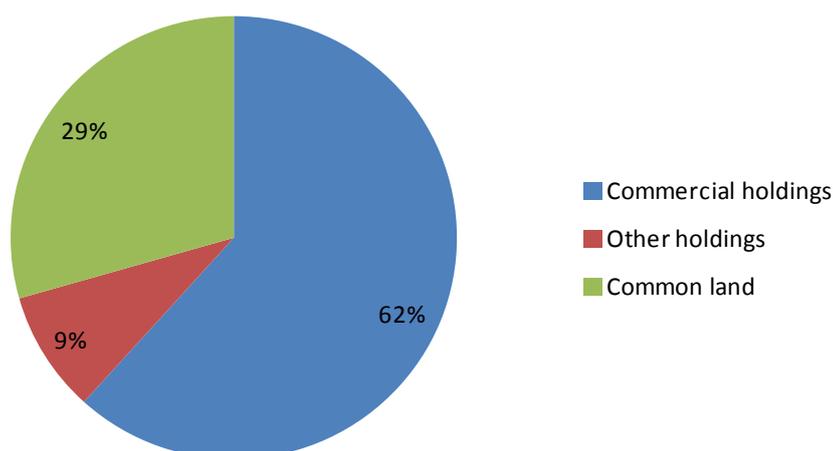


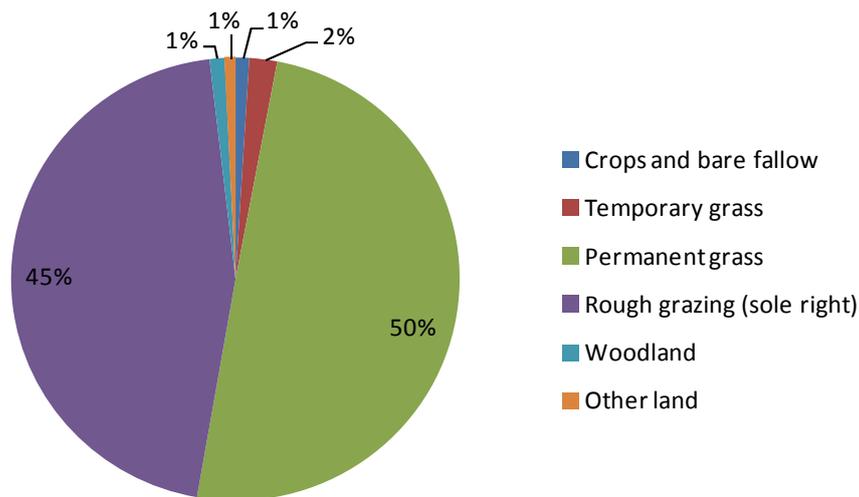
Figure 2. North Pennines AONB Utilisable Agriculture Area breakdown

Virtually the whole AONB is a Less Favoured Area (LFA), predominantly a Severely Disadvantaged Area (SDA).

The main land uses are permanent grass (50%) and rough grazing (45%). Other minor land uses include temporary grass, crops and fallow and woodland. See Figure 3.

² The Utilisable Agricultural Area (UAA) has been derived from eligible land use codes captured in Single Payment Scheme (SPS) data from the Rural Payments Agency, which has been combined with Rural Land Register (RLR) data. This was then merged with 'Common Land' in receipt of SPS payments, as not all common land parcels have been captured in the RLR data layer yet. The data was then cut against specific land use codes from Land Cover Map 2007 to remove some inconsistencies (Natural England, 2013)

³ Based on an estimated 27.9% of total AONB area being common (Holdaway and Smart, 2001: Landscapes in at Risk? The Future for Areas of Outstanding Natural Beauty)..



Source: Defra June Survey 2010

Figure 3. North Pennines AONB - land use, 2010 (% of agricultural area)

Over the period 2000-2008, for which there is broadly comparable data for all holdings, permanent grass increased as a percentage of agricultural land from 37% to 46% over the same period, whilst rough grazing decreased in area from 58% to 48%. Temporary grassland increased from 2% to 3%, whilst crops and fallow remained at around 1%.

3.2. Farms

There are a total of 671 commercial farm holdings in the North Pennines AONB with an average size of 51.4 ha, according to the 2010 survey. It is important to note that farm businesses may comprise more than one holding, and that very small holdings are excluded from the definition of a commercial holding⁴.

Many holdings (41%) are over 100ha in size. The next most numerous categories by size are those in the 50-100ha range (19%) followed by those in the 5-20ha range (18%) and 20-50ha range (16%).

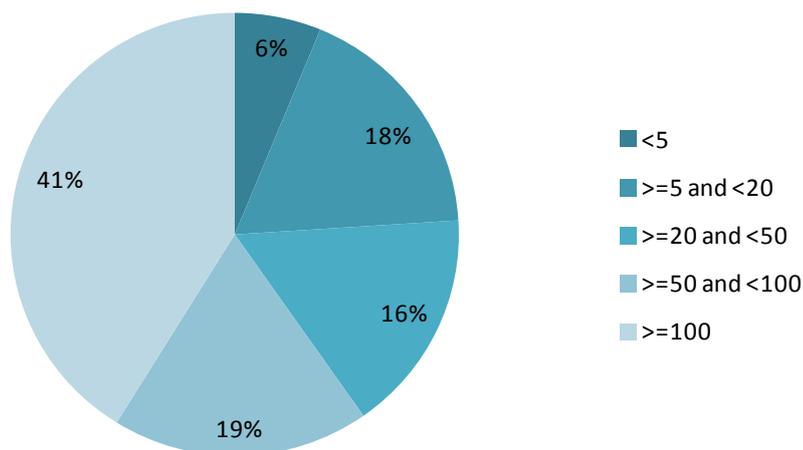
An estimate can be made of the area occupied by each size category of holding (assuming that holdings in the 5-20ha range have an average size of 12.5ha, those in the 20-50ha range 35ha, etc). Based on these assumptions, holdings smaller than 20ha occupy around 1% of the agricultural area of the AONB, while those over 100ha occupy 87%.

Figure 4 and Figure 5 show the breakdown of commercial holdings by number and area.

In terms of farm type⁵, the category with the most holdings is LFA Grazing Livestock (86%). The next numerous category is general cropping (7%). Dairy and lowland grazing livestock farms each comprise 1% of holdings. See Figure 6.

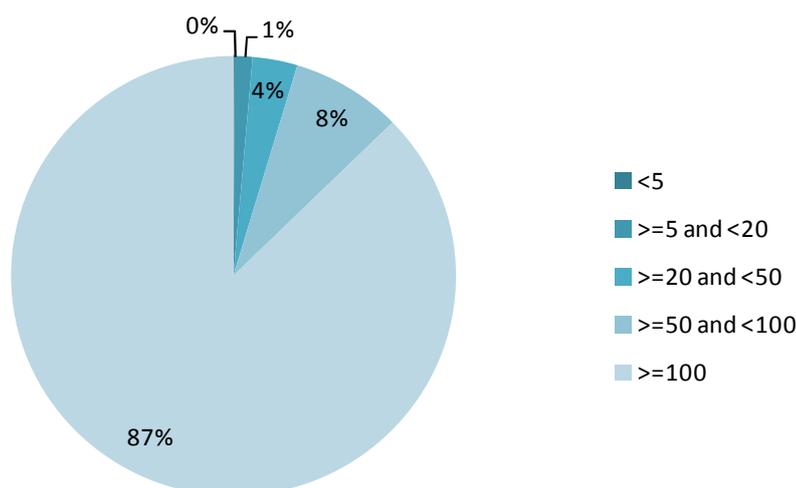
⁴ Commercial holdings are defined as those with significant levels of farming activity, i.e. holdings with more than 5 hectares of land or more than 10 cows, 50 pigs, 20 sheep, 20 goats or 1,000 poultry.

⁵ Farms are categorised according to whether a particular enterprise accounts for two thirds or more of Standard Gross Margin (SGM). For example, LFA grazing livestock farms are those where LFA beef and sheep enterprises account for more than two thirds of SGM.



Source: Defra June Survey 2010

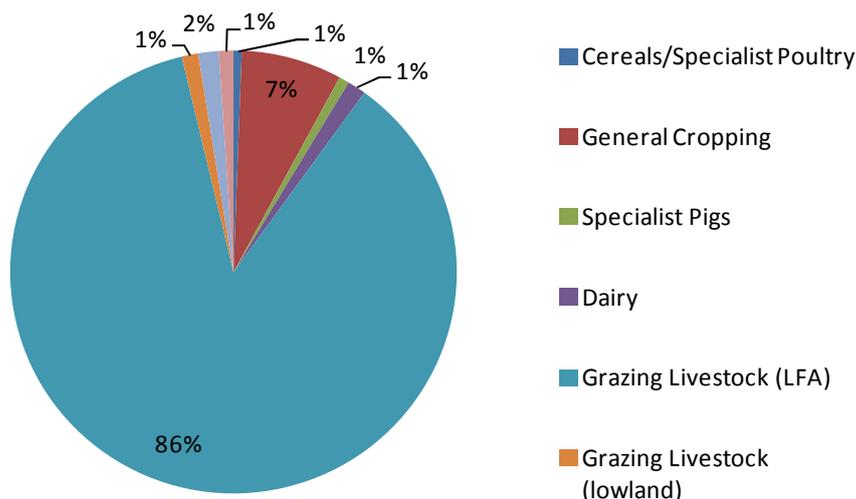
Figure 4. North Pennines AONB - farm size; breakdown by number of holdings



Source: Defra June Survey 2010

Figure 5. North Pennines AONB - farm size; breakdown by area (estimated)

The total number of all farm holdings increased by 30% over the period 2000-2008, from 901 to 1,172 holdings. This is mainly likely to have been the result of small holdings acquiring a holding number in order to register for the Single Payment Scheme in 2005. It is estimated that commercial holdings comprise around 60% of all farm holdings. Very small farms (<5 ha) and large farms (>100ha) increased as a proportion of the total, with farms of other sizes decreasing in number and proportion. In terms of farm type, over the same period, there were increases in the number of holdings categorised as LFA grazing livestock (583 to 644), 'other' (230 to 423) and mixed (8 to 21). The number of dairy holdings decreased slightly.



Source: Defra June Survey 2010

Figure 6. North Pennines AONB - farm type, 2010 (% of holdings)

3.3. Cropping

There is only a small amount of cropping in the AONB. The 2010 survey indicates 924ha of cereals, and 209ha of other crops, with the balance as bare fallow. More detailed cropping data is available from the 2007 survey; this shows that cereals and crops were grown on a minority of holdings. The breakdown of cereal crop by area was spring barley (34%), winter barley (30%) and winter wheat (20%). Other crops grown were predominantly root crops, brassicas, fodder beet and other crops for stock feed.

The total area of cereals grown in the AONB increased from 586ha to 1,352ha over the period 2000-2008. There has been a slight reduction in spring barley and winter barley as a proportion of total cereals, and a slight increase in winter wheat. Comparable data is not available for other arable crops.

3.4. Livestock

There are almost 37,000 cattle on commercial holdings in the North Pennines AONB, including 13,000 suckler cows and 2,000 dairy cows. There is a total of 469,000 sheep including 221,000 breeding ewes. See Table 1.

In common with many other parts of the country, there has been a decrease in total numbers of cattle and sheep in the AONB over the period 2000-2008. The total number of cattle reduced by 11%. Within this, the number of beef cows decreased by 18%. The number of dairy cows, however, increased by 6.5%; this is likely to be the result of restructuring of dairy units. The total number of sheep reduced by 12%; within this the number of breeding ewes decreased by 18%.



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Figure 7. Farming is dominated by livestock systems based on permanent grassland

	Number
Cattle	
Female 2+ yrs dairy with offspring	2,077
Female 2+ yrs beef with offspring	13,042
Calves <1yr	12,288
Other cattle	9,580
<i>Total cattle</i>	<i>36,987</i>
Sheep	
Breeding ewes	221,252
Lambs under 1yr	232,310
Other sheep	15,555
<i>Total Sheep</i>	<i>469,117</i>
Other livestock	
Pigs	2,284
Poultry	192,223
Goats	52
Horses	615

Source: Defra June Survey 2010

Table 1. North Pennines AONB - livestock numbers, 2010

3.5. Agricultural labour

The agricultural labour force on commercial holdings in the North Pennines AONB stands at 1,454 including 1,454 farmers, 25 farm managers and 235 farm employees, see Table 2. 41% of farmers and 65% of farm employees are part-time or casual.

Type	Full time	Part time	Casual	Total
Farmers	701	493	n.a.	1,194
Managers	#	#	n.a.	25
Employees	82	78	75	235
Total				1,454

Source: Defra June Agricultural Survey

Table 2. North Pennines AONB - agricultural labour, 2010

The total labour force on all holdings decreased by 2.8%, from 1,810 to 1,759, over the period 2000-2008. This overall trend masks: a decrease in full-time farmers; an increase in the number of part-time farmers (+9%, likely to be linked to the increase in the number of holdings); and a decrease in the number of employees, particularly those working full-time (-29%). Labour intensity, expressed as the Number of Whole Time Equivalent⁶ (WTE) labour over Total Agricultural Area has fallen in the North Pennines AONB from 0.0120 WTE/ha to 0.0107 WTE/ha, a reduction of 11% over the period 2000-2008. These trends reflect the restructuring process that has occurred across the farming sector over the past decades.



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Figure 8. The high proportion of designated land and priority habitats has led to an exceptional level of HLS uptake

⁶ Whole Time Equivalent labour is the sum of full time labour and 50% of part-time labour.

3.6. Land tenure

Approximately 40% of agricultural land in the North Pennines AONB is owner-occupied with the remainder rented. There has been a decrease in the proportion of land owned over the period 2000-2008, and conversely an increase in rented land.

3.7. Agri-environment scheme participation

In April 2013, there was a total of 172,616 ha of land under agri-environment schemes in the North Pennines AONB, equivalent to 91% of UAA. This compares to 69% of UAA for England as a whole⁷. The Environmental Stewardship (ES) scheme predominates, accounting for 88% of UAA, with Classic Schemes, including the Countryside Stewardship (CSS) and Environmental Sensitive Area (ESA) schemes, accounting for 3% of UAA.

The total annual cost of agri-environment schemes in the AONB is £12.60 million. ES accounts for £12.18 million and classic schemes account for £0.43 million.

Table 3 further breaks down agri-environment scheme participation in the AONB.

	Area (ha)	Annual Cost	No. of agreements
ELS/HLS	127,782	£10,383,228	381
ELS only	35,461	£1,532,443	398
HLS only	126	£42,925	3
OELS/HLS	3,130	£219,035	8
OELS only	0	£0	0
ES Total	166,499	£12,177,630	790
CSS	4,478	£255,484	
ESA	1,639	£170,085	
Classic Schemes Total	6,117	£425,569	
AES Total	172,616	£12,603,199	

Source: Natural England, May 2013

Table 3. Agri-environment schemes in the North Pennines AONB

3.8. Organic production

Data on the area of land in organic production in the North Pennines AONB is not available, however land needs to be registered organic or in conversion to organic in order to be in Organic Entry Level Stewardship and/or Organic Higher Level Stewardship. This equates to around 3,130ha (1.7% of UAA) although this must be considered an underestimate as there will be other registered and in-conversion land outside of these schemes. The comparable figure for England is 3.6%⁸.

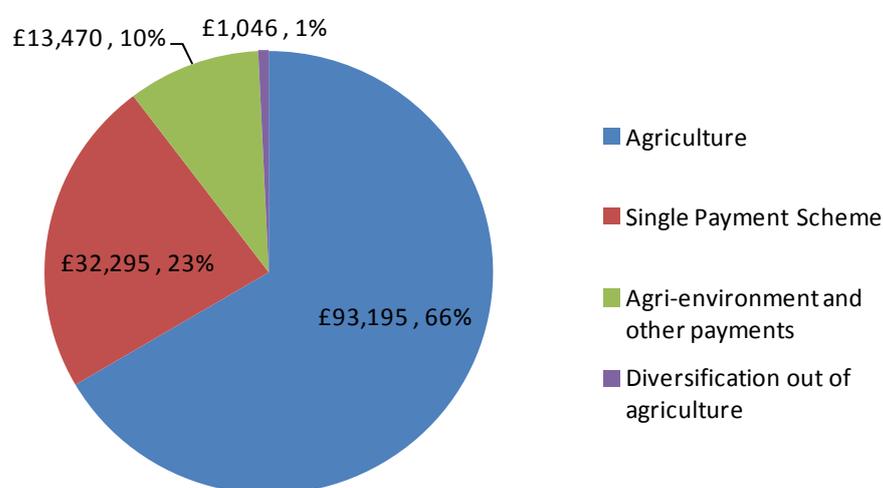
⁷ Natural England Land Management Update 12, July 2013

⁸ Organic Statistics 2012, United Kingdom, Defra

3.9. Farm income

Farm financial data is not available specifically for the North Pennines AONB. However Defra Farm Business Survey data is available for the North East region as a whole and this provides an indication of the changes in farm income, costs and profitability being experienced by farms in the AONB (the North East region data includes farms in the North Pennines in both County Durham and Northumberland). The Farm Business Survey data most relevant to this research relates to LFA grazing livestock farms, the predominant farm type in the AONB.

The total income (before taking into account any costs) for LFA grazing livestock farms in the North East region was, on average, £140,007 in 2011/12. This represents the output of the farm business. A breakdown of this output is shown in Figure 9. Two thirds of total output is attributable to agriculture mainly in the form of livestock sales. Of the total agricultural output of £93,195, beef output accounts for 39% and sheep output for 50%.



Source: Farm Business Survey 2013

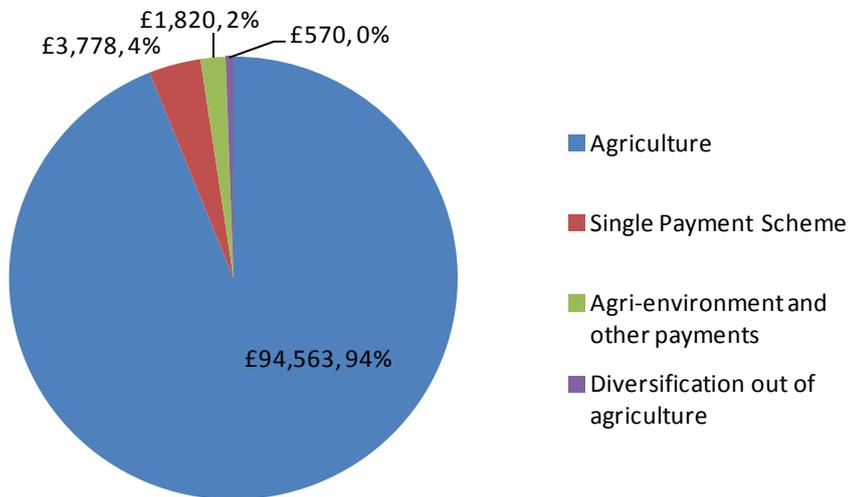
Figure 9. Breakdown of average total output (gross income) per farm – LFA grazing livestock, North East region, 2011/12

The total variable and fixed costs for LFA grazing livestock farms in the North East region was, on average, £100,731 in 2011/12. A breakdown of these costs is shown in Figure 10. The vast majority (94%) of these costs can be attributed to agriculture with relatively modest costs attributable to the Single Payment Scheme, agri-environment schemes and diversification. Variable costs for agriculture were £47,527 per farm with feedstuffs being the major component at £19,476 per farm (41% of the total) and veterinary costs at £3,870 (8%). Fixed costs for agriculture were £47,035 per farm with machinery costs taking the largest share at 44%, followed by land and property costs at 20% (£9,186).

Total output less total costs results in the net profit for the business. This is termed the Farm Business Income (FBI) in the Farm Business Survey. FBI comprises total output from agriculture, Single Payment Scheme, agri-environment schemes and diversification less expenditure in the form of variable and fixed costs, together with any profit/loss on the sale of fixed assets⁹. The FBI for LFA

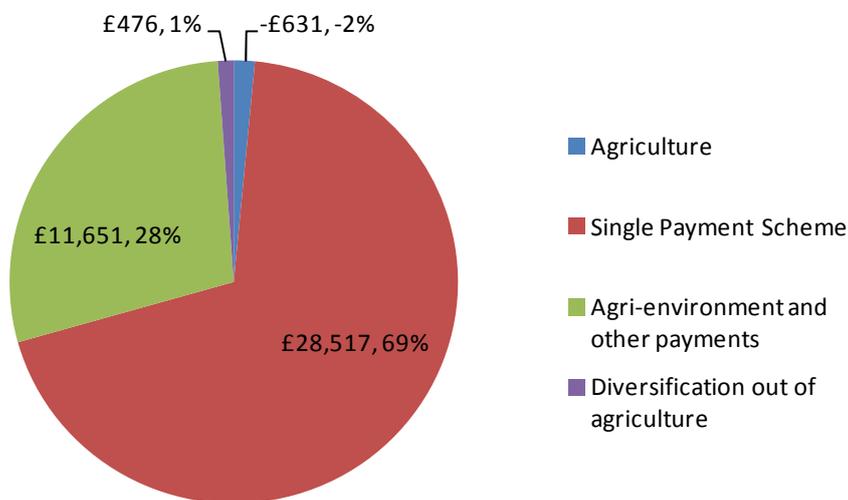
⁹ Farm Business Income (FBI) is the preferred measure for comparisons of farm type and represents the return to all unpaid labour (farmers, spouses and others with an entrepreneurial interest in the farm business) and to all their capital invested in the farm business including land and farm buildings. FBI equals: total output from agriculture (including crop and livestock valuation change), the Single

grazing livestock farms in the North East region was, on average, £40,012 in 2011/12. A breakdown of FBI is set out in Figure 11. This shows that the majority (97%) of the profit of the farm business comes from the Single Payment Scheme and agri-environment scheme payments. In other words, while the agricultural enterprises are very important in terms of output, this income is generally outweighed by the associated costs leading to a minimal or negative contribution to profit from the agricultural enterprises.



Source: Farm Business Survey 2013

Figure 10. Breakdown of average total costs per farm – LFA grazing livestock, North East region, 2011/12



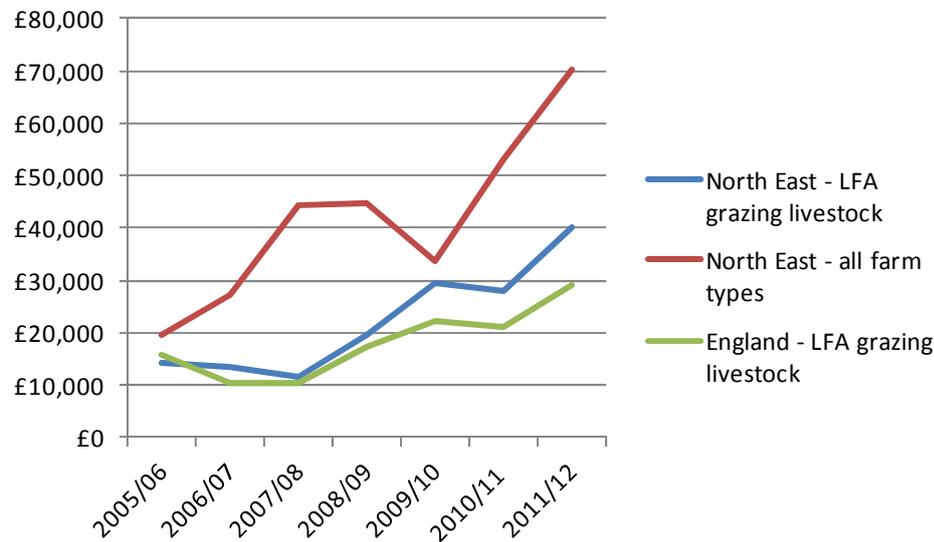
Source: Farm Business Survey 2013

Figure 11. Breakdown of average Farm Business Income (profit) per farm – LFA grazing livestock, North East region, 2011/12

Trends in FBI for LFA grazing livestock farms in the North East region are shown in Figure 12. This shows an increase from £14,409 per farm in 2005/6 to £40,012 per farm in 2011/12. The increase

Payment Scheme, agri-environment schemes and diversification less expenditure (costs, overheads, fuel, repairs, rent, depreciation, paid labour) plus profit/(loss) on sale of fixed assets.

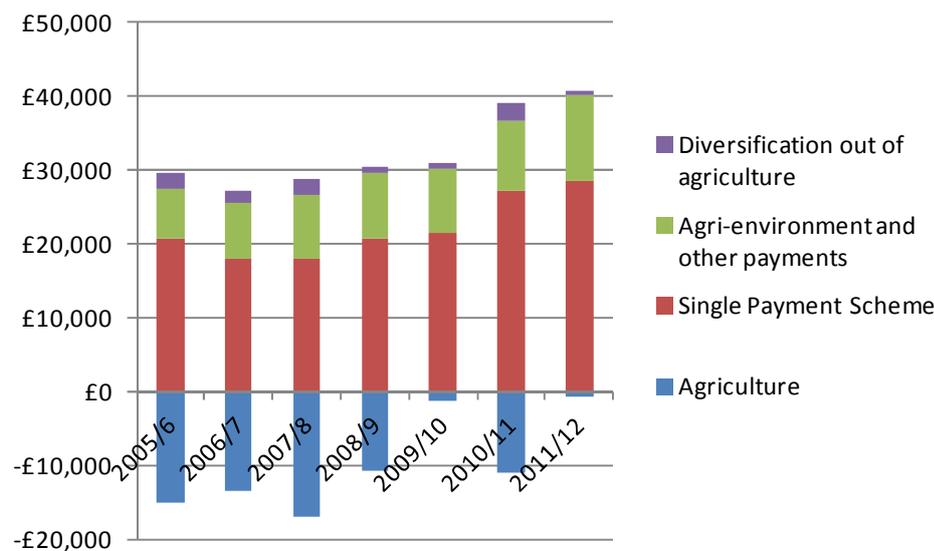
can be attributed at least in part to strengthening cattle and sheep prices, albeit offset to an extent, by higher input costs including feed and fuel, and an improvement in scheme payments partly related to the devaluation of the pound against the euro. Average profitability for LFA grazing livestock farms in the North East lies well below that for all farm types in the region, but exceeds that for LFA grazing livestock farms across England as a whole due, amongst other things, to higher stock numbers.



Source: Farm Business Survey 2013

Figure 12. Average Farm Business Income per farm

Trends in the breakdown of FBI for LFA grazing livestock farms in the North East region are shown in Figure 13. This confirms the generally negative, but fluctuating, contribution coming from agriculture and the significant positive contribution coming from the Single Payment Scheme (SPS), agri-environment and other payments (including LFA payments) and, to a lesser extent, diversification out of agriculture.



Source: Farm Business Survey 2013

Figure 13. Breakdown of average Farm Business Income per farm – LFA grazing livestock, North East region

Additional statistics relating to the LFA grazing livestock farms in the North East in 2011/12, derived from the Farm Business Survey¹⁰, provided here for purposes of comparison with farms in the Upper Dales, are set out below.

- The average FBI of £40,012 represents a 7.2% return on capital on an average asset value of £580,305 per farm.
- The average farm size, excluding common grazings was 188 ha including 65 ha of sole occupation rough grazing.
- There were 117 Grazing Livestock Units (GLU) on an average farm. The average beef herd was 41 cows with 78 followers per farm, and the sheep flock was 435 ewes with 441 other sheep.
- The average farm employed 1.57 annual labour units (down 4.7% on 2010) of which 1.08 were farmer and family and 0.30 paid regular and casual (down 12%).
- The average investment in machinery and equipment in the year was £11,851 per farm. Landlord's capital type investment averaged £3,609 per farm.

3.10. Agricultural output

A detailed analysis of the economic value of farming in the North Pennines AONB lies outside the scope of this report. However a crude estimate can be obtained from Defra June Survey and Farm Business Survey data for LFA grazing livestock farms. This farm type accounts for 86% of all commercial holdings in the AONB and the majority of HNV farms in the area.

There is a total of 579 commercial holdings categorised as LFA grazing livestock farms in the AONB according to the June Survey, 2010. Farm Business Survey data for the North East suggests that the average LFA grazing livestock farm had a total agricultural output of £93,195 in 2011/12, including £82,096 livestock output, £6,042 crop output and £5,019 other agricultural output such as contracting work on other farms. This suggests a total agricultural output for LFA grazing livestock farms in the AONB of around £54 million per annum. This, however, may well be a slight over-estimate given the slightly larger average size of farms in the Farm Business Survey sample compared to the AONB. It should be noted that this excludes other income (including SPS, AES and diversification out of agriculture) and costs.

4. Biodiversity in the Upper Dales

4.1. Fell pastures

As in most surviving High Nature Value farming areas, the majority of the farmland in the case study area takes the form of semi-natural pastures – rough grazings of one sort or another. These are dominated by large areas of upland acid grasslands, dry heathland, wet heaths and rush pastures and blanket bogs, but they also support smaller areas of more uncommon and even more valuable habitats.

Blanket bog may not be uncommon in England, but is a habitat for which the UK has a particular European importance. According to the AONB, the total area of blanket peat in the North Pennines is around 90,000 ha, of which around 2,900 ha at 4,000 sites is bare or eroding. Nevertheless, to quote the JNCC in the context of Moor House- Upper Teesdale SAC, *the site includes the least damaged and most extensive tracts of typical M19 Calluna vulgaris – Eriophorum vaginatum blanket*

¹⁰ Farm Business Survey (2012) North East Region Commentary 2011/12

*mire in England and shows this community type up to its highest altitude in England. This large expanse of peat displays the full range of features typical of the Pennines, with extensive erosion, mainly on higher areas, interspersed with large swathes of bog dominated by heather *Calluna vulgaris* or cottongrasses *Eriophorum* spp. A few areas display small-scale surface patterning, with distinct *Sphagnum* hollows and intervening ridges. Some parts of the site show characteristics of the western-type Scottish Blanket bogs, whereas the lichen-rich areas are a feature of bogs in Fennoscandia.*

This presence of features which are reminiscent of other more Boreal or Alpine countries is a recurring theme in the biodiversity of the upper Dales. For example, *Moor House – Upper Teesdale has the most extensive area of Alpine and Boreal heaths south of Scotland and is the best southern outlier. The main sub-type is H19 *Vaccinium myrtillus* – *Cladonia arbuscula* heath, which occurs on an extensive plateau. Characteristically there is an abundance of lichens, especially *Cladonia* species, but on this site there is also an unusual abundance of large clumps of the montane lichen *Cetraria islandica*. At the edge of the plateau *Vaccinium* – *Cladonia* heath gives way below to a wind-clipped form of H12 *Calluna vulgaris* – *Vaccinium myrtillus* heath which grades into taller heaths of the same community lower down the slopes. On one level summit at an altitude of 600 m, wind-clipped heather of a short but upright growth form occurs among a profusion of lichens, especially *Cladonia* species. This constitutes an unusual alpine/subalpine form of *Calluna* – *Vaccinium* heath that is very local in England. And again, the summit of Cross Fell has the best-developed and most extensive area of siliceous alpine and boreal grasslands in England.*

The area contains examples of communities which are associated with long-lying snow patches - *this site in northern England is the largest and most diverse example of Alpine pioneer formations of the *Caricion bicoloris-atrofuscae* south of the Highlands. It is a southern outlier with an extensive area of the habitat type, and is a southern outpost for many of the rarer arctic-alpine plants characteristic of this habitat type, with a unique relict mountain flora. Teesdale sandwort *Minuartia stricta* is restricted to Upper Teesdale, and other rare species found in this habitat type include false sedge *Kobresia simpliciuscula*, hair sedge *Carex capillaris* and Scottish asphodel *Tofieldia pusilla*. The NVC types represented are M10 *Carex dioica* – *Pinguicula vulgaris* mire and M11 *Carex demissa* – *Saxifraga aizoides* mire.*

It contains a range of scree communities, some of which are also typical of Alpine of areas: *Moor House – Upper Teesdale is representative of communities on both low and high altitude siliceous scree in northern England. Scree are extensive, with diverse plant communities. Cross Fell is a southern outlier of high-altitude gritstone scree, with a flora including rare lichens and some widespread montane vascular plants. Ferns including parsley fern *Cryptogramma crispa* and holly fern *Polystichum lonchitis* occur on extensive whin-sill scree at lower altitudes. This site is representative of the communities of calcareous and calcshist scree in the north of England up to an altitude of 760 m. This site has the most extensive areas of calcareous and calcshist scree in the UK, consisting of Carboniferous limestone. Communities are diverse and there is a mix of northern and southern floristic elements, including holly-fern *Polystichum lonchitis*, rigid buckler-fern *Dryopteris submontana*, limestone fern *Gymnocarpium robertianum*, musk thistle *Carduus nutans* and mossy saxifrage *Saxifraga hypnoides*. Hairy stonecrop *Sedum villosum* occurs where scree is flushed by springs.*

Scree sometimes gives way to cliffs, and again the communities present are nationally- and internationally-significant: *Moor House – Upper Teesdale SAC is one of three sites representing Calcareous rocky slopes with chasmophytic vegetation in the north of England. Crevice communities occur on extensive limestone scars, especially along the Pennine escarpment and around the summits of hills. The most extensive community present is characterised by green spleenwort *Asplenium viride**

and brittle bladder-fern *Cystopteris fragilis*. Less common species found in this community include hoary whitlowgrass *Draba incana*, alpine cinquefoil *Potentilla crantzii* and holly-fern *Polystichum lonchitis*. The site is also of interest for its combination of southern and northern flora. Rarer southern species include bird's-foot sedge *Carex ornithopoda* and horseshoe vetch *Hippocrepis comosa*. The whitebeam *Sorbus rupicola*, which is widely distributed but found at only a few sites, is also present. It is also one of only a very few sites in England supporting Siliceous rocky slopes with chasmophytic vegetation. The most extensive occurrences of this community type are where the Whin Sill outcrops at Falcon Clints, Ravenscar, Holwick Scars and High Force. Some examples also occur at Middle Tongue and alongside Cash Burn. Characteristic species present include parsley fern *Cryptogramma crispa*, mountain male-fern *Dryopteris oreades* and northern buckler-fern *D. expansa*. Bearberry *Arctostaphylos uva-ursi* and starry saxifrage *Saxifraga stellaris* also occur in this community. Limestone pavement is also present in some locations.

The high rainfall, as well making possible the large areas of blanket bog, supports a range of wetland habitats with higher levels of nutrients and water movement, associated with springs and seepage areas. Many of these are also of international significance; the range and diversity of these habitats within such a small area – in part a reflection of the variable geology – is also notable. *Hydrophilous tall herb fringe communities occur on wet ledges in base-rich rocks, which are inaccessible to grazing livestock. One of the most extensive stands is on a tributary of Little Gill, and examples also occur at Lady Gill, Greencastle, High Cup Nick and Mickle Fell. Typical species that occur in these localities include great wood-rush Luzula sylvatica, wood crane's-bill Geranium sylvaticum, water avens Geum rivale, lady's-mantle Alchemilla glabra, wild angelica Angelica sylvestris and roseroot Sedum rosea.*

This is one of three sites in northern England that have extensive series of petrifying springs with tufa formation. Tufa springs often occur at the junction between limestone and other, less permeable, rocks at a range of altitudes. Tufa springs are associated with calcareous glacial drift and can be found in calcareous grasslands, in fen systems of grazed pastures, associated with limestone scar cliffs and screes and amidst acid heathland and grassland. The flora is exceptionally rich and includes rare northern species such as bird's-eye primrose Primula farinosa and Scottish asphodel Tofieldia pusilla.

This is one of two upland sites in northern England selected for Alkaline fens. Spring-fed flush fens of NVC type M10 Carex dioica – Pinguicula vulgaris mire are widespread on the moors amidst calcareous grassland, limestone scars, heath and bog, in enclosed pastures amidst a range of acid and calcareous grasslands and in meadows, often as part of complex vegetation mosaics. The site has an exceptionally important rare plant flora associated with flush vegetation, including species such as bird's-eye primrose Primula farinosa and Scottish asphodel Tofieldia pusilla. On the highest and coldest parts of the site fen grades into Annex I type 7240 Alpine pioneer formations of the Caricion bicoloris-atrofuscae, and intermediate examples occur.

This is the most important site for marsh saxifrage Saxifraga hirculus in the UK. Approximately ten of the flush areas support populations of marsh saxifrage, including areas in the Appleby Fells, Cross Fell and Upper Teesdale, containing a total of over 270,000 plants – >90% of the UK population. In this area distributions are very patchy within flushes so that population estimates are hard to support, but individual populations in these localities can be large, with several localities supporting thriving populations of many thousands of plants. In 1999 the largest population was estimated at 153,100 individuals.

This is one of three sites representing M26 Molinia caerulea – Crepis paludosa mire in northern England. Although less extensive and more fragmentary than at Craven Limestone Complex, stands occur in a wider range of ecological contexts, including examples within 6520 Mountain hay

meadows (which are not found in other sites), as well as examples in lightly grazed pasture, on wet margins of woodland and on stream banks.

On drier areas, there are significant stands of calcareous grasslands: there are extensive stands of CG9 *Sesleria albicans* – *Galium sternerii* grassland. It is an important variant of this community since it contains a rich assemblage of relict arctic-alpine species, such as spring gentian *Gentiana verna* and alpine forget-me-not *Myosotis alpestris*, making Moor House – Upper Teesdale one of the most important arctic-alpine refugia in the UK. The grasslands are for the most part heavily grazed but show transitions to a wide range of other vegetation types, including 7130 Blanket bogs, acid grassland, 7230 Alkaline fens, 6520 Mountain hay meadows, 8240 Limestone pavements, cliffs and 8120 calcareous and calcshist screes of the montane to alpine levels.

Another feature of drier acidic areas is juniper. Upper Teesdale has the second most extensive area of juniper scrub in UK and the largest south of Scotland. The main area of juniper scrub grows on the igneous whin-sill, at moderately high altitude. In Upper Teesdale the juniper has developed mainly on heath and is of the W19 *Juniperus communis* – *Oxalis acetosella* type. There are transitions to dwarf-shrub heath, acidic grasslands and whin-sill cliffs. Small patches of juniper scrub also occur on calcareous soils, including the sugar limestone grassland for which this site is famous. Palaeo-environmental evidence indicates that juniper scrub has been present continuously since the last glacial period.

Lead and other base metals have been mined in the area for centuries. The heavy metal tolerant plants which grow on the spoil heaps are also an Annex 1 habitat. This Calaminarian grassland supports species such as spring sandwort *Minuartia verna*, alpine penny-cress *Thlaspi caerulescens* and Pyrenean scurvygrass *Cochlearia pyrenaica*, along with lichens such as *Cladonia rangiformis*, *C. chlorophaea* and *Coelocaulon aculeatum*.

4.2. Inbye meadows and pastures

While many of the non-Alpine pasture types listed above extend onto the enclosed land, the most notable feature of the inbye areas is the species-rich meadows. The North Pennine Dales SAC encompasses the range of variation exhibited by mountain hay meadows in the UK, most of which are found within Teesdale and Weardale. According to the JNCC¹¹, the grasslands included within the site exhibit very limited effects of agricultural improvement and show good conservation of structure and function. A wide range of rare and local meadow species are contained within the meadows, including globeflower *Trollius europaeus*, the lady's-mantles *Alchemilla acutiloba*, *A. monticola* and *A. subcrenata*, and spignel *Meum athamanticum*.

According to JNCC Upper Teesdale SAC contains actively-managed Mountain hay meadows at their highest altitude in the UK. Though representing a smaller proportion of the national resource than the North Pennine Dales Meadows SAC, the meadows of this site have been managed at an extremely low level of agricultural intensification and show good conservation of habitat structure and function.

The AONB Partnership has surveyed the majority of upland hay meadows in the North Pennines. Out of a total area surveyed of 2326 ha, 278 ha were considered to be very species-rich meadows; 950 ha to be intermediate/medium species-rich meadows and 1098 ha to be species-poor meadows.

¹¹ <http://jncc.defra.gov.uk/protectedsites/sacselection/sac.asp?EUCode=UK0014775>



Andy Stephenson, Creative Commons Licence

Figure 14. Upper Teesdale SSSI is unusual in England in containing both fell and inbye land

4.3. Woodland

Figures generated for the North Pennines AONB Management Plan (relevant to the year 2007) suggest that there are 5,128 hectares of woodland in the AONB (2.6% land cover); the area of broadleaved woodland is 1,645 ha (32% of all woodland), of which 930 ha (57% of broadleaved woodland) is ancient or semi-natural, while coniferous woodland accounts for 3,483 ha (68% of all woodland).

4.4. Fauna

The area is notable for its extremely rich bird fauna. A comprehensive survey of the North Pennine Moors SPA was carried out for Natural England between 2004 and 2007 under the direction of Kevin Shepherd. While it is not possible to separate out the case study area as a unit, data for two of the component SSSIs of the site – Moorhouse and Upper Teesdale – gives an indication of the significance of the area for birds (Table 4) when compared against the Great Britain populations for the same species.

The conjunction within a small area of severely declining lowland birds (yellow wagtail, grey partridge, linnets) with upland birds of extremely limited distribution in England (dunlin, ring ouzel, golden plover) is significant – the survey report notes how unusual grey partridge is in the uplands, for example, and describes the yellow wagtail as ‘*essentially a lowland species*’. Also noteworthy is the wealth of birds characteristic of the habitat mosaics where cultivation and rough grazings meet

(black grouse pre-eminently, but also whinchat and stonechat and, in a damper context, redshank and lapwing).

	Moorhouse + Upper Teesdale	All SSSIs at least partly in AONB	GB population
Red grouse	1414	5676	154700
Black grouse (male)	135	337	6510
Black grouse (female)	105	321	
Grey partridge	43	156	70000-75000
Oystercatcher	91	374	113000
Golden plover	899	3190	22600
Lapwing	890	3707	154000
Dunlin	71	161	9150-9900
Snipe	221	1541	52500
Curlew	738	3911	105000
Redshank	100	458	38600
Short-eared owl	2	>11	1000-3500
Yellow wagtail	1	>1	11500-26500
Ring ouzel	43	125	6157-7549

Table 4. Surveyed numbers of selected bird species in SSSIs in the study area and the wider AONB

Black game are a totemic species for the area; Langdon Beck is widely regarded as the best place in England to see them. Since this general survey did not look for them at the optimal time – dawn – it is likely that the figures above are an underestimate.

The diversity of management intensity, including that of grazing densities and heather burning, is also a factor in the variety and richness of the bird life. While many species need deep cover, at least at certain points in their life cycle, Shepherd notes that *were it not for grazing stock and heather burning, golden plovers would soon be restricted to the sparsely vegetated montane and semi-montane habitats and the more extensive, wetter blanket bogs dominated by low carpets of Sphagnum mosses and cottongrasses. Instead the species flourishes in heavily grazed areas and particularly on the most intensively managed grouse moors where, in places, safely removed from predation, pairs were observed tending young on every, or every other burnt patch.* A similar preference for short turf on flatter areas was found in the case of skylark and meadow pipit.

One species which is known to like plenty of vegetation structure is the curlew, and AE management aims to deliver these conditions. Interestingly, Shepherd notes that *the precise distribution of curlews across the SPA is much more difficult to explain, though height and density of vegetation, frequency and extent of bare damp or wet patches, nature and frequency of disturbance, and gradualness of change in traditionally occupied territories are likely to be significant determinants. The mobility and adaptability of the species to localised land management practices often results in a complex and confusing pattern of local increases, decreases, losses or relinquishment of previous habitats and invasions of new habitat.*

The data for ring ouzel must be put in the context of this being essentially a northern species – only around two thirds of the UK population is found in Scotland, and the total population in N England is estimated at between 1095 and 1264 birds¹².

¹² <http://www.ringouzel.info/research/National%20Ring%20Ouzel%20Survey%202012%20-%20provisional%20estimates.doc>

The brown hare is present as are water voles. Recent identification of relatively strong and connected colonies of water voles in the upper reaches of the rivers Tees, Wear, South Tyne and East/West Allen, has led to national experts designating three parts of the North Pennines AONB as National Key Sites for Water Voles. National Key Sites are chosen for having large areas of highly suitable habitat for water voles; having ongoing predator control and having the potential to be a source of water vole recolonisation.

Upland flushes are the habitat of the Habitats Directive Annex 2 species, the round-mouthed whorl snail *Vertigo genesii*. It lives amongst moss, low-growing sedges and a rich assemblage of rare and local arctic-alpine plants such as bird's-eye primrose *Primula farinosa* and Scottish asphodel *Tofieldia pusilla*. *V. genesii* is found at a number of base-rich flushes around the slopes of Widdybank Fell and at isolated flushes further east on Cronkley Fell and Holwick Fell, at altitudes between 400 m and 525 m. The snail is locally abundant at some flushes and dominates the molluscan fauna at many of them.

4.5. Designations

The study area contains a number of designated sites. Sites of Special Scientific Interest, the national designation, are shown in Figure 15; many of these are also Special Protection Areas (SPA) under the EU Birds Directive (Figure 16) and/or Special Areas for Conservation (SAC) under the EU Habitats and Species Directive (Figure 17).



Figure 15. Sites of Special Scientific Interest in the study area

The study area includes all of Upper Teesdale (14,361 ha); Far High House Meadows (6 ha); Cornriggs Meadows (15 ha) and Slit Woods (14 ha) SSSIs and part of Moor House and Cross Fell (part or all of 8 units, a maximum area of 6,124 ha) and Appleby Fells (5 units, 6,490 ha) SSSIs. There are also a limited number of small geological SSSIs.

All of those parts of Upper Teesdale, Moor House and Cross Fell and Appleby Fells SSSIs which fall within the study area are also designated as part of the North Pennine Moors SPA.

The same areas are also designated SAC, but this time the meadows are part of a separate North Pennine Dales meadows SAC, along with the 2 meadow SSSIs in Weardale and other sites outwith the study area, while the other habitats fall into the Moor House – Upper Teesdale SAC. The North Pennine Moors SAC adjoins the study area but does not cross into it. The features of Community Interest for the Natura 2000 sites are listed in Table 5.

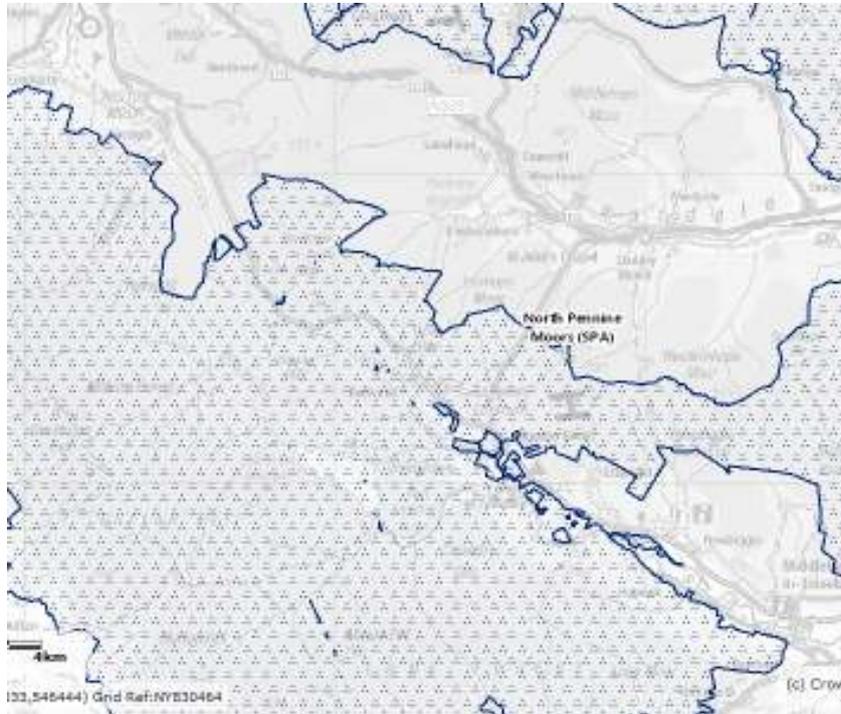


Figure 16. Special Protection Areas under the Birds Directive in the study area

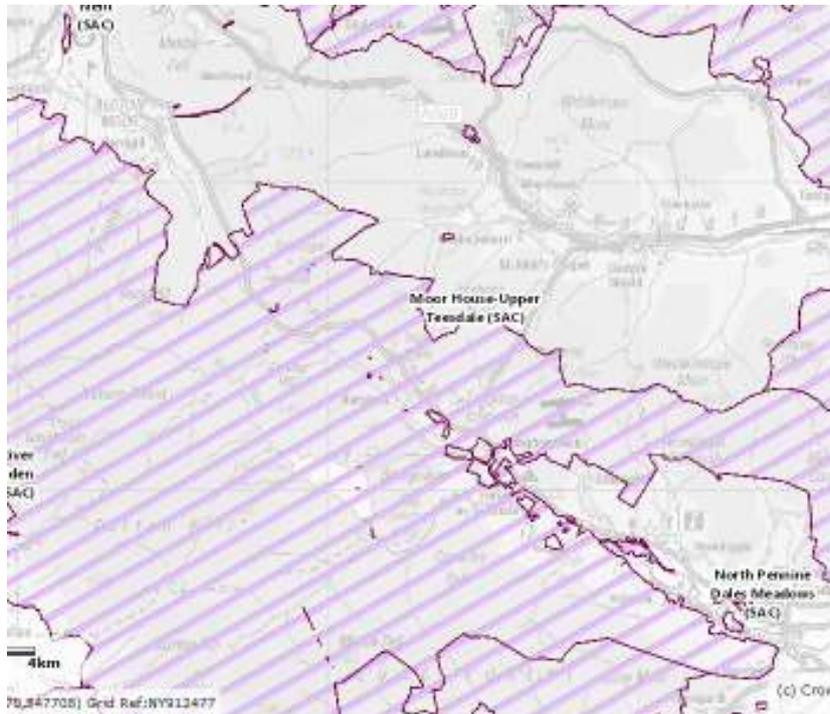


Figure 17. Special Areas for Conservation under the Habitats Directive in the study area

Site	Features of Community Interest
Moor House – Upper Teesdale SAC	<p>Annex I habitats that are a primary reason for selection of this site:</p> <p>3140 Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. 4060 Alpine and Boreal heaths 5130 Juniperus communis formations on heaths or calcareous grasslands 6130 Calaminarian grasslands of the Violetalia calaminariae 6150 Siliceous alpine and boreal grasslands 6410 Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) 6430 Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels 6520 Mountain hay meadows 7130 Blanket bogs (* if active bog) * Priority feature 7220 Petrifying springs with tufa formation (Cratoneurion) * 7230 Alkaline fens 7240 Alpine pioneer formations of the Caricion bicoloris-atrofuscae * Priority feature 8110 Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani) 8120 Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii) 8210 Calcareous rocky slopes with chasmophytic vegetation 8220 Siliceous rocky slopes with chasmophytic vegetation</p> <p>Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:</p> <p>4030 European dry heaths 8240 Limestone pavements * Priority feature</p> <p>Annex II species that are a primary reason for selection of this site:</p> <p>1015 Round-mouthed whorl snail Vertigo genesii 1528 Marsh saxifrage Saxifraga hirculus</p>
North Pennine Dales Meadows SAC	<p>Annex I habitats that are a primary reason for selection of this site:</p> <p>6520 Mountain hay meadows</p> <p>Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:</p> <p>6410 Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)</p>
North Pennine Moors SPA	<p>Golden plover (breeding) Hen harrier (breeding) Merlin (breeding) Peregrine (breeding) Curlew (breeding) Dunlin (breeding)</p>

Table 5. Features of Community Interest on Natura 2000 sites in the study area

4.6. Site condition

In general, site condition in the area is unfavourable (Table 6), with the proportion of habitats in good condition (Figure 20) ranging from less than 10% (upland bogs) to only around 40% (acid grassland). While the detailed site condition reports on the Natural England website indicate that some units show as unfavourable due to failures on one specific feature, it is also the case that many sites are shown as recovering purely on the basis of having been entered into agri-environment agreements.

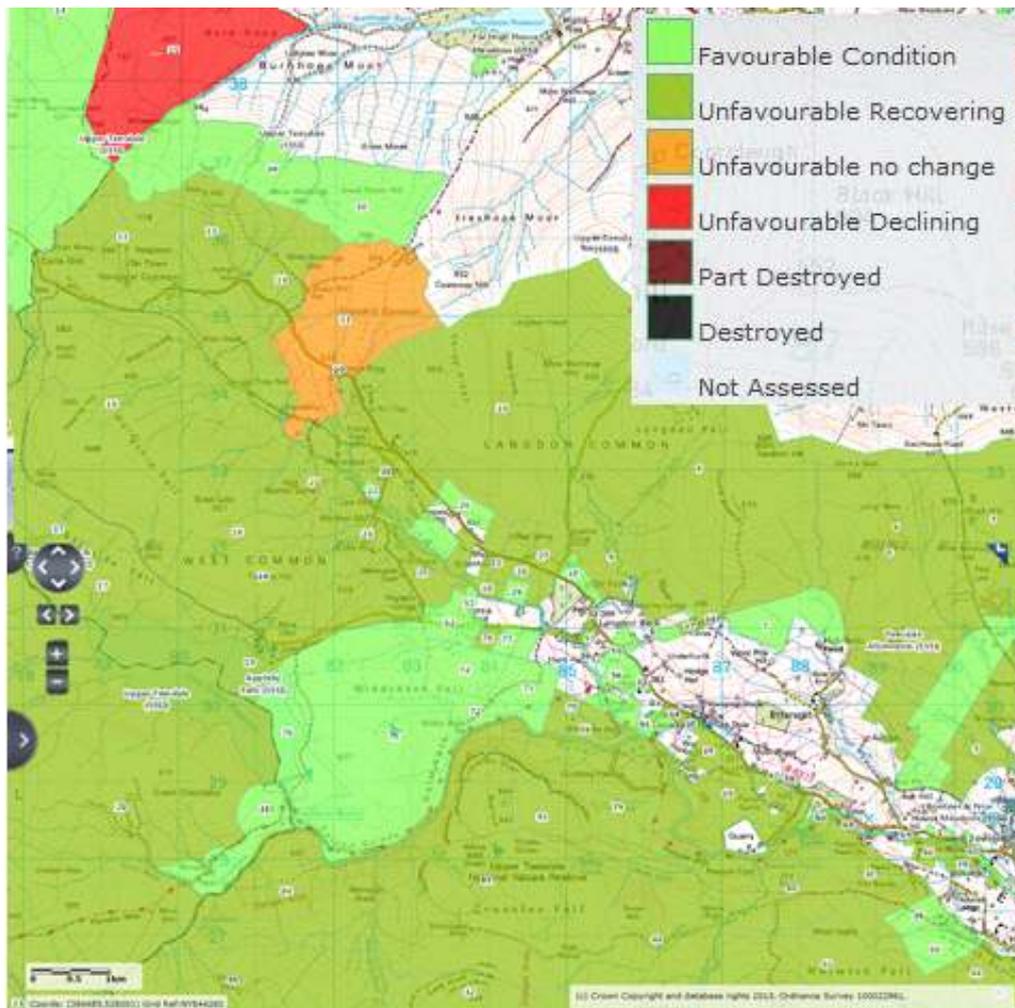


Figure 18. Site condition of SSSI units, upper Teesdale

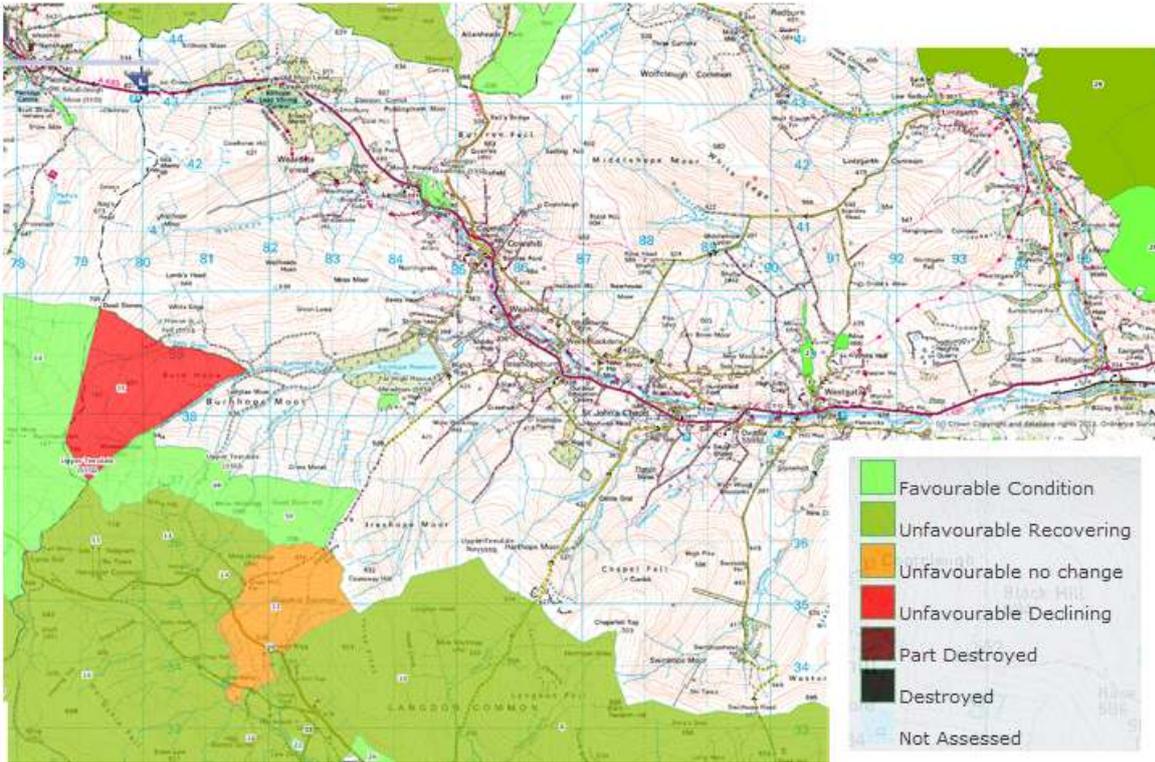


Figure 19. Site condition of SSSI units, upper Weardale

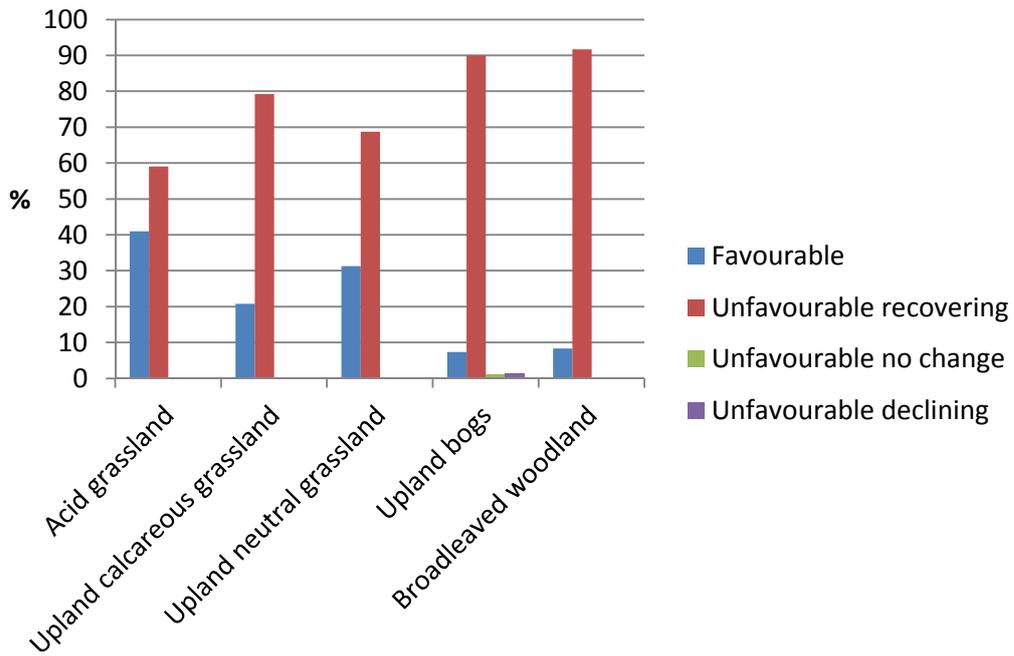


Figure 20. Site condition of SSSI units by dominant habitat (%)

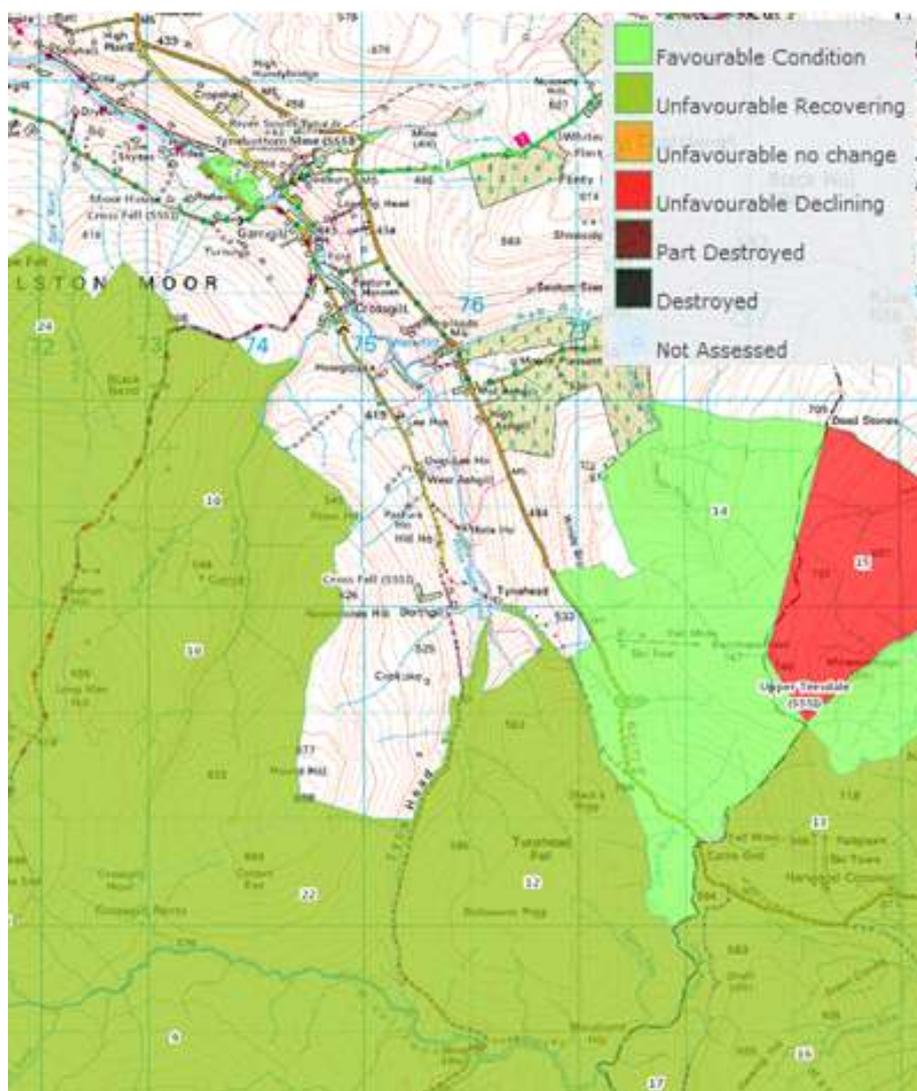


Figure 21. Site condition of SSSI units, Garrigill

	Favourable	Unfavourable recovering	Unfavourable no change	Unfavourable declining	Total
Acid grassland	632.05	910.08	0	0	1542.13
Upland calcareous grassland	14.48	55.21	0	0	69.69
Upland neutral grassland	80.83	177.54	0	0	258.37
Upland bogs	1847.50	22520.22	295.39	370.46	25033.57
Broadleaved woodland	8.80	97.2	0	0	106.00
Total	2583.66	23760.25	295.39	370.46	27009.76
%	9.6	88.0	1.1	1.4	100

Table 6. Site condition of SSSI units by dominant habitat (ha)

5. Ecosystem services delivered in the North Pennines AONB and study area

This section summarises key information on the key ecosystem services provided by principal habitats within the North Pennines AONB, together with an estimate of their value. It draws on a number of national and local studies exploring the nature and value of ecosystem services in upland areas, including the North Pennines.

5.1. Introduction to ecosystem services

In recent years there has been a growing interest in the concept of ecosystem services and how they link to the human well-being and economic prosperity.

The Millennium Ecosystem Assessment¹³ provided a state-of-the-art scientific appraisal of the condition and trends in the world’s ecosystems, the services they provide and the options to restore, conserve or enhance the sustainable use of ecosystems. The UK National Ecosystem Assessment¹⁴ then provided the first analysis of the UK’s natural environment in terms of the benefits it provides to society. There has also been a range of research undertaken specifically in relation to upland ecosystem services, some of which can be applied to the North Pennines AONB and this study.

The UK NEA defined ecosystem services as “the benefits provided by ecosystems that contribute to making human life both possible and worth living”. Ecosystem services are usually classified along functional lines as set out in Table 7. They include both tangible benefits and intangible benefits (‘goods’ and ‘services’).

Provisioning services: The products obtained from ecosystems.	Regulating services: The benefits obtained from the regulation of ecosystem processes.	Supporting services: Ecosystem services that are necessary for the production of all other ecosystem services.	Cultural services: The non-material benefits people obtain from ecosystems.
For example, <ul style="list-style-type: none"> • food • fibre • fresh water • genetic resources 	For example, <ul style="list-style-type: none"> • climate regulation • hazard regulation • noise regulation • pollination • disease and pest regulation • regulation of water, air and soil quality 	For example, <ul style="list-style-type: none"> • soil formation • nutrient cycling • water cycling • primary production 	For example, through <ul style="list-style-type: none"> • spiritual or religious enrichment • cultural heritage • recreation and tourism • aesthetic experience

Source: UK National Ecosystem Assessment (2011)

Table 7. Types of ecosystem service

¹³ Millennium Ecosystem Assessment (2005) Ecosystems and Human Well-being: Synthesis. Island Press, Washington, D.C.

¹⁴ UK National Ecosystem Assessment (2011) The UK National Ecosystem Assessment: Synthesis of the Key Findings. UNEP-WCMC, Cambridge.

5.2. Ecosystem services in the North Pennines

A summary of the key ecosystem services provided in the North Pennines AONB is set out in Table 8 below. This derived from both: the North Pennines AONB Management Plan¹⁵, which provides a summary of ecosystem services provided by the North Pennines landscape; and the North Pennines National Character Area profile^{16,17} which provides further detail, including an analysis of ecosystem services and opportunities. The supporting services which underpin the other ecosystem services and are not separately listed.

Provisioning services

- **Food and fibre provision:** Hill cattle and sheep are reared, with progeny sold directly and indirectly for beef and lamb. Fibre, in the form of hay/silage and wool, is also produced.
- **Timber and wood fuel provision:** Timber and wood fuel is produced from 3,483 ha of coniferous plantations and from a proportion of the 1,645 ha of broadleaved woodland.
- **Stone and building materials provision:** Local stone and other materials are produced from small-scale quarries.
- **Renewable energy:** Wind, hydro and biomass power are generated in the area. The right technology in the right place is important.
- **Water availability (water supply):** With its high rainfall and impervious rocks, this upland block is an important catchment for the Tyne, Wear, Tees and Eden, and has several large reservoirs. The area provides water for both domestic and industrial use downstream in Tyneside, Wearside, Teesside and Carlisle.

Regulating services

- **Climate regulation:** Peaty soils, with a high carbon content, cover 62% of the area, and underlie blanket bog, upland heath and mires, while humus-rich soils cover a further 5%. Appropriate management of the moorland and pasture can improve carbon capture, as can extending woodland cover in some circumstances.
- **Regulating soil erosion:** The extensive peaty soils are prone to wind and water erosion. Sediment run-off can be reduced by ensuring good vegetative cover on blanket bog and heather moorland. In the dales, maintaining a good protective cover of vegetation, such as permanent grassland, scrub or woodland, particularly on steep gill sides and alongside watercourses, will protect soils from erosion and reduce sediment run-off.
- **Regulating water quality:** Water quality is predominantly good in the many fast-flowing streams and rivers, but there are some issues of diffuse pollution and point-source pollution from mining spoil and river gravels. There is also some localised discolouration of water from eroded peat with poor vegetation cover, which can be addressed by appropriate moorland management.
- **Regulating water flow (flood control):** The greatest risks from river flooding are downstream, in urban locations in Tyneside, Wearside and Teesside, and also in Carlisle. Improving land management practices, taking steps to reduce run-off from the land and slow the flow of floodwaters will benefit the many settlements downstream.
- **Pollination:** The extensive areas of semi-natural habitats including blanket bog, upland heathland and species-rich grasslands support large numbers of insects and provide nectar sources for pollinators.

¹⁵ North Pennines AONB Partnership (2009) The North Pennines Area of Outstanding Natural Beauty Management Plan 2009-2014

¹⁶ National England (2013) Natural Character Area Profile: 10 North Pennines

¹⁷ There is a large overlap between the North Pennines AONB and the North Pennines NCA. 88% of the NCA lies within the AONB. 95% of the AONB lies within the NCA. Total area of NCA = 214,563 ha. Total area of AONB = 198,300 ha. Total area of land in NCA and AONB = 188,488 ha.

Cultural services

- **Sense of place/inspiration:** The North Pennines provide one of the most remote and wild experiences in England, the expansive open moorlands contrasting with the more sheltered dales, with their meadows, pastures and drystone walls, villages and dispersed farmsteads all built in local stone. This distinctive landscape has a strong sense of place and cultural continuity, based on its long history of farming and mining. There are cultural associations with many writers and artists. This is recognised in the area's AONB designation
- **Sense of history:** This is portrayed in the rich time depth of historic heritage, from Bronze Age field systems to the subsistence miner-farmer landscape, with its wealth of evidence of mining activities. In particular, the area has great potential for revealing evidence of historic land uses, especially on the moorland, due to the lack of cultivation and development.
- **Tranquillity:** The North Pennines have high levels of tranquillity, with their low population, few villages and roads, a lack of development, open moorlands and quiet dales.
- **Outdoor recreation:** There are extensive areas of open access land on the moorlands, covering 61% of the area. There is also a good network of rights of way, with three national trails and forests that provide a range of recreational opportunities. In addition to walking, there are a range of sites available for informal countryside recreation such as cycling, fishing, canoeing, wildlife watching, caving, eco- and geotourism and heritage tourism.
- **Field sports:** Grouse shooting in particular is a very important recreational activity in the area, both in terms of its influence and impact on land use and management as well as economically and socially.
- **Biodiversity:** The North Pennines are internationally recognised as very important for arctic-alpine flora, upland moorland habitats, limestone grasslands, hay meadows, woodlands, becks and rivers, with their associated species. Some 46% of the area is designated as an SPA, for its biodiversity value. The range of habitats supports some iconic birds as curlews, black grouse, ring ouzel and several raptors, which are a key attraction to visitors.
- **Geodiversity:** With its dramatic landforms, intrusions of hard Whin Sill rock and long history of mineral exploitation, the North Pennines AONB is internationally important for its geodiversity, and has been awarded UNESCO European and Global Geopark status.

Source: adapted from National England (2013) Natural Character Area Profile: 10 North Pennines

Table 8. Ecosystem services provided in the North Pennines AONB

A summary of the ecosystem services provided by different habitats, and associated with HNV farming, in the North Pennines AONB is provided in Table 9. This is indicative only.

Further details on the key ecosystem services associated with HNV farming in the North Pennines, including opportunities for further delivery and indicative values, are set out below. Each section sets out the current state of the ecosystem service and the opportunities to enhance it, particularly on farmland. In addition, where possible, indicative figures for the economic value of the ecosystem service are provided.

The economic values provided are based on available economic literature. Two types of figure are provided:

- Indicative economic values for a particular ecosystem service (on a unit basis); where available, these are based on value transfer methods (in this case a meta-analytic function transfer based on the results of multiple primary studies) and derived from other studies; and
- Indicative payments to farmers and landowners (on a unit basis) under possible future Payment for Ecosystem (PES) schemes; these are derived from the South Pennines upland ecosystem service pilot, the most relevant research available.

Ecosystem service group/ service	Upland limestone grassland	Upland hay meadows	Calaminarian grassland	Blanket bog	Upland heathland	Upland acid grassland	Semi-natural broadleaved woodland
Provisioning							
Food and fibre provision	++	+++	+	++	+++	++	-
Timber and wood fuel provision	-	-	-	-	-	-	++
Regulating							
Water supply	++	++	++	+++	++	++	++
Water quality	+++	+++	-	+++	++	++	++
Flood control	++	++	++	+++	++	++	++
Carbon storage and sequestration	++	++	++	+++	+++	+++	+++
Soil protection	+++	+++	+++	+++	+++	+++	+++
Pollination	+++	+++	++	++	++	++	+
Cultural							
Recreation	++	++	++	++	+++	++	++
Biodiversity	+++	+++	+++	+++	+++	+++	+++
Tranquillity & other cultural services	++	++	++	+++	+++	+++	++

Key: high (+++); medium (++); low (+); negligible (-)

Source: own analysis derived from UK National Ecosystem Assessment (2011) and Natural England (2013)

Table 9. Ecosystem services derived from HNV farming habitats in the North Pennines AONB

These are different approaches/figures for different purposes, however they are included alongside one another for the sake of completeness, given the paucity of relevant data.

It should be emphasised that there are considerable uncertainties relating to the indicative economic values and payments provided. These relate to factors including the nature and extent of the ecosystem service provided in the North Pennines, and the values and payments which may be applicable or achievable there. The values and payments are included for indicative purposes only.

Due to these differing circumstances and hence ecosystem services provided, there are unfortunately no simple benchmark values of individual or bundled ecosystem services on a habitat basis (i.e. £/ha for different upland habitats)¹⁸. A rigorous assessment, involving the application of available meta-analysis functions (e.g. Brander or Ghermandi) to the North Pennines AONB lies beyond the scope of this report.

¹⁸ Pers.Comm. (7.11.13) Sophie Rolls, Economist, Natural England

Lastly, it is worth noting that this section also draws on the North Pennines AONB case study included in 'Economic Valuation of Uplands Ecosystem Services' produced in 2009¹⁹. This case study seeks to apply economic valuation techniques, in the form of a toolkit, to valuing the ecosystem service changes arising from the North Pennines AONB Management Plan. While interesting in terms of the issues explored, the authors were unable to put economic values on the changes due to lack of knowledge of the influence of management plan actions on the wide range of ecosystem goods and services provided in the area.

5.3. Food and fibre provision

Farming is the main land use in the North Pennines AONB and farmland and farm management make a significant economic contribution to the area (see Section 3). The Defra June 2010 Survey shows that the North Pennines represent around 1.3% of England's agricultural land. Beef and lamb, in the form of progeny for rearing on and finishing, are the most significant food commodities. The North Pennines represents accounts for 1.7% of England's beef herd and 3.4% of England's breeding flock. Fibre production takes place in the form of hay/silage and wool. Importantly, much of the farming practiced in the AONB can be considered as High Nature Value farming, based on low intensity, working with natural processes, and supporting wider biodiversity.

There is arguably limited potential to improve food production, thereby contributing to food security, as increased livestock numbers could adversely affect soil erosion, water quality, water storage, carbon sequestration and biodiversity.

An indication of the economic value of food and fibre provision based on agricultural outputs is set out in Section 3.10.

5.4. Timber and wood fuel provision

Broadleaved and coniferous woodlands on farms in the North Pennines AONB tend to be small, fragmented and not easily accessible. Semi-natural broadleaved woodland is largely restricted to river banks and steep slopes of valleys and gills. These woodlands are vulnerable, therefore, to poor or lack of management. Woodlands are often grazed through by livestock which prevents natural regeneration and suppresses ground flora.

There is some potential to bring farm woodlands into management to increase local, small-scale production of wood fuel and benefit biodiversity.

The economic value of timber and wood fuel provision is likely to be low given the limited area and productivity of farm woodland.

5.5. Water supply

The North Pennines AONB is a large watershed area, with high rainfall draining into the catchments of several major rivers including the Tees, Wear, East and West Allen, South Tyne and Eden. High rainfall and impervious rock has led to the construction of reservoirs to provide drinking water for the region, as well as for industrial uses downstream in Tyneside, Wearside, Teesside and Carlisle. These reservoirs include Derwent, Waskerley, Cow Green, Selset, Grassholme, Balderhead, Blackton

¹⁹ Eftec (2009) Economic Valuation of Upland Ecosystem Services. Natural England Commissioned Report NECR029

and Hury. The more modern of these reservoirs are used to regulate flows to facilitate major abstractions downstream.

Water infiltration and storage is supported by large expanses of blanket bog and upland heath (c. 100,000 ha, see 4.1 above), together with other areas of semi-natural habitats including grasslands and woodland. These semi-natural habitats together with land management practices associated with low-intensity farming assist reducing surface runoff, thereby both diminishing the size of flood peaks and ensuring that baseflow is maintained in times of drought.

The Environment Agency's assessment²⁰ shows that surface water resources have 'water available' status over most of the area. Exceptions include the River Gelt whose headwaters rise near the north-west boundary of the area and have 'no water available'. This lack of water is impacting on the international wildlife importance of the River Eden downstream.

There is potential to improve the infiltration and storage of water by extending wetland and woodland habitats within floodplains, and by increasing flood storage areas within the valleys. Moorland management that achieves good vegetative cover, including mosses and cotton grasses, and encourages active peat formation would also improve water infiltration rates and holding capacity, whilst also improving carbon capture. Blocking grips can improve the condition of the peat and encourage active peat formation. These would help mitigate the effects of climate change which is expected to result in more unpredictable rainfall and drier summers.

Indicative economic values for water supply based on calculations for other areas^{21,22} are in the range £1,000-1,500 per hectare per year. Further work would be required to assess the values specifically applicable to the AONB.

5.6. Water quality

Water quality in the North Pennines AONB is predominantly good due to the high coverage of semi-natural habitats, extensive farming systems and low population, although there are some issues of diffuse and point source pollution, and water discolouration. The ecological status of river waters is generally good or moderate. The chemical status of groundwater is poor, although there are no major aquifers²³.

High rainfall and steep gradients to watercourses result in rapid run-off, which increases the erosion of the channels and thus the sediment load. This has effects on both the water quality and ecological value of rivers downstream, especially after heavy rainfall. The presence of moorland grips can speed up the rate of run-off and thus exacerbate the scouring of watercourses. Climate change is likely to result in more frequent and heavier storm events, contributing to this problem.

Bare and degraded peat, in some instances exacerbated by the construction of tracks, is particularly vulnerable to erosion, and as well as contributing to sediment load, this causes water discolouration issues. There is approximately 2,900 ha of peat which is bare or eroding, spread across over 4,000 sites in the AONB. This equates to approximately 3.2% of the total area of blanket bog on the AONB.

²⁰ Environment Agency Catchment Abstraction Management Strategies (CAMS) / Abstraction Licensing Strategies for Tees, Wear and Tyne

²¹ Brander, L. et al (2012) The economic value of ecosystem services from the terrestrial habitats of the Isle of Man. Report for DEFA, Isle of Man.

²² Brander, L.M., et al (forthcoming). Economic valuation of regulating services provided by wetlands in agricultural landscapes.: a meta-analysis. Ecological Engineering.

²³ Environment Agency (2009) River Basin Management Plan. Northumbria River Basin District. Annex A Current State of Waters

On in-bye land, water quality can be affected by diffuse pollution from applications of manure, artificial fertilisers and other chemicals. Soil erosion leading to sedimentation of water courses can occur through over-grazing, or allowing livestock to poach or erode river banks.

Climate change is expected to result in drier summers and reduced river flows, thereby also affecting water quality, especially on the River Gelt.

Point source pollution from mining spoil and polluted gravels remains an issue in some catchments. However these gravels often support important Calaminarian grasslands, which need to be managed to maintain their specialised communities whilst reducing the potential for erosion and sediment run-off.

There is potential to improve water quality and help mitigate the effects of climate change. Managing moorlands so that a good vegetative cover is maintained will aid infiltration and reduce the rate of run-off and sedimentation. Maintenance of permanent grassland, or introducing scrub or woodland along watercourses, can aid infiltration and reduce soil erosion, especially on steep slopes.

An indicative economic value for water quality based on calculations for other areas is in the order of £2,500 per hectare per year. Further work would be required to assess the values specifically applicable to the AONB.

Additional evidence is available relating to potential payments payable to farmers and landowners. 'Developing place-based approaches for Payments for Ecosystem Services' (PES)²⁴ suggests some figures for improvements in water quality in the South Pennine, see Table 10.

Payments based on improvements in water quality derived from changes to peatland management have historically been modest, however the Sustainable Catchment Management Project (SCaMP) sought to combine initial capital payments from United Utilities with ongoing agri-environment scheme payments from the Government.

In SCaMP 1, combined funds of £10.5m were made available to improve 20,000ha of land. This equates to £525 per hectare for initial capital costs and ongoing support through agri-environment schemes. Spread over 10 years (the typical length of an HLS agreement), this equates to £52.50 per hectare per year.

In SCaMP 2, 30,000 hectares of land is being improved at a cost of £11.3 million. This equates to £376 per hectare for initial capital costs and ongoing support through agri-environment schemes. Spread over 10 years, this equates to £37.60 per hectare per year.

An indication of the balance between capital and ongoing support can be obtained from SCaMP 1. In this first phase, United Utilities paid £8m for capital improvement works (grip blocking, restoring moorland, livestock fencing etc.) and the Government paid £2.5m through agri-environment support; mainly through HLS payments so the ratio of capital:revenue support was approximately 75%:25%.

Table 10. Indicative payments for improvements in water quality - South Pennines

²⁴ Quick, T., Reed, M., Smyth, M., Birnie, R., Bain, C., Rowcroft, P and White, A (2013) Developing place-based approaches for Payments for Ecosystem Services, URS London. Report for Defra and Natural England

The direct applicability of this level of investment and payments (in the range £38-50 per hectare per year) to the North Pennines is open to debate given the generally good quality of water coming off the moorlands in the area (in contrast to the poorer water quality coming off the moorlands in the South Pennines). In addition, utility companies would need to demonstrate to Ofwat that incentivising land management changes is a cost-effective way of reducing treatment costs (in comparison to reasonable alternatives) and will not lead to unnecessary increases in costs for customers.

5.7. Flood control

There are three major rivers rising in the North Pennines – the Tyne, the Wear and the Tees. There are also several short becks that drain the west-facing slopes and flow into the river Eden. The headwaters of these major rivers are fed by high rainfall and drain extensive moorlands. The greatest flood risk is downstream of this area, affecting settlements over a wide area of northern England from Carlisle, round to Middlesbrough.

With high rainfall and steep river gradients, runoff can be rapid, with the watercourses reacting quickly. This could be exacerbated by an increase in frequency and scale of storm events arising from climate change.

There is potential to improve the management of land in these upland areas to moderate the pattern of run-off, benefitting the urban and industrial areas downstream not only by reducing the magnitude of flood waters but increasing the dependability of supply during low water conditions. This is the preferred approach of the Environment Agency to river flood risk management. There may also be scope to improve and extend wetlands in valleys to function as washlands. By allowing rivers to follow more natural courses, and extending the areas of temporary flood storage in the valleys, the energy and quantity of river flows can be reduced, thus also reducing erosion and improving ecological quality downstream.

An indicative economic value for flood control based on calculations for other areas is in order of £5,000 per hectare per year. Further work would be required to assess the values specifically applicable to the AONB.

5.8. Carbon storage and sequestration

The soils over some 62% of the area have a high carbon content (20–50%), in particular those underlying blanket bog (64,685 ha), upland heath (34,345 ha), and areas of unimproved grassland. Carbon storage is also provided by woodland (5,128 ha) and the underlying humus-rich soils.

Significant volumes of carbon are stored within the extensive peat and peaty soils in this area, an estimated 41.7 million tonnes²⁵. In some instances poor management such as high grazing levels or inappropriate burning regimes and wildfires, have affected these soils. Blanket bogs sequester carbon where there is a good active sphagnum moss layer, whilst damaged bogs release significant amounts of stored carbon. In the future, climate change may cause peat soils to dry out and be vulnerable to oxidation, resulting in further loss of carbon.

Carbon sequestration and storage could be enhanced by more sympathetic moorland management, the restoration of areas of bare and eroded peat, and the encouragement of active peat formation

²⁵ Natural England (2013). Estimated Peatland Carbon Storage and Greenhouse Gas Flux in English National Parks and Areas of Outstanding Natural Beauty. Draft report. Data set out in 'North Pennines habitat data summary'(2013).

through grip blocking. Existing woodlands need to be managed so that growth rates are enhanced and their carbon storage potential is improved. An increase in woodland cover would also be beneficial. Low input extensive livestock systems can contribute to sustaining carbon-rich soils, as well as reducing the use of artificial fertilisers. Areas of wetland, such as permanent wet pastures that are not ploughed and reseeded, could be expanded and appropriate management could be introduced to increase the carbon storage of soils in grassland areas.

Management of intact or moderately degraded bogs

It is estimated that around 36,000 tonnes of CO₂e (carbon dioxide equivalent) per year could be sequestered or safeguarded if all 30,000 ha of blanket bog in the South Pennines were managed to improve carbon storage and sequestration. Of this, 6,000 ha would require restoration of grips, hags and changes to burning; and 24,000 ha could be restored by reducing grazing.

Careful management of intact or moderately degraded bogs (on which grazing/burning had been reduced) could sequester an additional 1-2 tonnes CO₂e per ha per year:

At today's carbon prices of £5 per tonne CO₂e, this might be worth around £5-10 per hectare per year (more for some sites, and less for others, depending on the condition of the bog).

If carbon prices increased to £20 per tonne of CO₂e, this could lead to annual management payments to landowners of around £20-40 per hectare per year (lower for degraded bogs, higher for mossy bogs).

For more capital intensive restoration projects involving grip blocking or revegetation, costs and values are substantially higher.

Revegetating severely degraded peatland

Stopping peatlands from emitting greenhouse gases is even more valuable. It is estimated that if the 551 hectares of bare peat in the South Pennines were re-vegetated, this could save an estimated 17,000 tCO₂e per year in greenhouse gas emissions.

At a future carbon price of £20 per tCO₂e, revegetating severely degraded peatland (and restoring it to a moderately degraded state) could provide a carbon revenue of around £600 per hectare per year.

At present, transactions based on climate benefits are likely to be via Corporate Social Responsibility funding, and are therefore based on paying the full costs of restoration (including ongoing maintenance and other associated costs). Because re-vegetating bare peat can be expensive; restoration might be best achieved by forward selling the carbon (via carbon credits and a Peatland Carbon Code), under a 30 year agreement, which with a 25% buffer and an assumption that the eroding area would double in size during the next 30 years if no action was taken, might raise a lump sum of around £10,000 per hectare available to spend as capital towards planting new peat-forming vegetation on the bare peat (a useful contribution towards total costs). Because bare peat emits so much greenhouse gas, revegetation should be considered a priority.

Table 11. Indicative payments for carbon storage and sequestration - South Pennines

The total economic value of carbon in the North Pennines AONB can be estimated by converting 41.7 million tonnes of carbon into 153 million tonnes of CO₂²⁶, and then multiplying this by current day carbon prices of £5 per tonne CO₂e (carbon dioxide equivalent). This equates to £765 million worth of carbon. It should be stated however that this is the estimated value of the total stock, not the value achievable under any potential PES scheme which would be based on additional carbon sequestered.

Indicative payments for carbon storage and sequestration in the South Pennines have been suggested in 'Developing place-based approaches for Payments for Ecosystem Services', see Table 11.

These figures provide indicators of the financial 'value' of managing peatland carbon and show that 'carbon farming' could soon make economic sense on peatlands. These figures could be applied to the North Pennines, subject to caveats concerning total areas, total CO₂e tonnages, restoration required, carbon prices etc.

5.9. Soil protection

The North Pennines has three main soil types: blanket bog peat soils (34%); slowly permeable wet very acid upland soils with a peaty surface (25%); and slowly permeable seasonally wet acid loamy and clayey soils (25%). There are a number of other, less prevalent soil types.

A significant proportion of the soils is peaty and prone to wind and water erosion, and loss of organic matter. These soils include: blanket bog peat which is at risk of gully/hagging; slowly permeable wet very acid upland soils with a peaty surface; very acid loamy upland soils with a wet peaty surface, which are often found on steep slopes, and thus subject to a combination of rapid runoff and easily damaged peat layers; and freely draining very acid loamy soils and freely draining slightly acid loamy soils especially where they occur on steep slopes. Soil erosion and loss of organic matter could be exacerbated by more frequent storm events occurring as a consequence of climate change. These soils are also at risk through unsustainable management practices.

The slowly permeable seasonally wet acid loamy and clayey soils can be easily damaged when wet and may suffer compaction and/ or capping.

Measures should be encouraged to protect soil quality and reduce the risk of erosion. These include ensuring that these soils retain water in situ, have good permanent vegetative cover and are not overgrazed, overburned or subject to trampling, poaching or damage by mechanised activities, especially on steeper slopes. The risk of erosion of soils on steep slopes can be addressed by ensuring permanent grassland, woodland or other semi-natural habitats are created and maintained on steep slopes. Drainage of peaty soils, which can result in increased oxidation of carbon and soil loss, and compaction, which can result in poor water infiltration and increased surface water run-off, should be avoided.

Indicative economic values for soil protection are not available.

²⁶ Derived from Natural England (2010) England's peatlands. NE257. English peatlands contain around 584 million tonnes of carbon. If this all to be lost to the atmosphere, it would be equivalent to 2.14 billion tonnes of CO₂ i.e. a ratio of 1: 3.66.

5.10. Pollination

Upland blanket bogs, the open moorland and mosaics of heather, cotton-grass, bilberry, bracken, acid and calcareous grassland cover 47% of the area. Species-rich grasslands are also important resources, while many of the road verges are rich in flowering species.

The extensive areas of semi-natural habitats support large numbers of insects and provide nectar sources for pollinators. Species-rich grasslands also contribute by providing important refuges for many pollinating invertebrates that are in decline.

There is potential to expand the areas of species-rich grassland and managing hay meadows to protect or enhance their species diversity, using techniques such as spreading green hay and careful grazing and cutting regimes.

Indicative economic values for pollination are not available.



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Figure 22. Upper Weardale delivers a wide range of ecosystem services, from landscape to water quality

5.11. Recreation

61% of the area is accessible to the public (130,979 ha) along with an extensive network of rights of way totalling 2,182 km at a density of 1 km per km². In addition, 52 km of the Pennine Bridleway and 129 km of the Pennine Way run roughly north / south across the area, while nearly 2 km of the

Hadrian's Wall Path cuts across the north. Also the popular C2C cycle route cuts across the area. The large Public Forest Estate also provides a range of recreational facilities, including walking, cycling, mountain biking, riding, star gazing and bird watching. Grassholme Reservoir provides sailing facilities, while the many watercourses provide angling and in some places canoeing.

The North Pennines are well known for recreation that depends upon the natural environment, including walking, birdwatching, cycling, riding, canoeing, fishing, orienteering, geotourism, wildlife watching, star gazing and heritage tourism. In most instances these activities can be carried out whilst respecting the natural assets of the area, but any increase in levels of use would need to be managed to avoid adverse impacts on the natural assets of the area including tranquillity and biodiversity. Forests in particular can cope with large numbers of people with minimal impact and can provide good opportunities for activities such as mountain biking.

Grouse and pheasant shooting demands special mention as this is a key influence on land management and important economically in terms of income and employment. The moorland is important for red grouse, and special management in the form of burning and cutting is undertaken, alongside grazing, to support grouse populations for shooting. In future, climate change resulting in warmer wetter winters might impact on the survival of red grouse, thus impacting on grouse shooting.

An indicative economic value for outdoor recreation in the uplands, based on the recreation value function developed for the UK NEA²⁷, is £17.25 per visit. Visitor numbers are required to estimate a total economic value. Even with this data, the estimates are highly uncertain, due to underlying uncertainties about the values per trip (which will vary widely for the wide range of recreation types).

5.12. Biodiversity

The North Pennines is of particularly high value for biodiversity, reflected in the large proportion of the area that is protected through national, European and international nature conservation designations (see Section 4). Key habitats include blanket bog, mountain heath, wet heath, dry heath, arctic / alpine flora, calcareous grasslands, upland hay meadows, juniper scrub, upland ash and oak woodland. The area is also important for rare and iconic birds including black grouse, curlew, ring ouzel, lapwing, golden plover, merlin and peregrine, and other species including otter, dipper and water vole. With the high proportion of open access land, all these habitats and species can be seen and enjoyed by the public.

There is potential to improving the ecological condition of habitats and increasing the coverage of semi-natural habitats. This would not only contribute to biodiversity but also other ecosystem services such as water quality and soil protection.

Putting a value on biodiversity in the North Pennines AONB is difficult. Biodiversity underpins many of the ecosystem services outlined above and is included to an extent in the value of services such as food and fibre provision, pollination and recreation. There is therefore the risk of double counting by valuing biodiversity separately.

²⁷ Sen A., Harwood A. R., Bateman I.J., Munday P., Crowe A., Brander L., Raychaudhuri, J., Lovett, A., and Foden J., (forthcoming) Economic Assessment of the Recreational Value of Ecosystems in Great Britain. The Economics of the UK National Ecosystem Assessment, Special Issue of Environmental and Resource Economics.

Biodiversity values include: direct and indirect use values (walking across the hills and appreciating the natural environment and wildlife is an example of a direct use, whereas carbon storage and sequestration is an example of an indirect use (people are not aware that they are benefiting in this way)); and non-use values (for example, the value for future generations (bequest value), the value of knowing that certain species and natural spaces exist and the value of future, as yet known, benefits (option value)).

It is also important to highlight the benefit of biodiversity conservation for local economies. This includes expenditure and employment by conservation organisations as well as the economic benefits arising from visitors who come to enjoy the wildlife and the scenery, generating custom for local businesses (tourism, food, retail, recreational enterprises). A number of economic studies have shown the strong correlation between a high quality landscape and environment and a positive impact on business performance²⁸.

Overall, taking into account the above, the values associated with biodiversity in the North Pennines AONB are likely to be significant.

One potential mechanism for directly translating improvements in biodiversity into payments for farmers and landowners is biodiversity offsets or credits. This is an approach where developers or local authorities pay for biodiversity improvements in order to offset biodiversity losses elsewhere; such improvements include restoring degraded habitat and creating new habitat. Corporations may also buy biodiversity/conservation credits as part of their Corporate Social Responsibility (CSR) activities. 'Developing place-based approaches for Payments for Ecosystem Services'²⁴ explored the potential value of biodiversity offsets and suggested a figure for improvements in biodiversity in the South Pennines, see Table 12:

In contrast to funding based on the value of climate regulation or water quality benefits, biodiversity credits may, theoretically, offer greater financial rewards.

It is estimated that voluntary biodiversity offsets could generate around £25,000 per hectare over 100 years. This would equate to £250 per hectare per year. Philanthropic funding has generated funding for biodiversity projects, and Corporate Social Responsibility also has good potential. However demand to date has been slow.

It is uncertain what the actual demand for blanket bog and other upland habitat biodiversity credits might be. Given the relatively low development pressure on this habitat type (with the possible exception of wind farms) demand from developers can be expected to be weak. Demand from corporations, who are interested in purchasing biodiversity credits, is unproven. As such it is considered that biodiversity, on its own, is unlikely to generate significant revenue at present. However, this may change as biodiversity credits and off-setting mature.

Table 12. Indicative payments for biodiversity - South Pennines

Similar concerns could be applied to the availability of PES payments for biodiversity improvements based on biodiversity offsets or credits in the North Pennines.

²⁸ Cumulus Consultants (2013) Valuing England's National Parks. Report for National Parks England.

6. Farmer survey

A central element in the project was to *'interview a sample of farmers from the three sub-areas to ascertain their views, needs and aspirations in relation to their farming operation and the future sustainability of this in economic, ecological and practical terms'*.

6.1. The sample

The contractors were supplied by the AONB with extracts from the Rural Land Register (RLR) containing the names, addresses, contact details, holding numbers, holding area and number of parcels on the holding for all holdings in the upper parts of Teesdale (north and west of High Force/Ettersgill Beck); Weardale (west of Swinhopeburn and the Rookhope Burn) and South Tynedale (south of Garrigill).

The spreadsheet contained 68 entries; a summary of these 68 holdings is given in Table 13. Telephone contact details were available for 61 of these and 1 contact was known to have died since the list was prepared. The remaining 60 were ranked in size order with the intention of sampling every other entry to give a total dataset of 30 holdings.

As the work progressed, refusals or information on circumstances (non-farmer/death/retirement/merger of holdings, etc.) which precluded the inclusion of certain holdings in the sample were encountered. In such cases, the next entry in the spreadsheet was taken.

Eventually a reduced sample of 25 questionnaires was taken with the agreement of the AONB (Table 13). This represented 44% of all holdings in the study area. 15 interviewees were in Weardale; 1 in Tynedale and the remaining 9 in Teesdale.

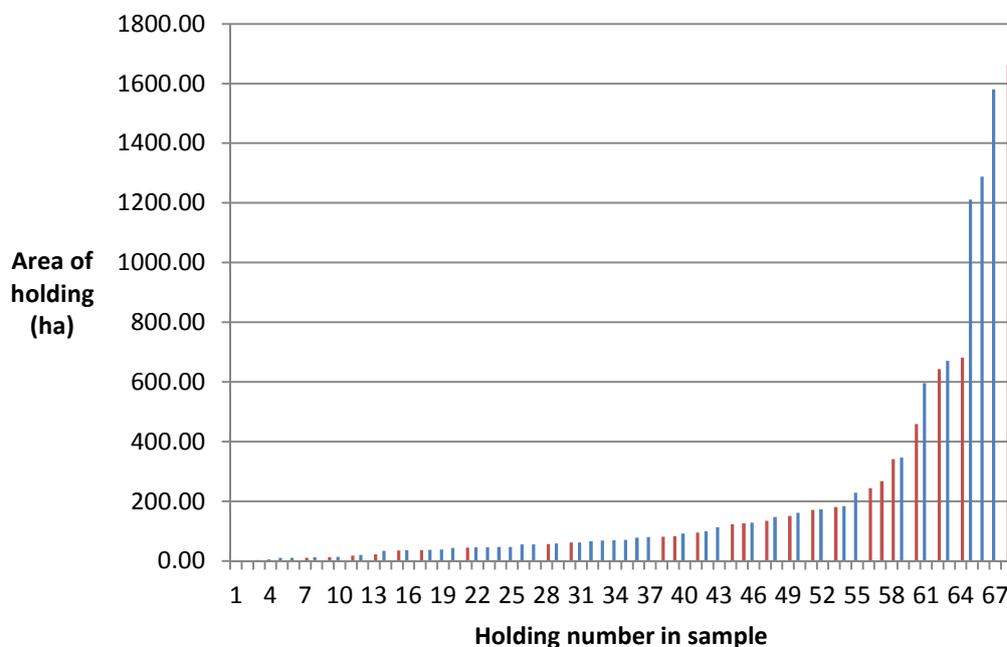


Figure 23. Sampled farms (red) and other farms (blue), by holding area

	No. of holdings
Interviewed	25
Refusals	7
Agreeable but not available	3
Contacted, but owner is absentee	2
Others	19
<i>Total real sample</i>	<i>56</i>
Visited but not farming in area	2
Died/retired/amalgamated	8
'Wrong number'	2
<i>Dud entries</i>	<i>12</i>
Total	68

Table 13. Breakdown of the RLR spreadsheet entries provided

21 holdings (plus 2 not possible to include) were visited by Gwyn Jones in the week commencing 9th of September, 2013 and the remaining 4 were visited by Jonathan Brunyee on 23rd of September, 2013. 2 of the 'official' farmers were women – we use 'he/him' here throughout to maintain anonymity.

6.2. The questionnaire

The questionnaire used (Annex) had a combination of quantitative and qualitative questions. An amendment was included after the first day of interviews to gather information explicitly on any land held outwith the study area.

Where issues arose in practice with any of the questions, these are highlighted in the discussion below.

6.3. The farms and their farmers

6.3.1. Holdings and tenure

Farm size and tenure

While the farms are given in order of holding size in the RLR, Figure 24 shows the actual area of land used by each business interviewed and gives quite a different picture, reflecting land coming into the business (through a partner, by acquisition, etc.) or lost from the business (lost tenancy, downsizing as retirement approaches or through illness, etc.).

The mean area which a holding farms within the upper dales is 197 ha (this compares to 188 ha for the North East region as a whole – see Section 3 above). One business dominates the graph; half the holdings are smaller than the median farm size of 119 ha.

Secure tenure within the study area

13 of the holdings were predominantly owner-occupied, with another 2 split more or less equally between owner-occupancy and secure tenancy. 2 holdings were predominantly rented in some way from close relatives and/or the relatives of partners. The remaining 8 holdings were wholly held on rent, all in Teesdale (where only 1 of the sample was predominantly owner-occupied).

Impact of landlords

There were few complaints about the impacts of the landlord on the farm when it came to the inbye land (for common land, see below). Some who were new entrants found the estate very obliging and supportive as regards HLS negotiations, business direction and investment in new buildings – ‘*I wanted this farm as it is a good size, the landlord is willing to work with us, and the HLS underpins what we want to do. It was a great opportunity for us to farm in balance with the environment*’, said farmer 47.

The love of Lord Barnard for upper Teesdale was noted by many, with a contrast being drawn, implicitly at least, with the attitudes of his agents - in the context of passing on tenancies, farmer 33 went as far as to suggest that the eventual death of the landowner would itself be a major threat to farming in the area.

Being a tenant farmer could be an impediment to engaging in on-farm diversification and indeed, few farmers in the sample availed themselves of on-farm diversification opportunities. However, we found no difference between tenanted and owner-occupied holdings - of the 3 farmers who had diversified, 2 were actually on tenanted farms, and one had been assisted to do so in the short term by the landlord, suggesting that the problem is one of lack of perceived opportunity, rather than tenorial.

One effect which is quite serious however, as pointed out by farmer 36, is that on tenanted, everything has to pay for itself within the tenant’s farming lifetime. It was far from clear whether this made tenants more or less likely to invest in capital-intensive systems, but again the lack of independent advice to analyse the cost-benefits seemed a clear handicap.

Insecure tenure within the study area

The largest holding in the sample is also notable for the large proportion of its land which is rented. A substantial proportion of that land used to be farmed by what was the largest holding on the RLR extract. It is one of 10 holdings (40%) which have some rented land within the study area which is neither held on a secure tenancy nor held informally from a close relative. At least 1791 ha are rented, compared to a ‘securely-held’ area (excluding common land) of 3128 ha.

In most cases the areas rented are small – additional hay ground is not uncommon. While the average area rented by those holdings which have such land is 179 ha, the median is only 20 ha, reflecting the huge area (1417 ha) rented by one holding. We did not collect more detailed information on the nature of the short-term tenures.

CAP payments on insecurely-held land

Of the 10 interviewees with insecurely-held land, at least half had arrangements with landlords who were themselves in Stewardship and who are passing on the agri-environment constraints, but not the payments, to their tenants. Some of the tenants in fact only suspected HLS participation.

At least 2 tenants thought or knew that their landlord was also claiming SPS on the rented area, and both were nevertheless being asked to pay rent, as, apparently, were the 3 others where SPS claims were not discussed during the interviews. By way of contrast, farmer 54 was one of those landlords who rented land out while continuing to claim the payments.

Farmer 54 defended the ability of ‘inactive’ farmers to claim payments, disagreeing that such a phrase would describe him and stressing the responsibility which he felt and took very seriously. Indeed, farm 54 illustrates the difficulty of sole applicant agri-environment (see also common land, next section) – he is very active in organising AE-funded walling on his holding, something which does *not* involve effort on the part of his tenant.

However, given the economies of upland farming (see 3.9 above and 6.6 below), the ability of inactive farmers to be paid for the income foregone and additional costs of agri-environment commitments or the costs of maintaining land in GAEC – burdens which are in fact borne largely or wholly by their tenants – is a cause for some concern and casts current policy in a poor light.

It was not clear whether the insecure tenants were analysing the cost benefits of renting land under these circumstances – farmer 52 felt it was worth it for the crop they cut and that they couldn’t manage without it. However, farmer 37 admitted never to have considered the economics of the transaction.

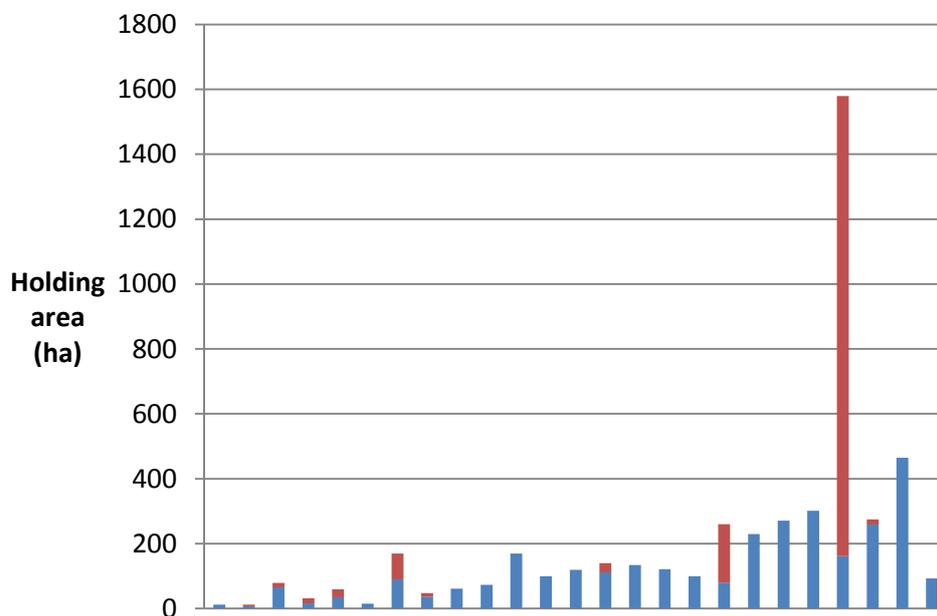


Figure 24. Land held on secure or within-family (blue) and insecure non-family tenure (red) by the farming business within the upper dales

Common land and stinted pastures

At least 14 of the interviewees had rights of pasture on registered common land or stinted pasture, 12 of whom were actively using them, with the others having rented out theirs in one case and having volunteered not to use any as part of an agri-environment agreement in the other. 6 of the rightsholders were in Weardale (40% of Weardale interviewees) and 8 were in Teesdale (89% of Teesdale farmers). At least 2310 ewes are depastured on commons by the interviewed farmers.

Accessing RDP schemes is more complex on such land. Farmer 31 reported that they couldn’t get Upland Transitional Payments due to the objections of one inactive stinthead, who wished to rent out his stints. Farmer 33 related how the AE agreement involved payments to all rightsholders, but only a small proportion (including the interviewee himself) was agreeable to actually reducing their own ewe numbers. On the other hand, farmer 23, a new entrant, explained how he had chosen not

to reduce his recently-purchased flock and had managed to secure agreement of his fellow-commoners to this effect.

In total, at least 6 (possibly more) interviewees (a minimum of 42% of those with rights on commons or stinted pastures) were benefitting from AE payments. In at least 4 of those cases the applicant was the estate – farmer 33 said that at the time they were unaware that any other possibility existed. In the case of farmer 41, the applicant was a graziers’ association, but the impression given was that this was a man of straw, with all the impetus coming from the estate, whose influence was perceived as dominant - they ‘*wrote the agreement*’. The resulting blocked grips were not only seen as a problem on the fell, but on the good inbye land below, where the diverted water was allowed to discharge. The balance between landlord and rightsholders would seem to be quite different here from that in many other upland areas in England, from Dartmoor to the Lake District. Graziers seem to have few sources of independent advice, while the landlord is well-organised and proactive.

Other land

Given the anecdotal evidence that land occupied outwith the study area is an important element in the farming businesses of holdings in the upper dales, we were asked to gather data on this question (Figure 25). In fact, only 5 holdings (20%) reported such land – a total of 467 ha; once more this dataset is dominated by the largest holding in the overall sample, which has 400 ha. The average ‘non-dale’ holding is 93.4 ha, but the median such holding is just 40 ha.

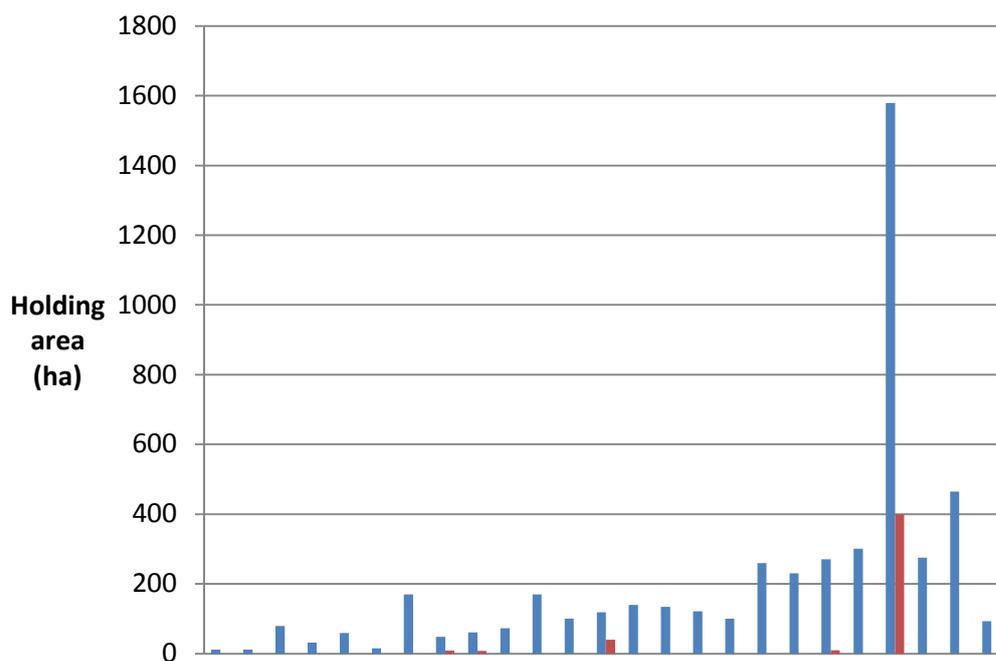


Figure 25. Total area used by the farming business, within (blue) and outwith (red) the study area

6.3.2. The farmers

11 (42%) of the 26 farmers (one business is run as a partnership) were in the dominant 50-60 age group (Figure 26). Only 3 farmers were under 40, while 5 were over retirement age, with at least one in his 80s.

This is perhaps reflected in the length of time for which they had been farming in their own right – an average of 25 years, with half of farmers having farmed for that same amount of time.

Assuming that a farming generation is around 40 years, 8 farmers were at least 3rd generation; 7 of these knew that the farm had been in the family for over a century. 4 farmers were second generation. More surprisingly perhaps, 13 of the 25 farmers had started farming from scratch or at least in a farm which had not been either in their family or that of their partner.

This apparent easy access to farming 20-50 years ago seems to contrast markedly with the difficulties of accessing farmland nowadays. While this was not addressed explicitly by many interviewees, it was implicit in many of their comments. Farmer 11 would be keen to do more, allowing him to work longer on the farm himself and offering opportunities in time for his young sons, but what land became available was going to people with very deep pockets. Similarly farmer 23 would like more land to enable him *'to be as full-time in terms of income as he is in terms of hours worked'*!

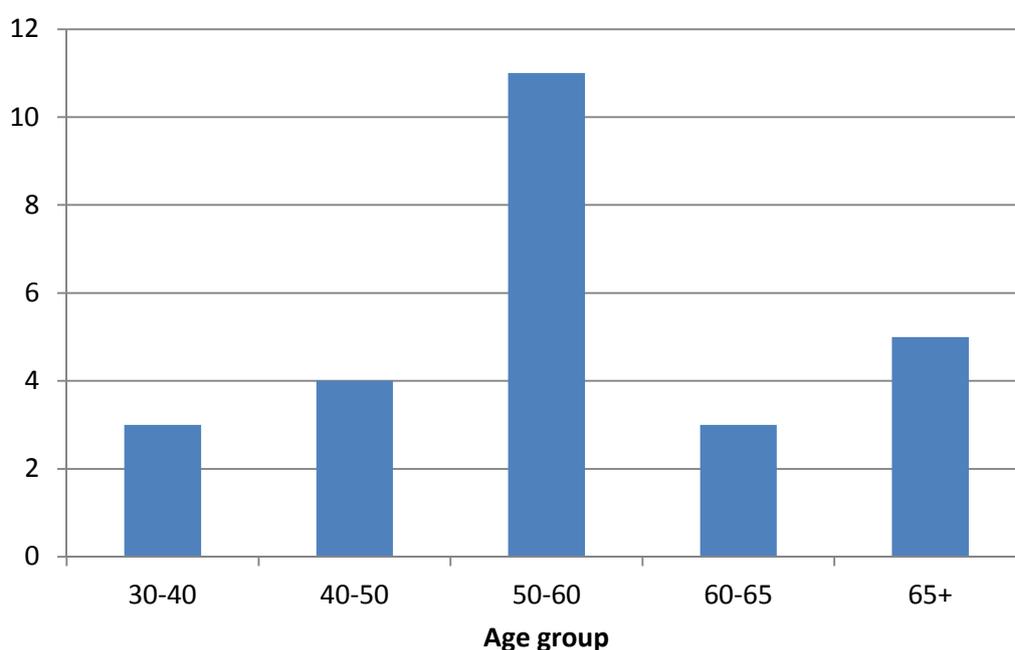


Figure 26. Age of the farmer

One limiting factor would seem to be the availability of easy income for the inactive farmer from SPS and/or AE payments (see above) – the expanding farmer or new entrant having to incur the costs and getting none of the financial benefits. Rents were said to be starting to reflect the opportunities of ‘slipper farming’, with £60/ac (£150/ha) widely quoted. In fact farmer 11 thought that the estates themselves were starting to become slipper farmers. We return to this issue in 6.7.2 below.

Another factor cited was the move by some grouse moor owners to managing their fells without any sheep. According to farmer 50, this was driven by impatience for an increased bag *now* on the one hand and by a certain trendiness to follow the example of some estates in Swaledale (and where shooting days were now being limited due to poor grouse numbers, according to the same farmer).

The 25 businesses we interviewed supported a total of 36.25 full-time equivalents, of which 30 were actual full-time farmers. 12 farmers (including some who consider themselves full-time) had off-farm employment, as well as 8 farmer’s partners. Some of the employment was farm or farming related – plant hire or working on other farms, for example. It would seem likely that off-farm income is subsidising some of the farming businesses visited.

3 farms were formally employing farm staff (while another was in effect giving full-time work to a freelance waller) – in one case this was purely a matter necessity due to the size of the farm enterprise, but on both the other farms there was an element of wishing/having to maintain the scale of the business in order to be able to keep employing the help.

Almost all farms used contractors for at least one operation – mowing, baling, scanning, shearing and walling being typical examples.

Of the 5 farmers over the age of 60, only one had a definite line of succession where a son or daughter would take over as an active farmer; this was the farmer planning to retire fully. A second farmer was turning semi-active, mostly claiming payments, while a third was already in this class.

6.4. The farmland

6.4.1. Introduction to the land use data

The questionnaire was intended to gather information on the area of various land types (unimproved grassland; semi-improved grassland etc.) and separately to gather data on management and condition. This proved difficult to carry out in practice: such ecologically-focused concepts have little meaning to farmers, while the contractor would not have been able to verify the information gathered or provide alternative independent data.

The approach taken, which it is hoped produces a dataset which is at least internally fairly consistent, was to ask the farmer first about his meadows and the fertiliser regimes followed, then to ask about any land he considered rough grazing ('such as allotments') and then ask about any fertiliser, lime etc. applied to the pastures, which were calculated by subtraction of the meadows and rough grazings from the total farmed area. The breakdown of sole use land in the sampled farms is shown in Figure 27.

Arable land and woodland were minor land uses and will not be mentioned further. In the following sections, we will treat each of the major land uses (meadow, pasture, rough grazing including common land) separately, looking at their management and perceptions of their state and of trends in their quality.

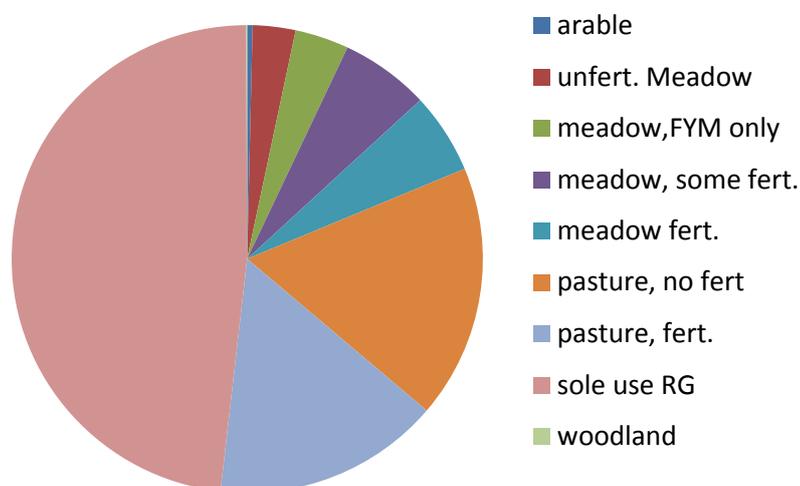


Figure 27. Land use (excl. common land/stinted pastures)

6.4.2. Overall agri-environment update

Since agri-environment (AE) participation is such an over-riding factor in land use and stocking decisions, it is appropriate to outline here the overall level of uptake. 20 of the 25 farms (80%) were in Higher Level Stewardship. 3 of the 5 remaining farms (all in Weardale) were small and not very intensive, while the remaining non-participants were relatively intensive.

While none of the non-participants had inbye SSSI land, at least one had been in the ESA previously in his own right (and was reducing his activity due to age), another had felt very limited by ESA rules on rented land (without getting the payments) and another had reduced activity due to ill-health and had put all the land in Entry Level Stewardship (this same farmer had the impression that he would not have been accepted into HLS, but had not been advised directly of this).

6.4.3. Meadows

Meadows account for about 1/6 of the total farmed area in sole occupancy. 19 of the interviewees had at least some meadows in HLS options and of the 6 interviewed who are not in HLS, one has hay meadows receiving no fertiliser, one uses manure only, one uses manure and less fertiliser than the HLS maximum; 2 are intensive. In the discussion below, we consider the comments of all non-intensive 23 farms together.

Fields receiving limited fertilisation account for around 2/3 of the total meadow area on the sample farms; about half receives up to 1 cwt/ac (50 kg/ac) of 20:10:10, with a quarter each getting organic manures only or receiving no fertiliser of any description.

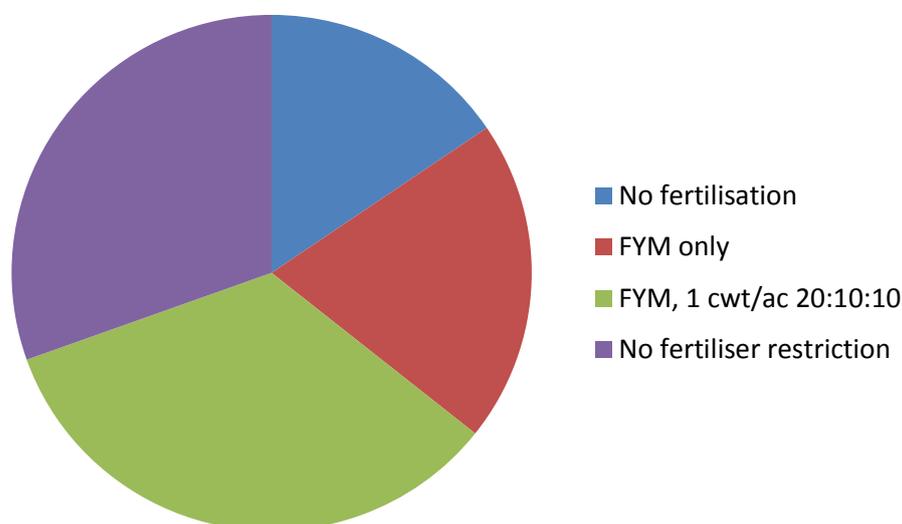


Figure 28. Fertilisation regimes on sample farms meadows

It must be a cause of some concern if half the farmers think that one of their key resources – the one which keeps their livestock alive over the winter – is in poor fettle. But this is the situation in this sample. 11 farmers think that on balance the current condition of their hay meadows is poor, while the same number is seemingly happy with their condition.

Sadly, the reality of AE is not even as moderately positive as this 50:50 split suggests. Some farmers content with their meadows are managing them as intensively as they wish (farms 9; 50 - 'they

couldn't be better!; 52). Others notice deterioration but are still happy enough with things as they stand (farms 5; 23; 30; 39; 41). In the case of farm 11, there seems to be a conscious incorporation of environmental values into the assessment – *'a mix of floristic quality makes for a good mix agriculturally'*.

Some farmers take a more sanguine attitude, at least accepting that some meadows are better than others or that some years are better than others (farms 11; 23 again; 44). Farmer 23's wettest field had been cuttable for the first time this year, giving him the best overall harvest he has had so far. Farm 22 also has some fields which can't be accessed by machinery every year and also has huge variation in production in particular fields – a change from 25 to 50 bales in one year.

Nevertheless, the overall picture of hayfield quality and of trends in that quality was almost universal across the non-intensive meadows:

- Increased wetness and associated increase in agriculturally and ecologically undesirable wet soil species (rushes, creeping buttercup). 9 farmers mentioned this issue.
- Increased wetness and associated increase in ecologically-acceptable wet soil species linked to reduction in yield or feed quality (marsh marigold, meadowsweet). This was cited as a problem by 4 farmers.
- Increase in agriculturally and ecologically undesirable species on dry meadows (soft brome). This was mentioned by farmer 37.
- Increase in (presumably) ecologically-acceptable species linked to reduction in yield or feed quality on dry meadows. Overall, 8 farmers mentioned this issue. Unlike the problems cited above, this was more likely to be expressed without reference to any particular species. Farmer 13 had an increase in creeping thistle. Farmer 11 mentioned the spread of hay rattle. An unusual problem was experienced by one farmer whose SSSI field had become dominated by an endemic lady's mantle, *Alchemilla acutiloba* – needless to say, the field was assessed as being in favourable conservation status. But the majority said things like, *'Most fields not too bad – thick, but no length now [and recent] production is down 50 bales from 200. But one field in strict HLS which gets nothing is down from 47 to 22 bales'* (farm 7); *'A lot more flowery, but sward is short and crop low'* (farm 11); *'All the meadows fogged up well, but these days it barely reaches your knees even when you cut it whereas before even the fog reached your knees. We rented some land which was in Tier 2 and it lost a lot of goodness'* (farm 30); *'Used to have half as much hay again as we needed, but now we don't get enough. You get one good crop in five years'* (farm 36); *'Used to be time to cut hay when it came to top of wall and we got 100 bales to the acre; now it only reaches half way up and we're lucky if we get 60'* (farm 41).

The limiting of fertiliser applications is one obvious reason for a reduction in production volume - this is after all the basis of the income foregone calculation for AE payments. Not only were the farmers who didn't limit their fertiliser regime uniformly happy with their production, but some of the interviewees described how they had tried to balance the loss in production with other considerations, e.g. *'We negotiated and had to put half the meadows into HLS in order to get walling grant'* (farm 31); farm 37 had a wet field which they could not dry out, but had they been able to, they would certainly not have put it into HLS; *'Getting more restrictions was an option for higher payment, but we chose not to do that'* (farm 39); *'We're not in HLS for our own fields because the payment wouldn't be enough to buy the extra hay'* (farm 52).

Some of these comments suggest that the AE payment calculation is somehow deficient (see also 6.7.1 below) – something stated bluntly by farmer 23 *'I can't see that putting a hundredweight of fertiliser on would do much harm and it would massively cut feed bill'*. Farmer 58 thinks *'We have lost the balance. A little fertiliser was traditional on meadows – we can't keep taking and not put something back', though of course this doesn't necessarily imply the use of 20:10:10!* An interesting comment was made by farmer 33 – he and his neighbour reckon that after around 10 years *'the grass learns to grow with/without fertiliser'*.



Rebecca Barrett

Figure 29. An example of a 'low sward and small crop'?

Deciding not to use artificial fertiliser is not the only way nutrient inputs have been reduced on some of the farms. The loss of cattle was widely credited with making a difference: farm 5 had limited manure supplies (essential for shifting nutrients onto the meadows, which are in essence extractive parts of the farm) due to being sheep-only; *'The fields were better when we had cows. We averaged 230 bales, but only 64 this year. There's no muck midden now that the cows gone'* (farm 13); farmer 17 also thought there was a link between falling production and not the loss of the cattle but the different stocking regimes in the past *'they used to hammer the fields in winter'*; farmer 3 also stressed the importance of hard grazing – fields easily get away to rush and a wet year both hinders the former and promotes the latter.

The lack of bulk noted above on farm 30 was said to be due to having *'No muck now since we stopped with cows. It started to go down when we gave up dairy cows because the sucklers had poorer muck'* (an interesting theme to which we will return in 6.5.3 below). The point about a change in stocking regimes was echoed by farmer 37, who thinks the old farmers had *'a better quality of muck'*, containing pig and hen manure, for example. A note of caution was struck by

farmer 41 – when the interviewer asked whether the loss in hayfield quality on his farm could be put down to getting rid of the cattle, he said that he noted the same changes on farms which still retained their cows.

Liming does not perhaps get the attention it deserves. Though many, like farmers 17 and 22, saw the need for lime, we came across comments like ‘I would like to lime but can’t afford to’. Farmer 13, on the other hand, uses pellet lime every year *‘because it’s cheaper than fertiliser!’* and farmer 11, who was obliged to lime by his AE contract found that *‘it made a big difference’*. However, farmer 37 looked at the results his neighbour got when he limed and was sceptical – he would rather use basic slag. Farmer 17 quotes the lack of clarity about the use of lime as a good example of the wider confusion within AE and didn’t understand why basic slag is not allowed any more.

There is broad agreement that fields are getting wetter at least in part due to climate – 3 farmers mentioned it specifically in the context of meadow quality. Another uncontrollable factor is the negligence of neighbours – one farmer had acceded to putting one meadow into HLS because the neighbouring drains were poorly maintained and spilling onto his field. The interviewees had a range of views on the extent to which farmers could stop the wetting process on their own fields. Farmer 7 was adamant that in his case at least, poor drain maintenance was not a contributory factor to wetting fields, while farmer 31 was sure that the old under-drains would need maintenance, given today’s heavy machinery. Farmer 23 would like to drain one of his SSSI wet hayfields, which he was only able to cut for the first time this year, but fears *‘they would not be keen on it’*.



Rebecca Barrett

Figure 30. The well-managed meadow should have both an ecological and an agricultural value

Not all of these factors are directly related to AE – even some of the farmers using low or zero artificial fertiliser applications are doing so independently of ESA or Stewardship. However, the overall picture is that most farmers are choosing to be constrained by AE contracts. We return below (6.7.1) to some of the wider issues relating to the AE process, but it is appropriate to outline here some specific reflections on hay meadows.

Some farmers commented on the differences between ESA and HLS. While on some fields, early cutting dates are impossible (farm 22), on most fields they are bound to be an issue, especially in good years (farmer 5 *'could have taken a crop in June sometimes'*), but farmer 41 commented that cutting was never as late as the 23rd of July. On the other hand, the more flexible approach taken by HLS compared to ESA is appreciated: *'The prescriptions seem very flexible – on one field we're only trying to cut once in 4 years'* (farm 22); *'Much better than ESA, with its fixed rotation'* (farmer 33); *'Fixed rotation was sometimes very irritating'* (farmer 44).

The rules on mechanical operations are seen as a major down side to HLS compared to ESA and are very irksome: *'We try our hardest and it really annoys me that I can't spread muck in frosty weather'* (farmer 17); it makes things *'much harder'* than the ESA (farmer 33). Farmer 33 feels the dates to be very difficult – has to finish by the end of March. He did get a concession for putting on fertiliser, but he knows that it was refused to his neighbour – *'they are very inconsistent'*. Farmer 39 said fixed dates for operations made him *'feel like a criminal'* when all he wanted to do was do things at the most appropriate times. Farmer 54 says *'banning muck spreading in certain months makes no sense – needs to be connected to the state of land, and it can be very good for things like waders'*.

While most concentrated on the impact of AE on agricultural production, some also reflected on the results from an environmental perspective. Farmer 17 lamented that *'they liked these damp meadows, and then they got meadowsweet, marsh marigold or rush and it is completely unproductive. The very thing they set out wanting, they ended up stopping us doing, which is managing the meadows as productive flower-rich fields.'* Farmer 36 noted the irony of a neighbour whose fertilised field was so good that 'they' (North Pennines AONB?) were using it as a seed source, but who was then told (by the AE officer? by the NE area officer?) that he is not allowed to fertilise. Farmer 17 cited *'meadows which people liked at start of ESA'* which are now *'not what we wanted'* for HLS, despite all the years of faithful obedience to the ESA prescriptions. Farmer 37, whose dry SSSI field had been taken over by soft brome while he was in ESA, was not allowed to enter it into HLS, so poor was it. He noted that *'This seems to be a common experience'*. We return later to what 'this' might be and its importance for the relationship between farmers and environmental administrators.

6.4.4. Inbye pastures

The inbye pastures category is perhaps the most diverse, and it is one where putting farmers' comments into the context of land cover ('habitat type') is most difficult for the consultant. This is especially the case because it was left to the farmer to define what land falls within its scope (see above), having been asked to separate out his 'rough grazings' during the interview.

Almost half of the pasture receives at least some fertiliser (Figure 31). In some cases, even AE participants were being allowed to fertilise, but not to lime on farm 37 at least. Farmer 41 notes that liming pastures was carried out in the 1950s and the trend away from liming pastures was a concern to farmer 13 who says that pastures don't respond as well to any fertiliser used without it.

A number of farmers reported a deterioration in pasture quality, either in the form of increased tussockiness/coarseness (2 farms), the spread of rushes (6 farms) or the spread of dockans and

thistles (1 farm; but another noted that thistles come and go and are not necessarily the sign of a wider or more permanent deterioration). The spread of rushes has been noted even on non-AE farms (e.g. farm 37).

Even some farmers who do not see a deterioration on their pastures are concerned about their ability to control rushes. The prohibition on rush control on both pastures and rough grazings in ESA was widely deprecated and a number of interviewees noted pointedly that they were now being *obliged* to control rushes on the same area. Farmer 41 would like to spray some rushes, given that there are some areas where access with a mower is not feasible. Weedwiping is allowed (though subject to the same difficulty of access), but the fact rush control had to be rotated is seen as unrealistic by farmer 48 (and unnecessary given that it is impossible to get everywhere anyway).

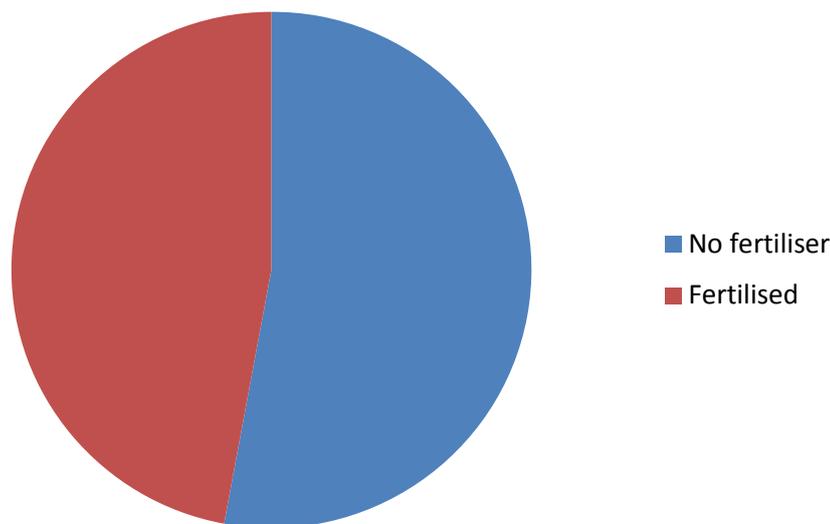


Figure 31. Fertilisation regimes on sample farm permanent pastures

Although, as farmer 31 said, if pastures *'are sweet, sheep will keep on top of them'*, the reality on many farms seems to be that sheep-only grazing is leading to pasture deterioration on the less palatable areas. *'Getting cattle back on the land has helped species diversity and grazing, but we still don't have enough stock to manage the land properly'* (farmer 47). Farmer 13 presented a virtuous circle where cattle grazing not only improved the pasture in itself, but gave a rationale to the beneficial use of lime on the same pastures. He had experience of both Galloways and continental cattle – the former were much happier to eat rushy pasture.

Farmers 30 and 36 had both seen deterioration on former dairy pastures. While the former had no cattle now, having disposed of them independently of AE (they admitted that they were if anything understocked), the latter still had suckler cows. However whereas in former times there were 80 cattle on that particular pasture – all the cattle were there during the shutoff period on the meadows – by now there are only 35 cattle and less sheep on this. While he admitted that the weather certainly hasn't helped, he could quote comparable 'control' fields which show a big difference.

Many of the species that farmers considered significant and whose numbers they had observe to change were linked to pastures. Some of the negative changes seemed to be weather-linked: grey partridge hit by the hard winter (farm 3); declines in the last spring in redshank, golden plover, lapwings and snipe put down to the wet weather (farmer 39).

In other cases, changes to land management practices were thought to be implicated: farmer 13 said that at the start of the 1970s he could walk down his field and disturb 6-8 nests by accident, but now he has to look for them. He puts it down to black headed gull and crow predation. The gulls have expanded a lot and nest on a local moorland lake – they were never controlled but didn't really exist in the area when he was young. The same farmer had noticed a decline in partridge numbers, which could possibly be due to buzzard. While blaming the weather for the recent decline, farmer 39 also thought that stopping muck spreading in some of the key months for these species could not be good for them.

One concerned farmer (48) believed that reduced cattle, bank erosion and dunging was having an adverse effect on river life: *'There are no fish in the river any more. It seems dead'*.

Some changes, many positive, were described without explanation. The absence for some time of the yellow wagtail from farm 37 was noteworthy.

Finally, it is worth recording the views of farmer 50. He says he used to be a famous improver; now feels he is public enemy number one, but he thinks things will turn round. He illustrates the differing perceptions of farmers and environmentalists. Though his farm is undoubtedly intensively managed, he doesn't feel that the best farmers in a grassland situation have to compromise the environment terribly. It was interesting that he *doesn't* feel the same about arable, *'which is dead, and I know, because we have it ourselves!'*

6.4.5. Rough grazings (including common land)

This section set out comments received both about farmers' own fell (allotments, intakes) and about common land or stinted pastures that they use.

Unlike some upland areas, the tradition on many fells in this area is to clear the moorland completely of all stock in winter – this is not an AE innovation and occurs not only on the stinted fells of Raby Estate, but for example on the north side of Weardale (farmer 54). In the case of grazing dates, the main impact of AE in this area seems to have been to secure a longer rest period.

Being rough grazing, a wide range of initial agricultural quality is to be expected – fells within the sample ranged from largely grassy through heathery to mossy. Farmers were often therefore unsure how to answer our question on the quality of the rough grazings: *'I'm not how good it is really; it's very rushy in places, but Natural England seem to like it'* (farmer 11). We therefore present here the farmers' impression of change in the nature and quality of the pasture.

A recurring theme, as with the inbye, was the expansion of rushes and the farmer's inability to control them, especially when under AE restrictions (see 6.4.4 above). In all, 11 farmers mentioned rushes as a problem on their allotment or fell, with 7 seeing them getting worse.

A shift towards a more tussock or coarser pasture was also a concern expressed by 4 interviewees. Farmer 17 had also noticed that the heather is receding up the fell, and that it seems to be disappearing in this way even from areas of stock exclusion. On one of farm 33's cow pastures, *Juncus squarrosus* (Figure 32) had expanded markedly.

Many farmers recognise the weather as being a contributory factor in these changes. Stocking regimes are also seen as crucial by many. Understocked farm 30 admits that their current grazing load is insufficient to eat all the forage they produce. A hill pasture on farm 31 where rushes are

'taking over' used to have 40 cows on it in days gone by. Sheep-only farm 52 was being paid under AE to summer 6 cattle on 290 ha.



Figure 32. *Juncus squarrosus* (Image: J R Crellin, Creative Commons Licence)

Farmer 33 said, *'It was a good allotment once over but now it's going rushy due to a lack of stock. About 15 years back the ESA folk wanted cows off the allotment, now Natural England wants them back on, so now they are on again, but now they want us to split it to control grazing. I've got ponies, but I'm not allowed to put them on allotment! It's really gone back as has one of the cow pastures. It's got lots of [Juncus squarrosus] and that's due to having fewer livestock'*.

Farmer 36 had similar negative experiences: *'The fell's getting overgrown. It was never hard eaten, and never was very heathery, so it's the white grass and rushes which have expanded. The rabbits had a bad winter - it really killed them off. But then Natural England came out after and said it was undergrazed and we need to put more sheep on. And the scheme is paying for estate to keep the rabbits down!'*

In a similar vein, one farm had a substantial area of juniper on the rough grazings: *'We had to fence round it – we told them it was actually the rabbits which were eating it, but Natural England didn't believe us. They not only fenced the juniper off but planted some and it turns out the ones they planted were diseased!'*

The complex interaction with the estates in the drawing up of fell AE contracts was discussed previously (REF), as was the lack of thought sometimes for the consequences of grip blocking on the fell for the adjoining inbye land (farmer 41). Farmer 58 even thought that *'Some of the grip blocking has been made erosion worse on the moor'*.

Some farmers were willing to admit that not everything they do is optimal either. Intensive farmer 50, whose hill *'couldn't be better'* says that in the past *'I did things like overgrazing the high hill,*

which I wouldn't do now. But I was borrowing up to the hilt – now I can afford not to do it.' Farmer 52, though much less intensive, had cut the ewe numbers by a third under various schemes, and was getting the same lamb crop now as he had previously.

The last word goes to farmer 58: *'In the summer of 2001 there were no livestock on the hill because Foot and Mouth Disease (FMD) hit the winterings; the next summer heather beetle came and hammered the fell. I think it was the damp conditions in the rank vegetation which allowed it to take off. We had to wait for it to die out. But I've also noticed that starlings have really declined – you don't get the huge flocks you used to, and I think they used to control it too. We have plenty of peewits and curlews breeding, but not so many come back. I don't think they're happy where they're wintering because they seem to be back up here in any good weather, even if it's snowing. There's fewer hares now – I think the weather is partly to blame, but also yobbos with lurchers. There used to be 38 ring ouzel males along the burn 30 years ago. Not any more; I think it's due to the kestrels myself. And the black grouse and partridge and so on are decreasing because cattle numbers have gone down and because we put less back into the land – there used to be 400 cows summering up here and now there's only 50. And I think the weather is also a contributory factor, waterlogging the chicks'*.

6.4.6. Purchases of fertiliser and lime

14 farmers (56%) buy at least some fertiliser. A total of around 76 tonnes of 20:10:10 is purchased annually by the sampled farmers, as well as 100 tonnes of nitrogen fertiliser, 30 tonnes of fibrophos and over 100 tonnes of slag.

6 farmers (24%) are currently using lime, at least as part of a multi-annual rotation (though more are considering it) – no more than 40 tonnes is bought annually.

6.5. The livestock

Just over two thirds of interviewed farms had a mixed stock of cattle and sheep (Figure 33) and only one (a very small holding) had no livestock but nevertheless had agricultural activity by the farmer himself, in the form of hay production.

Unfortunately, we were unable in the time available to produce total livestock numbers – we lacked detailed information on the numbers of non-breeding stock and the length of time they are on the holdings in the dale (the use of owned or rented lowlands has been noted previously (6.3.1 above), but away-wintering of various classes of livestock on tack is also ubiquitous). Our ability to produce stocking density data is further handicapped by the fact that almost no farmers could tell us their fell area.

6.5.1. Sheep

There were 10,302 breeding ewes on the 25 sampled holdings. Swaledales were the most popular sheep breed (Figure 34), with at least 8290 ewes kept on 20 (80%) of the holdings. 40 years ago, J C Coulson²⁹ could write *"Swaledale are the commonest breed, followed by the Cheviot..... The ewe lambs which are not kept as replacements for their own flock are old in the autumn for crossbreeding"* [our underlining].

²⁹ in Clapham, A R (ed.) (1978) *Upper Teesdale: the area and its natural history*.

and other tups on at least 11 (44%). Only on 2 farms (8%) were all the ewes being put to a Swaledale ram. A number of holdings with at least some Swaledale ewes, and not just at the smaller end of the scale, bought in all their Swaledale replacements.

Other breeds are not uncommon, especially Texel and Beltex. One farmer was keen on Lleyn sheep – one ewe had been received as a housewarming present and always produced the best lamb on the farm, so now they want a field-full of them!

Just as the breeds have changed since the 1970s, so has the production system. While odd lambs may have left the farm fit for slaughter in times past, nowadays 20 farms (80%) are selling a substantial proportion of their output to the abattoir or through the fat lamb marts, with at least 5 (20%) sending most or all of their stock down this route (one of which sold specifically to the light lamb trade).

6.5.2. Cattle

Although we have no data to prove it, it seems clear from anecdotal evidence that the number of cattle keepers has declined however – some reasons given were the loss of headage payments, the impact of FMD and the loss of outwintering ground.

14 farmers had suckler cows of their own (a total of 427 breeding cows); one kept bullocks only; 2 take in grazing cattle.

Breeds varied but continental crosses were common (Limousin, Belgian Blue, X Friesian etc). One farmer used to keep Galloway cattle – *'The boys who want big cows need educating to think about cow longevity!'* One recent entrant was keeping Luining: *'The Luining is a commercial, crossable and calm cow. Although it is bigger than other native breeds it is still suitable for grazing the SSSI and HLS ground'*.

The majority of herds are spring calving with cattle housed in the winter months (for up to 6 months). Most calves are sold as stores at 6 – 12 months. A few farmers are fattening cattle.

6.5.3. Livestock housing and feeding

Although the inwintering of some livestock seems to have been traditional on many farms, the scale of livestock housing seems to have increased substantially in recent years. Some of it is clearly independent of any scheme - the biosecurity value of home wintering was recently starkly highlighted (or made a necessity) by FMD, for instance. Some of this is the direct result of AE prescriptions, with the inwintering of a Swaledale hill flock being demanded of farm 48 (originally it was demanded that they lamb indoors).

And most aspects of changing systems seem at first sight unrelated to AE – the switch to less hardy breeds of cattle and sheep; a push for higher lambing percentages and larger cross lambs even on the remaining native flocks; selling more lambs and even bullocks fat, and so on. They are part of wider trends, and indeed farmer 17 admitted not to having thought much about it when he went to a system based on bought-in continental heifers; it was what everyone was doing. They seem to reflect the buzz phrases of the moment – 'add value', 'shorten your supply chains' – and most of all they reflect the desire of many farmers to have the greenest field, the best silage, the most pricey lambs, so as to feel good about themselves and gain the respect of their peers.

But in some ways, the indirect influence of AE can be detected even here. The use of the land itself is hemmed in by AE prescriptions. Farmers *could* devise ‘do less and earn more’ systems around those payments, but while rents set by land agents may now be starting to reflect the opportunities opened up by decoupling and AE to claim money while doing less or not much at all, such options rarely appeal to farmers. Moreover, the tenant farmer might have to consider what happens when he retires – perhaps he has to ‘cash in what he has on the ground that day’, as farmer 36 put it. Running down the farming activity might not seem attractive in that light either.

No, as farmer 41 said, farmers ‘see two ways of responding to the pressures they feel – to expand and ranch or to intensify’. Given that the opportunity for expansion is limited, intensification can easily come to be seen as the only available option, and given the limitations on the use of the land, this results in keeping more of the livestock in sheds for longer periods and with increasing dependence on bought-in feeds.

In our sample, only the farmer with no livestock of his own bought no feedstuffs of some description. Of the rest:

- 23 (92%) were buying cake of some sort (over 499 tonnes annually);
- 11 mostly mid-sized holdings (44%) were buying in licks and blocks (7.7 t);
- 4 (16%) were buying energy-rich sugarbeet pulp (148 t);
- 10 farms (40%) regularly bought hay or silage bales (almost 1000 bales or 250 t annually, with some individual farms buying an incredible 250 bales or more).

Sadly we did not think to ask specifically about straw and so we only know of 3 farms who bought any in, but since one of them bought 140 bales annually, we suspect that this is the tip of the iceberg.

Livestock production in an extractive system in which nutrients are only slowly replenished from the atmosphere or by the weathering of minerals. Certain elements of upper dales farms, the meadows in particular, are very sensitive to exhaustion; how they were kept fertile in the past is perhaps one of the key gaps in our understanding of the traditional system.

In recent times, nature conservationists have been very concerned with the opposite threat to this delicate balance – that the ease of availability of artificial fertilisers will give a huge boost to nutrient status never before experienced by the meadows (and pastures) and change – simplify and impoverish – the rich flora they contain.

Bought-in feed/bedding								
	Bales	Tonnes	N kg/t	P kg/t	K kg/t	N	P	K
Straw	144	36	5.8	1.6	11.6	209	58	418
Hay	980	294	14.9	2.2	17.9	4385	647	5268
SB Pulp		48	15.5	0.7	15.9	744	34	763
Cake (@ 15% protein)		399	24	3	6	9576	1197	2394
<i>kg</i>						14914	1936	8843
<i>tonnes</i>						14.91	1.94	8.84
Bought-in fertiliser								
20:10:10		76.5	200	43.6	83	15300	3335	6350
<i>tonnes</i>						15.30	3.34	6.35

Table 14. Nutrient input calculations

It is difficult to avoid the conclusion that it seems to have been assumed that manures, in contrast, are of less significance – that while they certainly involve the shift of nutrients from one area of the farm to the other and should be subject to some control, the flows are nevertheless internal to the farm. Our data suggests that not only is this not the case, but that the inputs are significant.

We took the feed and bedding purchase data for the 24 ‘unintensive’ farms (ignoring licks as trivial) and, using published conversion factors³⁰ we worked out the tonnage of N, P and K being brought into those farms. We then used standard coefficients to convert the weight of 20:10:10 fertiliser into comparable figures (Table 14).

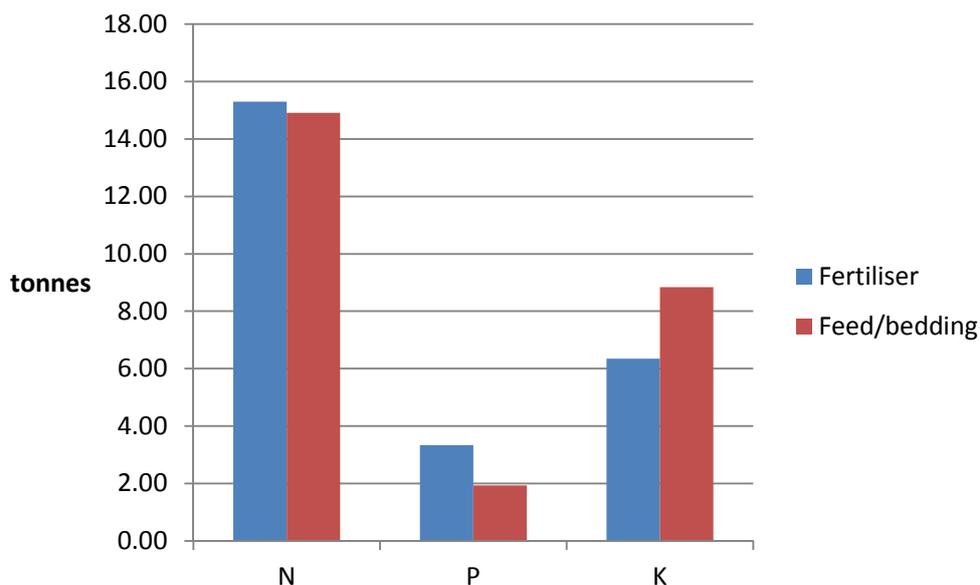


Figure 36. Comparison of bought-in N, P and K inputs by source

It can be seen (Figure 36) that even with the probably incomplete data for straw, the input of nutrients from *non-fertiliser* sources is significant and, in the case of K is higher than that from fertiliser.

6.6. Farm economics

6.6.1. Farm Income

We asked farmers about their Farm Business Income (FBI). FBI is the total output from agriculture (including SPS, agri-environment schemes and diversification); minus expenditure (including variable costs, fixed costs/overheads including paid labour). It excludes unpaid labour and off-farm income (see Section 3.9 above).

It would be fair to say that most farmers were unsure about this figure and the data must be read with a health warning. Moreover, when they wanted further guidance we asked them to tell us

³⁰ Watson, C, Topp, K and Stockdale, L (2010) A Guide to Nutrient Budgeting on Organic Farms. Results of Organic Research: Technical Leaflet 6. Institute of Organic Training & Advice http://www.organicresearchcentre.com/manage/authincluds/article_uploads/iota/technical-leaflets/a-guide-to-nutrient-budgeting-on-farms.pdf

‘what they pay tax on’, which possibly led to more certainty, but even more inaccuracy. Many have external sources of income, for example, but in this case the figures below would appear over-optimistic.

With those caveats, there would seem to be a considerable variation in FBI (Figure 37), with most farms showing a positive net income (the 1 exception had exceptional circumstances).

Given that this FBI not only has to cover drawings and tax but the cost of reinvesting in the business, this is not a rosy picture.

When asked about their FBI trend over the last 5 years, 22 were able to give an answer (of the remaining 3, one had no idea, one was consciously building up the balance sheet rather than concentrating on income and one was having to spend money on a diversification project which was in a planning limbo). Of these, 6 (27%) had seen an improvement, 11 (50%) thought that any variation was just the normal up and down fluctuation, while 5 (23%) thought it had deteriorated. The rises were mostly in the context of new entrants whose current net income was low but farmer 33 had agreed to an AE stock reduction and calculated that the loss of sales was around £2000 while the payment was £9000, while farmer 36 was the only one to report an improvement due to rising livestock prices. Falls in FBI were all linked to increased input costs.

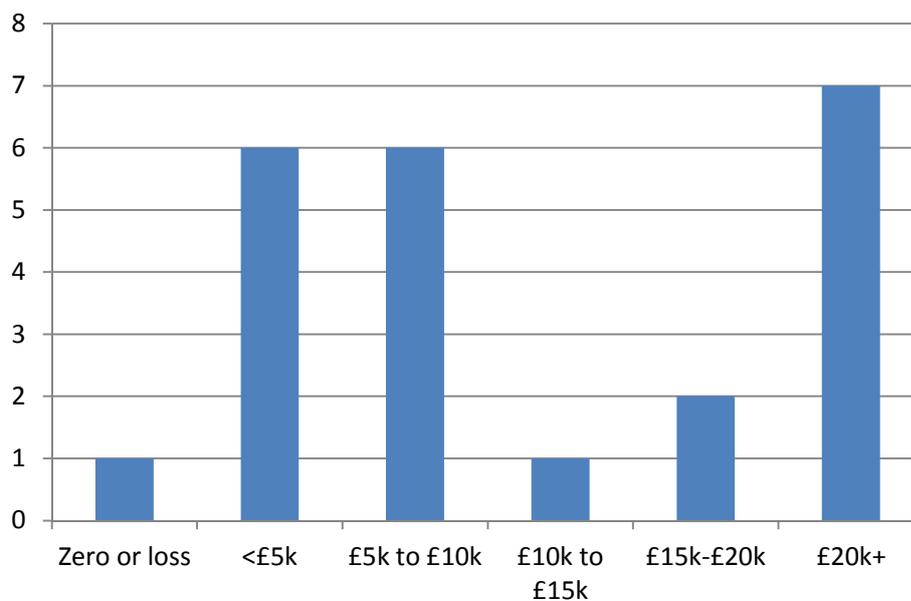


Figure 37. Variation in reported Farm Business income

We also asked farmers what percentage of their farm output comes from the various income streams. Although approximations were used, the results (Figure 38) show the importance of SPS and AE income to all the farmers in the study area.

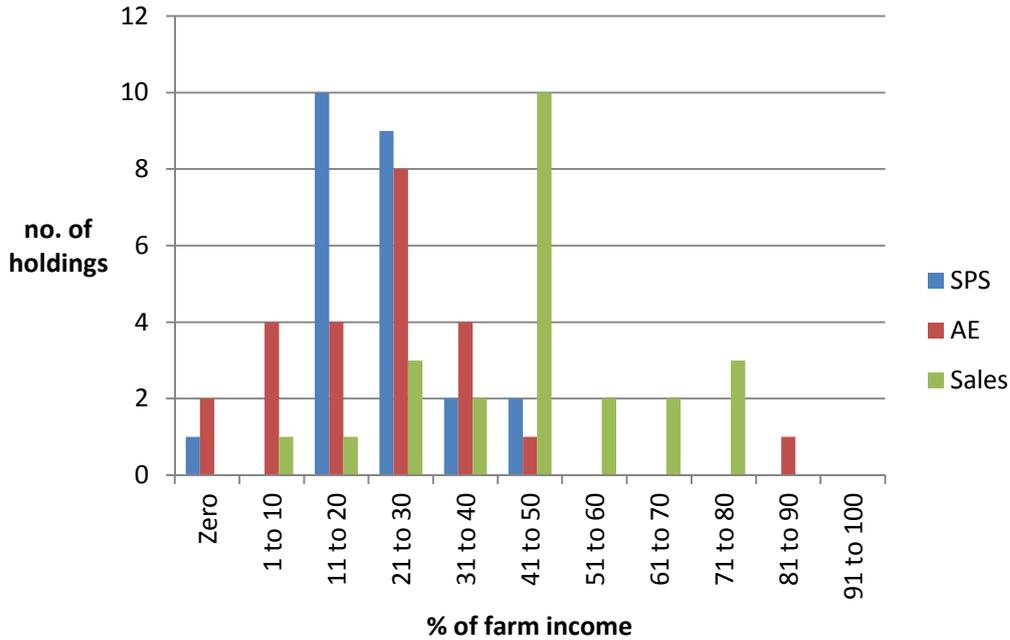


Figure 38. Relative importance of income sources in farm output (diversification ignored as trivial)

‘Turnover is vanity; profit is sanity’, as the old accountants’ saying has it; the various income sources are generated by potentially distinct activities, each of which comes with its own costs of production, the scale of which may vary considerably between them. An active farmer who claims £10000 of SPS and sells £10000 worth of lambs, cast ewes and wool could easily make a larger profit than an inactive claimant of £10000 SPS who somehow manages to keep his land in Good Agricultural and Environmental Condition. Can we then say anything meaningful about the *profitability* of the actual farming systems in the upper dales?

We are handicapped by our lack of data on scheme receipts on most farms (a few farmers mentioned the sums in passing) – we were wary of appearing over-intrusive, but we should, on reflection, have asked the question directly. Defra is not allowed to release any current CAP payment data at present, due to a judgement by the European Court of Justice. However, data for 2009 is available online, so some rather out-of-date information is available for 14 of the more long-established of the sampled producers.

We assume that while AE is prone to change (and seems to have gone up, judging from the few individual comparable figures we have), SPS, which is limited by the forage area and (unless the farmer subsequently engaged in trading) the entitlements allocated in 2005, is more likely to remain constant.

We therefore used the SPS amount from the Defra website and the percentage it accounted for in farm output to estimate the current income from AE, livestock output and diversification. We carried out the exercise twice, once including the large intensive farm and once without it.

Figure 39 shows the more representative breakdown for the 13 less intensive farms (including the large intensive farm has the effect of significantly increased the percentage of income coming from livestock to 68% and reduced the AE fraction to 14%). This suggests that scheme income is relatively more important in the case study area than in the FBS sample (see Section 3.9 above).

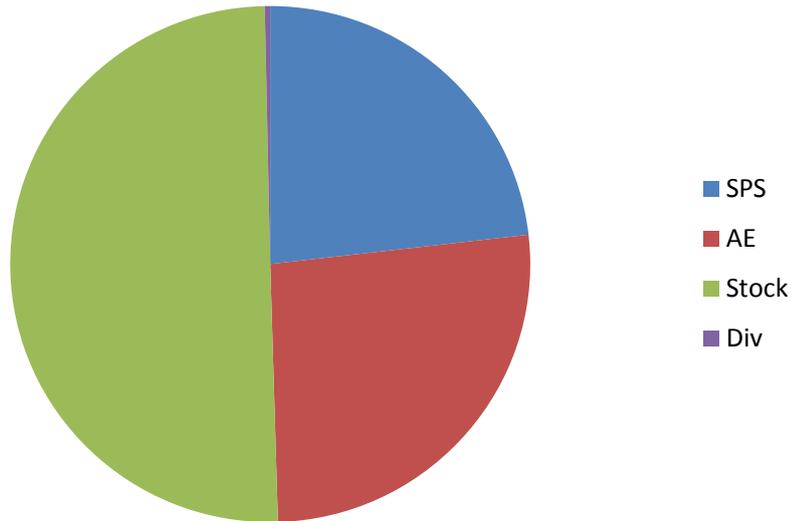


Figure 39. Breakdown of estimated total output for 13 'non-intensive' farms in the upper dales

This still does not tell us how output relates to profit, it just puts absolute values to what had previously been percentages. If we had good FBI data, then we could work out the costs and can compare output with profit. However, our FBI data has two weaknesses – first, it is all in broad bands. Secondly, the highest band, which contains 7 (29%) of the 24 farms (the other one confessed to having no idea about financial issues) has no upper boundary, rendering the information even more uncertain.

To have some feel for the data, we are therefore confined to the 8 farms for which we have 2009 CAP payment data *and* reported an FBI of less than £20000 a year. The figures are the most optimistic possible - we assumed that their income was in the top of their respective band.

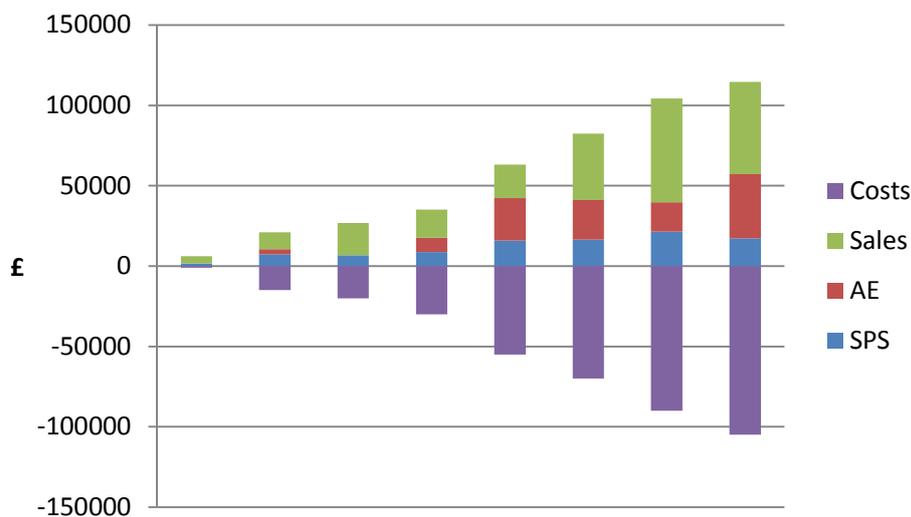


Figure 40. Optimistic assessment of output and costs on 8 upper dales farms

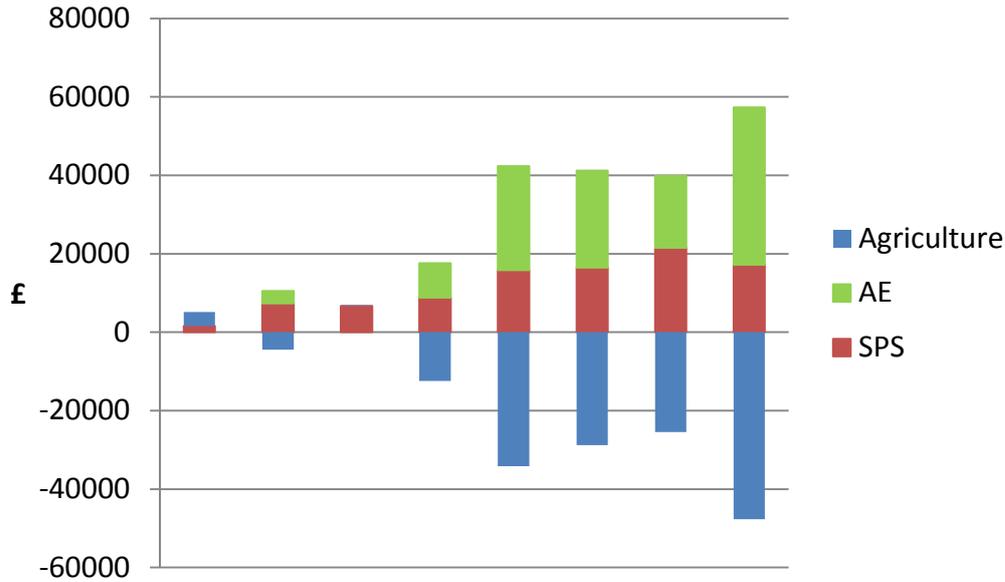


Figure 41. Previous figure shown in same format as Figure 13

The resulting picture (Figure 40, Figure 41) is frightening. At best FBI in the farm with the highest turnover is only 9% of output. Tiny changes in costs or income could have catastrophic results. Only in 2 of the 8 is SPS more than FBI; AE is higher than FBI in 3. Livestock output is higher in 7, but then this same livestock is the reason for incurring most of the costs.

In 6.3.1 above we noted the reported rise in rents. How do the amounts charged (£60/ac, ~£150/ha) compare to the FBI? Again we looked at the holdings with an FBI of less than £20000, but this time not limited to legal persons. We divided the FBI by the farm area using the best possible FBI value (upper threshold of the class) and the worst (we used an arbitrary £1000 for the £0-5000 class). In the optimistic case, only 4 farms had a FBI per hectare substantially higher than £150, while in the pessimistic scenario, only 1 had substantially more income per hectare (and that was a very small unit). One may object that the rent is already included in the farms' outgoings, but the point is rather that at a rent of £150/ha, the landlord is making more out of the deal than the tenant and at considerably less risk and effort.

An indication of the overall and relative profitability of LFA livestock enterprises can be derived from national figures from EBLEX set out in Table 15. This shows the negative net margin for LFA suckler herds, even amongst the top performers, alongside the rather better net margin for LFA breeding ewes (although this is still negative, on average, after including non-cash costs). It is reasonable to assume that costs in the upper dales are higher than the average and output no better and possibly worse than average, so that the 'bottom line' in the sampled farms is likely to be worse than the quoted figures.

As in many areas of the country, farmers' grasp of their accounts was not always very strong. When some interviewees were questioned about the rationale of (for example) taking on rented land without the benefit of CAP payments and encumbered with AE rules for which they don't receive the 'compensation' payment, it was clear that this was the first time the issue had been raised in their minds.

While taking land on annual lease is a short-term decision which is easily revoked, there is some concern that this lack of financial consideration also applies to more long-term commitments. While quite a few respondents seemed to have carried out a mental partial budgeting exercise when

deciding whether to do *less*, i.e. to enter AE (for example farmer 33, quoted previously), they seemed somewhat less rigorous when deciding whether to do more, for example, whether to make substantial capital investments or to embark on a high input system using lowland breeds.

Enterprise	Average	Top Third	Notes
LFA suckler herds – gross margin	£332.22 per cow	£350.21 per cow	
LFA suckler herds – net margin excluding non-cash costs	-£56.96 per cow	-£45.91 per cow	Gross margin less fixed costs
LFA suckler herds – net margin including non-cash costs	-£277.18 per cow	-£120.88 per cow	Gross margin less fixed costs less non-cash costs (e.g. unpaid family labour)
LFA breeding flocks – gross margin	£64.22 per ewe	£85.87 per ewe	
LFA breeding flocks – net margin excluding non-cash costs	£14.14 per ewe	£42.14 per ewe	Gross margin less fixed costs
LFA breeding flocks – net margin including non-cash costs	-£16.63 per ewe	£10.02 per ewe	Gross margin less fixed costs less non-cash costs (e.g. unpaid family labour)

Source: EBLEX Business Pointers 2012

Table 15. LFA livestock enterprises - gross and net margins

Many farmers identified the geography of the area – its climate, soils and resulting vegetation - as one of *the* major constraints they face, one of *the* major weaknesses of their farm and those of their neighbours. However many seemed to feel obliged to follow a farming system which tries to rise above such constraints, as if all their land were down in Lanchester. Rising above the costs of doing so is however impossible. These are big, potentially costly, decisions – it would be good if farmers had some independent source of advice to turn to when considering them.

For information, a comparison of key characteristics for the upper dales case study area and the North East as a whole is shown in Table 16 below. The farms included in the survey are not very different to those included in the Farm Business Survey for the North East. The FBI figure for the case study area should be treated with caution, as indicated above; it may be reasonable to assume that it is somewhat higher given the average for the region and the not dissimilar farm size, stocking and labour.

	Case Study Area (Average farm)	North East (Average farm)
Size	197ha	188ha
Stock numbers	412 ewes (10,302 breeding ewes on 25 holdings)	435 ewes
	30 cows (427 breeding cows on 14 holdings)	41 cows
Employment	1.45 FTE (36.25 FTEs over 25 businesses)	1.57 Annual Labour Unit
Farm Business Income	£12,000 est.	£40,000

Source: Farmer interviews; and Farm Business Survey 2011/12

Table 16. LFA grazing livestock farms - a comparison of case study and regional farm characteristics

6.7. Farming policy and policy delivery

6.7.1. Agri-environment

It is inevitable that any discussion of policy starts with AE, and not only because the farmers knew that this is at the heart of the rationale for the project. AE provides a very large proportion of the farm output – comparable to direct payments in many cases (*'We're grateful for it, and without it would all be ranched'* - farmer 39; *'ESA kept us going'* – farmer 11). But unlike direct payments it also imposes huge constraints on the farmer, constraints about which he has strong opinions.

Farmers came to the question with differing attitudes towards both the importance of nature itself for them and towards its place in policy. Many farmers were clearly interested in nature: *'I like this term 'HNV farmer' – I like my wildlife!'* (farmer 13); *'I quite like the HNV farming concept – it reflects the reality anyway and the realities of what could be done'* (farmer 22); *'It's nice to see the wildlife'* (farmer 30); *'It has been harmony between farming and nature, and it should stay that way'* (farmer 31). *'Yes, I do feel myself to be a HNV farmer. We are here just a short time and our job is to farm the land and protect this special environment for the next generation. The environment needs the farmers and the farmers need the environment – both can go hand in hand'* – farmer 47. The same farmers wondered aloud whether the same results could be delivered without farming on the new-style sheep-free grouse moors. Farmers should indeed *'mind what they do'* as regards polluting burns and the like, said farmer 52

Some farmers were suspicious of or resented the whole thrust of AE and the whole idea of HNV farming: *'There's generally too much concern for wild flowers. This HNV farming emphasis is negative if you think nature is butterflies, insects, birds of prey and the like. I think it is cows and sheep and you have to think of all these along with the other things (which are nice enough to see). Take a holistic view!'* - farmer 9. *'I feel sometimes that the habitat is considered more important than farmer who maintains it'* - farmer 17. *'More attention is being given to water voles and birds than to farmers! These things are not important to me'* – farmer 31. *'We are food producers and land managers, and we must find the balance. I despair at policy and some of the advice we get though'* - farmer 58. *'We seem less valued as farmers and we are losing our sense of pride in what we do. I do not feel like an HNV farmer. It is what we do as our day job; it's inherent'* – farmer 42. *'I am a livestock farmer but this role is reducing. I do not feel like an HNV farmer'* – farmer 48.

All the farmers, bar none, had experience of at least one of the AE schemes. Views on their relative merits had some common themes. ESA's walling grants were especially appreciated and missed (farmers 3, 7, 9, 11, 23, 37, 39, 41, 44, 52). ESA didn't want to *'plant stupid trees'* either (farmer 9); farmer 13 had no time for *'scrubby native trees'* either.

Some thought the schemes to be quite similar (farmer 3). A few found ESA to be easier (farmer 33) - a scheme which didn't change things much, in contrast to HLS (farmer 7, 44). Farmer 36 rued the passing of the straightforward approach of ESA Tier 1 – *'I'm not asking for 5 bags an acre, just the bag I've always put on'*. But others found UELS and even HLS to fit in with how they farmed without too much change (farmer 22, 37, 52).

Some of the more rigid aspects of ESA were roundly condemned: the banning of all rush control (farmers 9, 33, 39, 41); the unvariable dates for so many things (farmers 39, 41); the removal of cattle from the hill (farmer 33). The corresponding improvements in HLS were welcomed. HLS did however introduce dates for mechanical operations and this made it much more difficult than ESA, according to farmer 33. And the requirement to *buy in* stone for walling was *'madness'* to farmer 41.

In general however, HLS was seen as the more flexible scheme, allowing the farmer and the officer to come to the best solution *together*. *'They seem more amenable to doing what you think is best now – they seem to trust your knowledge more'* – farmer 54. What flexibility there was in ESA seemed to depend too much on the case officer, whose personal opinions and prejudices (*'not even policy'* – farmer 54) seemed to some to have had too much weight. The importance of the personality of the officer was mentioned by a number of interviewees (*'Personalities count for a lot – we had some good officers, including one with some farming experience'* – farmer 23; *'There's no need for conflict – it's all to do with personalities and ways of implementing things'* – farmer 33; *'we've got a good field officer; now there's plenty of flexibility'* – farmer 39). More is needed perhaps? *'Keep your schemes, but let's have a bit more common sense in them'*, said farmer 33.

Many had nevertheless come up against the limits of flexibility – sometimes they could be worked round or permissions could be sought and granted (*'We need to think of asking permission in bad weather to feed in certain places or move stock certain areas, but they're ok in response'* – farmer 52) and sometimes they just lived with them (*'At one point, we were supposed to split herd for grazing - the bull didn't think it was a great idea'* – farmer 22), albeit grudgingly (*'We need to tell them everything, even if we have permission, for example, if we are repairing field drains'* – farmer 33). Sometimes they really grated – two farmers mentioned the inflexibility of walling grants; farmer 33 had thought the idea of the grant was *'positive, but because of the snow we were unable to do all the walling we said we would. They refused us an extension and then considered us to have breached our agreement, so we couldn't ask for more'*.

The positive aspect of inflexibility is simplicity – farmer 33 thought that *'at least with ESA you knew where you were'*. He was worried by the thickness of the HLS contract and feared that few farmers were familiar with it - *'really scary'*. The same farmer, however, when talking about how the cattle were now back on the hill (having been removed under ESA), saw even that as part of the (negative) prescriptiveness of HLS.

This feeling of pressure was an underlying theme shared by many – farmer 37 finished describing how flexible and easy things were with *'but still I feel pressured'*. Some were much more unfortunate – at least two Teesdale farmers on SSSIs had had the threat of compulsory purchase made during discussions of AE. One said it came as a first resort, the minute there was any question of negotiating about the detailed prescriptions. Farmer 23 had a species-rich bank which was to be *'restored'* – he thought it was happening, *'but they wanted it quicker'*. *'It used to be a pleasure managing the land and the habitats, it was what we do naturally, but now it's just a headache due to all the regulations and schemes'* – farmer 48.

Attitudes count for much. Ignorance of how hill farming works can be a contributory factor – *'It would be good to have training for [AE] officers – attending a seminar or reading a book is not enough!'* – farmer 54. That might avoid the situation where *'people who don't know advise people who do'*, in the words of farmer 17 and have one less time where there are *'people in charge who don't have a clue'* (farmer 7).

Sometimes genuine misunderstandings can irritate – misunderstandings made much more likely when the field officer is based miles away in a completely different environment; farmer 31 recalled being phoned up with insensitive questions when *'we had four foot of snow here'*.

Sometimes, it is just the way people seem to be: *'They wind me up with their attitude – they don't ask to look at fields or even notify you that they're there. Let's have 'talkability' – not from a book and no recourse to threats straight away!'* (farmer 33); *'They take no notice of a farmer's experience'* (farmer 44). *'We CAN work together, but only if they can listen to farmers'* – farmer 37.

What did farmers think of AE schemes from the perspective of *policy* (i.e. nature) outcomes? Farmer 11 was positive – *'it did the flowers good. I'm very positive about it; very pleased with the scheme.'* Many were unsure whether all the effort and sacrifice had delivered the desired results, sometimes adding some interesting observations: *'I'm cynical about whether these schemes have achieved anything. People used money to buy round bales, bringing in thistles and the like, when it was maybe expected that they would reduce their stock instead'* – farmer 17. *'I'm not sure that all of what I'm being asked to do is giving results – the rush cover on my allotment is an example. It's especially bad I've compromised on numbers and yield'* - farmer 23. Farmer 37 was *'not sure if there's any improvement on the conservation side'*. Farmer 36 did not rule out being a 'park warden', but *'I want it to be really good – rich herb meadows not rushes!'* Farmer 50 thinks *'it's a scandal what [AE schemes] did for meadows. Paying someone in Teesdale for seed when there used to be meadows upon meadows in Weardale! Many of the ones in schemes are destroyed!'*

About faces (*'inconsistencies'* – farmer 37) on rush control and on cattle grazing of hill pastures and on liming clearly leave a bad taste in farmers' mouths. Stories of land being praised when going into ESA and then being refused entry into HLS for being 'too poor', or of land managed by methods contrary to HLS prescriptions being used as a seed source for meadow restoration (see 6.4.3 to 6.4.5 above) add to the worries of farmers that those in authority don't really know what they're doing. Faith in the system is low – farmer 37 noted sardonically that the fell was not bad and not getting any worse, *'despite the scheme'*.

Alongside this suspicion is a feeling that things are being demanded on the cheap. Farmer 41 analysed the basic situation his way: *'We can respond to the [wider] pressures [on farm economies in the Dales] by getting bigger, but then we end up with ranching and having to compromise on the environment. Or we can increase our stock numbers and buy in more stuff, and that also involves compromises on the environment. The way I see it, if we want something else, there's no alternative but to pay for it.'*

AE schemes are essential – *'We shouldn't rely on subsidies, but we can't keep enough animals not to. And the housewife wants cheap, so she won't pay enough to keep the dales looking good,'* said farmer 41. As farmer 39 says, *'We've got to say we're HNV, as that's why the payments are here! Try living without them!'* Farmer 13 went as far as to say that *'HLS is effectively blackmail – a farmer who doesn't want to go in is not supported'*. It seems unlikely that many farmers could deliver all the benefits envisaged by HLS by *'keeping things tidy from [their] own profits'*, in the words of farmer 50. So essential are they that farmer 54 sees the increasing trend towards targeting and, by implication, excluding some farms from AE schemes as contributing to the trend towards ranching

While farmer 11 reckoned he *'lost one end and gained the other'*, many beg to differ, saying that the money doesn't reflect the costs and income foregone. Farmer 13 again: *'When I came out of ESA, just keeping 25 ewes would bring in same money'*. Rules and payments often seem to be the same in the harshness of the upper dales as they are in other places with much better conditions (farmer 33). Farmer 52 says that while *'HNV is what we have to call ourselves because it is the only way the public will appreciate us, we need to make them realise what payments are needed for us to be like that'*. At present, farmer 23 says, *'Being a HNV farmer is good, but seems to come at a price!'* - to the farmer, that is. *'Payment rates need to be increased to reflect the costs'* - farmer 36.

Farmer 48's story seems to bring together all the worst experiences: *'They threatened compulsory purchase immediately, when we just wanted to discuss the prescriptions. It didn't seem very voluntary! And it's not as if it's an easy life. I don't really have anything positive to say except that we couldn't manage without the payments. But then we have more costs to get same result with our*

stock AND we're seeing the land going back. They need to show more respect to farmer's knowledge in way things are managed. The dales not as pretty as they were! I think you need to monitor what you've had people doing and adjust things accordingly.' As farmer 33 said, *'it's probably more trouble than it's worth to have a reputation as a HNV farmer'*. *'Depending on what 'they' want, it could be a poisoned chalice'* – farmer 50.

6.7.2. Direct payments

Payments should only go to those who are active and there should be some way of stopping it being converted into rents – farmer 48. One benefit of direct payments (and similar schemes which don't have to be 'applied for') is that they don't promote short-termism, said farmer 52 (farmer 54 agreed, citing walling as an example of how not to do it, with encouragement for training up wallers one minute and then no schemes to give them work the next).

The obvious way of linking payments to activity is to have at least a minimal level of coupling. Many interviewees suggested such a course: farmer 39 thought that *'People should be rewarded for what they do, i.e. keeping livestock. There should be NO payments for the inactive – payments should go to the people with the costs'*; *'There should be some sort of limited coupling at least, though recognising the danger of overproduction'* (farmer 31). *'We need some sort of coupling which doesn't encourage overstocking'* (farmer 37).



Andrew Smith, Creative Commons Licence

Figure 42. The upper dales have some of the harshest climatic conditions in England

Some kind of incentive for cattle could be considered (not necessarily within the direct payments) – ‘the loss of cattle from the dale is a disaster’ (farmer 54); perhaps there could be encouragement to keep Galloways on rougher ground (farmer 13).

‘The payments need to be rationalised – how can the same payments go to farmers in the Eden Valley who can grow cereal on some fields! There needs to be a reclassification and payments have to be more targeted to what the needs are’ – farmer 52. Giving ‘the same payments to places with much better conditions is nonsense’ – farmer 44.

Even cross-compliance can be superficial, said farmer 41 – ‘no one cares about the stock, only the paperwork.’ Farmer 48 noted that the system does of course have to prevent those who would just ‘take advantage’, but this includes ‘the ones who take payments and let things go to rack and ruin’.

6.7.3. Other aspects of CAP support (including items potentially funded from the RDP)

Demise of LFA payments

While only one farmer specifically looked back fondly at the HLCA, which he regarded as an ‘animal welfare scheme’ (farmer 13), the theme of needing to deliver spatially-differentiated general support was more widely echoed. The loss of cattle from the upper dales was cited above. In the upper dales, ‘small farms are not viable and ranching is becoming an issue – there’s a lack of care’ (farmer 17). ‘Support small farms to populate the area, keep schools going, maintain communities’ – farmer 11. Even within the dales, farmer 22 noted ‘It’s not too bad for us really – I feel sympathy for the fell sheep people and for people without land elsewhere’.

Timing of payments

The timing of all CAP payments is a key issue for farmers’ cashflow: ‘I need there to be no changes to when my money is paid! They need to try to understand the direct debit payments farmers have to make! Continuity is good!’ (farmer 23); ‘Think about the practical needs of a farmer, for example, avoid having no payment in one tax year and 2 the next’ (farmer 48).

Farmer education and training

The dearth of apprenticeships was deprecated very strongly by farmer 54 (significantly perhaps, one of those without children interested in taking over the farming activity). Of course, apprenticeships in themselves do not solve the problems – farmer 5 actually had a child such a training programme, but the holding was not large enough to support him (in this case, one can imagine that the apprenticeship only eased the path out of the upper dales).

Farm advisory services

It was noteworthy to the researcher (who declares his background of having worked for national farm advisory services in Scotland for 15 years) that very few references were made to the sources or quality or even the lack of advice. Some farmers in Weardale mentioned the success of UTAS in getting help for Teesdale farmers after the hard winter, but in Teesdale itself, we encountered some embarrassment about this help. There was also a slight feeling that it was difficult to be very short of money and very independent, shall we say.

Investment aids, Support for young farmers

Farmer 9 said that as ‘the money I spend locally is good for the country, there should be help for young people to invest. Defra should encourage better quality livestock production by encouraging good genetics and give grants for housing and handling facilities and for transport equipment to encourage best practice’. Interestingly, he was the only one calling for targeted investment aids for agricultural activities.

Farmer 13 had wide-ranging recommendations. There should be assistance for shelter belts – *'conifers, which do a job, like providing shelter and nest sites, not shrubby native trees! There should also be help for small-scale renewable energy on farms, but more hydro, not windmills'*.

Promoting farming and food

Farmer 22 thought Government should *'promote British farming a bit more – stop knocking it on the head!'* They need to *'communicate the benefits of what I do to the public'* – farmer 37. These comments fitted into a wider concern – the sense, quoted above, that just *'someone saying something on telly can put things wrong'* or the perception voiced by farmer 52 says that *'HNV is what we have to call ourselves because it is the only way the public will appreciate us, [but] we need to make them realise what payments are needed for us to be like that'*. This awareness-raising can fit within a wider framework of course – educating walkers for example (farmer 13). This in turn links with concerns about worming walkers' dogs (farmer 52). Few farmers seemed to have much confidence in changing consumer attitudes, despite the negative comments about the current *'housewife's choice'*. One exception was farmer 33, who saw the importance of *'proper cooking education in school'*.

6.7.4. Other policy areas

Commodity pricing

What used to be an issue of prime concern for the CAP is now left to the market. Many in our sample were not happy with the result. Farmer 7 said, *'prices are a problem; take this year after all the sheep dying in snow – the prices were still no better. We need to do something about imports, some way of regulating prices'*. Farmer 52 also called for fewer imports to be allowed. The power of the supermarkets was referred to, but so was the *'housewife's choice'* – falling easily for 2-for-1 deals and going for the cheapest. There is clearly an overlap with the need to raise awareness of local food production systems and their costs. Farmer 3 did however note that *'prices can't be bad just now, judging from the new tractors being bought'*.

Animal health

Paperwork in general is a burden (farmer 52) and needs some adjustment (farmer 13). Many of the most resented items fall under the animal health umbrella. *'Double tagging is nonsense; the six day rule is a real problem. The same rules should apply to horses [as to other livestock]'* – farmer 52. *'Tagging is a disaster; the six day standstill is a disaster. They say they're not expecting 100% compliance, but in practice...? For example, I know of a case of a suffering lamb taken to slaughterhouse, where the farmer forgot and got penalised. It has impacted on the stratification of livestock industry (which has massive benefits for wildlife) – 3% penalties on ALL subsidy if you breach the movement rules is a huge risk for former mixed farms, and is accelerating the move to arable only'* – farmer 54.

Moreover, said the same farmer, *'Walkers' dogs should be wormed, just like farmers' ones – it's a welfare issue with real costs. And the removal of dead stock removal is bonkers. I've noticed the ravens move off the farm.'*

Planning

One aspect of being in an AONB which drew negative comments was the strict planning policies. *'Permission to convert buildings even for family members is difficult, and even when they allow things, it's often with stupid ideas'* – farmer 3. One farmer cited a case of permission being granted for an outbuilding conversion on condition that the car was always parked on one particular side. Farmer 44 was experiencing the problems with getting planning for a barn conversion at first hand –

it was without doubt his over-riding worry at the minute. The respondents felt that the implementation of planning rules just served to compound both their difficulties in making their farm pay and their chances of keeping their children in the area, hopefully to succeed in time to the farm itself.

Regional policy failures

'There is poor access to services, including commercial services like fuel and shops' –farmer 3. 'The top end of Weardale is a bit neglected, not just in farming, but in general' – farmer 9. Broadband and mobile phone services are poor (farmer 54).

6.8. Farmers' view of their farming situation

As part of our questionnaire exercise, we were asked to find out about farmers' hopes, fears and aspirations. We did this in two stages – we first asked them about their assessment of their farms in a more objective way in the form of a SWOT analysis. We then asked them to outline their objectives and plans.

6.8.1. SWOT analysis

We asked the farmers to list the current strengths and weaknesses of their farming businesses, to identify the opportunities which they could potentially take advantage of in order to improve their situation and finally the possible threats which could lie in the wings. We also asked them about the impediments to change, but in this report of their comments we integrate these in 'weaknesses' or 'threats', as appropriate.

Strengths:

- Personal drive, ambitions, attitudes, 'way of life' (9, 11, 13, 30)
- Personal reputation, skills (9, 13, 39)
- Reputation of stock (11, 17, 22, 23, 31, 39, 41)
- Owned land, or the accumulated capital, or everything in good order (36, 44, 48, 50, 52)
- Stability (3)
- Support of interested family and/or successor in place (5, 17, 37, 52)
- Support of traditional, helpful community (22)
- Works well as hobby farm to minimise tax bill from off-farm work (7)
- External job allows some flexibility and resilience (30)
- Being own boss (33, 50)
- Having enough financial resilience to be able to make choices (54)
- Able to attract good AE payments; *'we have things no one else has'* (41, 48)
- *'In Teesdale, on Pennine Way....'* (42, 48)
- Producing at low cost (54)

It is notable that most of the perceived strengths are related to the farmer himself, to his family circumstances or to things at least notionally under his control (quality of stock, quality of buildings). The value given to independence could be seen as linked to this perception – in the ideal situation, the farmer can shape his own destiny. It is notable that only 3 farmers saw their location as a plus point, while only one thought that being able to produce at low cost was an advantage – perhaps a reflection of the exposure of most farms to large expenditure on external inputs.

Weaknesses:

- Age (3, 41, 44, 54)
- Poor health (13, 33, 41, 44)
- Lack of/ uncertainty about likely successor, young people all leaving (3, 30, 50, 54)
- Inexperience (22)
- Not enough land to provide income needed, and distracts attention from farm (5, 22, 23, 31, 52)
- Return to labour not enough – part-time wage for full-time work (7, 11, 17, 30)
- Lack of capital and/or high debt (9, 31, 44)
- Poor cashflow (17, 36)
- High dependence on subsidies (11, 41, 52)
- Lack of off-farm work for part-time farmers (5)
- Has to be approached like a ‘way of life’ (11)
- Vulnerability to both costs and prices, to unavoidable taxed (e.g. on fuel) and to fickleness of markets (*‘someone saying something on telly is enough to send things wrong’*) (7, 33, 41, 54)
- Poor infrastructure (9)
- Poor climate and land (5, 13, 31, 37, 39, 41, 42, 52, 54)
- End of road location (52)
- Poorly serviced road, poor broadband and mobile service (54)
- High inputs (39, 41)
- Paperwork and *‘restrictions’*. Six day rule. (13, 48, 52)
- Planning system (44)
- Lack of apprenticeship type system to bring on young peoples’ skills in farming (54)

Weaknesses, on the other hand, mostly centre on things over which the farmer has no control at all – his mortality, the lack of land, the fickleness of the market, paperwork – or little control in practice – his dependency on subsidies, the lack of return to his labour, the poor cashflow. It is only natural for the farmer to start thinking that his strengths can easily be trumped by most or all of these weaknesses.

Opportunities:

- Tourism-related diversification (3, 48)
- Off-farm employment (in mine, in building trade) (5, 7, 11)
- Better product (9, 22, 23, 39)
- More product (9)
- More consumer demand (*‘the housewife’s choice’*, *‘increasing population’*, *‘world food shortages’*) (13, 41, 42)
- Targetted headage payments (17)
- *‘Buy another farm?’* (50)
- Lack of opportunities in rest of economy means could be farming’s gain (54)

Weakness today is one thing; perhaps things will get better? Many farmers could not identify any opportunities. 5 who did saw them arising in non-farming activity. Maybe even the lack of off-farm opportunities could push people back into accepting the low wages and hard work of the farming life? 4 did see the chance to produce a more saleable product (breeding stock in some cases), while another 3 saw at least the possibility of an improvement in the overall market, though one of those farmers even as he spoke changed his ‘opportunity’ into a ‘threat’ – the housewife’s choice is more often than not for the cheapest product!

Threats:

- Worsening of health (3, 33, 41, 44, 50)
- Animal health crises (11, 30, 37, 52)
- Shifted into higher threat TB status (37)
- Weather (5, 13, 22)
- Rent inflation (9, 22)
- Reduction or shift in CAP money (e.g. to slipper farmers, to shooting estates) (9, 13, 17, 23, 33, 36, 39, 48, 52)
- Richer folk buying up any available land (11)
- Cheap food culture/power of supermarkets ('2 for 1 deals in supermarket') (13, 31, 41)
- Fall in stock prices (23, 30, 33)
- Increased fuel costs (13)
- Even more paperwork and regulation (13, 31)
- Death of Lord Barnard (33)
- 'Getting sick of it all' (41)
- Losing helpers, harder to get a start in farming (44, 54)
- Capital becomes less available – rules, interest rates etc. (50)

The threats mentioned are really just extreme versions of the weaknesses (worse weather, poorer health, lower prices and higher costs, more onerous regulation, the dependence on subsidies coming home to roost) – things not under the control of the farmer by definition, but also things which he feels he can't prepare for or influence. Put another way, they are the potential results of the weaknesses.

6.8.2. Plans and aspirations

10 farmers had plans which could broadly be described as 'Keep going' (40%), but within this there was a range of subtle shades. 5 wanted to stay the same, 1 from a position of uncertainty, but 2 from a confident position of feeling what they were doing was the best possible – farmer 13 '*is working it as economically as I can*' and farmer 37 thought his system '*pretty optimal, with easy labour*'. One farmer's was ready to change almost everything, as long as the farm stayed in the family, but noted nonetheless that '*the grazing patterns will stay the same, no matter what*'. Another was maintaining his activity more or less unchanged because he felt constrained by his various circumstances from adjusting things too much. A third was keeping going doggedly through ill-health until retirement.

In 4 cases (16%), the pressure of ensuring succession or a good retirement was pushing the farmer towards change or at least worry that things were not bringing in enough income. Succession is particularly difficult, implying in most cases that the heir takes over gradually and therefore that the NBI needs to be spread between more people (and on young people with higher outgoings than their parents). In farmer 11's case, it was an aspiration without urgency: '*I'd like to work more on the farm myself and also give my young sons opportunities here*'. Farmer 52 was relatively confident '*I want to keep going and be able to get our son back here*'. Farmer 31 said, '*If my son wants to stay at home, then I need to expand*'. Farmer 48 was living with heavy constraints and was just '*trying to see if it's possible to make it work for my son*'.

Many were keen to improve the quality of what they were doing but without implying significant intensification – farmer 22 wanted to achieve '*better quality through the pedigree route, so I can bring the farm into proper profitability*'. Farmer 23 wanted to '*Improve the purebred flock and be more successful at sales and shows. Same with the mule lambs. I want to buy the best tups I can afford.*' Farm 52 also wanted to improve the stock through buying better tups.

The lack of availability of land was a constraint to many (farm 9, farm 11) and pushes those who 'want to do more' to increase the NBI towards intensification. Farmer 39 felt the dilemma – *'I want to keep improving and getting a better income from a better product. But really there's not much more we can do.'*

Building up from very little, which a number of the interviewees were doing, is a time of pain today for a better time tomorrow, but farmer 17 is also realistic: *'I want to make money and reap benefits of my investments. I'd like to pack in my job and get more ground, but there's none available. But I am considering going more towards native breeds, so at least I can be self-sufficient in breeding stock.'*

Intensive farm 50 says he is doing what many aspire to: *'Make enough money so we can farm the way WE want, and that means to farm properly without cutting corners'*. Unfortunately, he is not representative. Below the aspirations of many respondents lie the simple and, one suspects, unrealised needs of farmers in the upper dales, as expressed by farmer 36: *'I want to be able to pay my bills. Beyond that, saving for retirement would be good. And maintaining the equipment would be good....'*. As farmer 41 says, *'The amount we have left to invest is not enough – in our case, it goes on walls and drains, but we haven't been able to afford lime, for example. It's not like we're big spenders - we've not had a holiday for at least 15 years!'*

7. Conclusion and recommendations

Our study area has been subject to massive changes over the last few years. Our interviewees told us about huge reductions in sheep numbers (by 30-40% in many cases) and a shortening of the fell grazing period. The number of active stinholders was said to have reduced. While the production of Mule ewe lambs for sale to farms on better ground remains very important, the number of farmers with home-bred Swaledale flocks is decreasing. Cattle herds have also reduced, and again there has been a general shift away from the more traditional breeds.

Away-wintering still happens, but the shock of Foot and Mouth has only further encouraged home wintering, often using recently-constructed sheds which are increasingly being used to finish a significant proportion of the lamb and calf crop.

On the inbye, management decisions have been circumscribed by the list of operations requiring Natural England's consent on SSSIs or AE prescriptions. Artificial fertiliser is still used, but lime and especially basic slag were said to have reduced, partly in response to signals from the ESA scheme. On the other hand, increased dependence on straw, forage and concentrate feeds from outwith the area has brought in large quantities of nutrients which find their way onto the fields.

Although the levels of ecosystem services provided are still very high, there is a perception from both farmer and environmentalist that things are deteriorating. Many farmers felt that their fells and meadows were losing condition; we were unable to see for ourselves what this meant in practice from an agricultural perspective, but Starr-Keddle's analysis of paired field surveys suggests that there is also evidence of loss of ecological condition. Farmers' faith in the advice and guidance from AE officers was generally limited – making up the lack of trust which has resulted from misguided ESA rules, subsequently overturned, may take some time.

Many of the farmers we interviewed felt trapped – the limited amount of intensification carried out by them and their forebears had made it possible for them to enter AE schemes which are

inaccessible to many others. They depend financially on those schemes and they also appreciated the help with restoring walls. But it had also reduced their options – some felt coerced to enter AE – and put them at the mercy of schemes which they felt did not cover their additional costs.

While not minimising the influence of a desire to be a ‘good farmer’ (a standard increasingly set with reference to out-of-dale ideals), one of the drivers for change is the inescapable fact that many of the farms have a low FBI but high turnover. In other words the farmer gets a low return for his effort through a system which exposes him to high risk from price fluctuations in both inputs and outputs. Substitution of capital investments (machinery, buildings) for labour only increases the farms’ exposure to external pressures.

7.1. A critique from a HNV farming perspective

The High Nature Value farming perspective starts from the recognition that, whatever its weaknesses, the current nature conservation riches of the upper dales are to a significant extent the result of farming (and sporting) management over many generations.

“What mattered to [the farmers] was not the biodiversity of the meadows which we treasure not, but the productivity of the vegetation, how much hay of decent quality could be produced given the more natural input of nutrients available from the muck the animals produced. From such necessities, mediated through generations of caring management, the heritage of the meadows we value has been bequeathed to us....” wrote John Rodwell³¹.

HNV farming recognises that these environmental public goods were a by-product of a management rationale in which the function of the ‘habitats’ was agricultural and resulted from a whole system which somehow made social, economic and agronomic sense. If ‘HNV farming’ is to be a meaningful phrase, the system must remain rational from *all* these perspectives.

Against this background and in the light of the very high levels of ecosystem services which the area continues to provide, there were a number of concerns arising from the farmer interviews:

Confusion in agri-environment; a move away from the voluntary approach

We found a situation where messages from Government had in the past been very definite but in some cases had turned out at worst completely misguided or at best confused (concerning rush control, the use of lime and slag, cattle grazing on the fell and the relative role of rabbits and sheep, for example).

While farmers generally felt that there was more flexibility in the latest AE schemes, many still felt themselves to be in a weak position relative to the field officer, whose personal character and experience then assumes a central importance. The need for better understanding between farmers and field officers was clear.

Of serious concern was the apparent willingness to coerce farmers into AE participation on the field officer’s terms by threatening compulsory purchase (an option only very rarely used by Natural England and its predecessors in practice). This represents a complete breakdown of trust and of any belief that a solution which works for both sides can be found. To come across two examples in a sample of 25 is extremely worrying.

³¹ in Gamble, D & St. Pierre, T (eds.) (2010) *Hay time in the Yorkshire Dales*

Poor 'outcomes' for farmer and conservationist

Ironically, there seems to be agreement that though there have been some positives (e.g. farmers having better productivity and hill improving as stock was removed), things have moved in an unfavourable direction from both the agricultural and ecological perspective in many cases. While botanical quality seems to be going down on many fields, as Starr-Keddle demonstrates, farmers also bemoaned the loss of both forage quality and quantity in their grass crop or on their fell pastures. In many cases, though not all, both sides were concerned with the same species – rushes in particular, but also creeping buttercup and soft brome on the inbye and *Molinia* on the rough grazings. This would seem to give a potential focus for collaboration and mutual understanding on the basis of which to build a better understanding of not only farmer needs but conservation officer needs (what favourable conservation status means for various vegetation communities, for example).

Lack of consideration of the farming system; lack of appreciation of farmer knowledge

The underlying problem seemed to us to be in part a lack of consideration of the farming system and of the need for it to function in an ecologically *and* agronomically rational way at the same time. The farmer's need for a certain bulk of crop is one that has driven management for the whole lifetime of a hayfield, for example; it seems strange now to separate that imperative from other aspects of 'condition'; for the farmer, such a dissociation is bound to lead to a feeling of alienation.

We noted the lack of mutual understanding of the 'visions' a farmer and a field officer might have for the same field. This is certainly one aspect of the farming system, but it is also about more than the independent management of certain parcels – all must fit together in an integrated whole. *All* policy, even the most disjointed, is integrated at some level by someone – if Government does not provide a joined-up approach, then this will be done by the farmer.

The case study area provided a really good example of this. England has traditionally taken a parcel-by-parcel approach to its AE schemes (and indeed to its SSSI management agreements); in the upper dales that means tight controls on both pastures and meadows, but little consideration to the farming system into which these fit. Many farmers responded not, as one interviewee said, by reducing their livestock numbers, but rather by intensifying those few elements of the farming system under their full control. However the result is also likely to have direct impacts on the features under scheme management, as our estimates of nutrient inputs illustrate.

Closely linked in practice to this lack of consideration of the logic and needs of the farming system is an apparent lack of appreciation of the farmer's skills and knowledge. Schemes seem predicated on saving habitats from the impact of farming, rather than maintaining them through farming – these contrasting perspectives have obvious knock-on implications for the role of the farmer in conservation. Significantly, there seems to be little discussion with farmers about how farming – even farming in the past, before modern fertilisers and herbicides – could possibly deliver a suite of outcomes which includes biodiversity conservation. When we asked such questions to farmers, it was obvious that they had never been asked them before. As well as creating a situation where aims and objectives are likely to end up in antagonism, this also relieves farmers of the responsibility for living up to their own image of themselves as the true guardians of the countryside.

No consideration of farm-scale economics

The same lack of a farm-scale perspective is manifested when it comes to the economics of the farm; indeed, it might be argued that it is the economic pressures which lead many of the farmers to

follow quite high-risk paths to increase their net incomes. It used to be said by Government in Scotland that conservation designations are ‘an accolade, not a burden’; the reaction in the case study area would be the same as it was in Scotland – as an interviewee said, there is a price to be paid for being a HNV farmer. He didn’t spell it out, but he meant that that price was being paid not by the State, but by him.

This has a number of aspects. At its most basic, Government does not seem to be considering whether the FBI of HNV farmers (farmers delivering a range of ecosystem services and public goods for which there is no normal market) is adequate, whether their reward per hour is sufficient or even whether it is higher than the minimum wage.

At a rather deeper level, farmers are receiving a range of different payments, attached to a variety of conditions. Some are available without any substantial activity or the incurring of significant costs by the claimant and are thus easily detached from farming per se. The implications of such flexibility for regions and systems where the delivery of public goods is dependent on at least some sort of coupling with agricultural activity does not seem to have been thought through. This includes considering the economics of certain activities (late cutting, grazing exclusion etc.) within the context of the overall economies of the farming system – for example, it makes little sense to consider only the income forgone of an extra week before cutting a meadow, if the cattle system in which that fodder is used is itself uneconomic.

Lack of joined-up policy

The perception that agricultural and AE policy is not ‘joined-up’ fits within a wider picture of policy incoherence, aspects of which were touched upon by our interviewees – planning rules, changing fashions on apprenticeships, animal movement rules and the weaknesses of regional policy all contribute to weakening the social and economic infrastructure within which HNV farming operates, including that of the wider rural community in the area (although the two are not the same thing).

Lack of independent advice

In this confusing and complex policy environment, where long-established ways of looking at things are complicated by things like the decoupling of payments, the availability of easily-accessible, reliable, good-value independent advice is essential for the farmer. While two of the study areas had no ready access to advice, Teesdale farmers had access to the Upper Teesdale Agricultural Support Services (UTASS). Our interviewees’ comments suggested that even UTASS was under considerable financial pressure, which is never a good basis for targeting independent advice where it is most needed.

7.2. Suggestions for action

On the basis of these perceived difficulties for HNV systems, we suggest a number of courses of action. Some are best addressed at the national (i.e. English) level, while others require local action; yet others may be open to local action as pilot areas or special cases within a wider national framework.

7.2.1. At the local level

Building trust: a North Pennines Farming Forum

In many AONBs (e.g. the Cotswolds), there is a formal Farming Forum which acts as a vehicle for a two-way conversation on a range of issues – information exchange, consultation, policy development. The *modus operandi* reflects local needs, but at a minimum the Forum meets annually; many form ad hoc working groups to work on particular topics.

Building trust: training of conservation professionals by farmers

A project³² run by the Foundation for Common Land is building up understanding between farmers and nature conservation administrators and NGOs in two pilot areas (Lake District and Dartmoor) through on-farm training on hill farming, delivered by the farmers themselves. The feedback has been extremely positive from both trainee and trainers, with the whole exercise building both trust and confidence. It would be possible to run a similar project in the case study area; if successful, it could even be self-funding after the initial set-up period.

Building trust: building bridges on understanding Favourable Conservation Status

One of the main stumbling blocks for understanding is the legal requirement on the State to fulfil its obligations under the EU Habitats Directive to bring Annex 1 habitats into Favourable Conservation Status on Natura 2000 sites, which leave administrators with little room for flexibility (but perhaps some flexibility nonetheless). It is vital that this most critical of constraints is well-explained and well-understood.

EFNCP has been working as an interlocutor between farmers and the National Parks and Wildlife Service (the equivalent of Natural England) in Connemara, Ireland – an area where animosity had reached a critical level. Such work is not easy and does not deliver immediate results - our Irish colleague had to arrange separate field visits before there was even a possibility of a joint meeting. However, it would be well worth such a process being initiated in the upper dales area, where the situation is by no means as dire as it became in Co. Galway and where, in some cases at least, there is scope for joint effort against common problems (rushes, *Molinia*...) and scope for some flexibility within wider constraints (working towards more rather than less agriculturally-rational upland hay meadow communities, for example). This could be initiated by the AONB, if appropriate staff are available to lead it.

Building trust: raising the positive profile of farming

A recurring theme was the lack of understanding of farming by the public, be it in the context of worming walkers' dogs or the need for financial support. Raising public awareness of farming can deliver these and many other messages. This is a classic case where public-private partnership can work well, with initiatives from the AONB supporting, catalysing and possibly co-ordinating action by farmers and other local businesses. We came across two specific project ideas in our farm visits, although the farmers had no idea where to seek advice; this needs to change.

³² <http://www.foundationforcommonland.org.uk/hill-farming-training-scheme-for-conservation-professionals>

Strengthening farming communities: encouraging collaboration

We came across a number of instances where collaboration might be beneficial to the local farming community, but where some ‘match-making’ arrangement would possibly be helpful. This might include buying co-ops or machinery rings, or could involve collaboration in marketing or livestock finishing, or land banking – acting as an independent matchmaker to free up access to land, not least for new entrants. There are clear overlaps with both awareness-raising on the one hand and with advice provision on the other; the key is to find the gaps in private or national provision and to be ready to fill it at an AONB or local level.

Strengthening farming communities: the planning process

A range of disparate issues were raised which broadly come under the ‘planning’ umbrella. While it is difficult to suggest specific actions, it appears that some sort of better dialogue with the farming community on issues such as farm building conversion would be beneficial, even if only to clarify the AONB approach to commonly-arising questions. In addition, and more positively pro-actively, the AONB could set out those developments which they would support and/or encourage (which might include those which support farm business income at the same time as strengthening appropriate land management; local production facilities; provision of recreation/tourism facilities). As it is, news of apparently perverse decisions spreads quickly, alienating and heightening the feeling of marginalisation in the farming community, and souring relations with the planning authority.

7.2.2. Locally, within a national framework

Building trust: delivering Favourable Conservation Status through collaboration

It might be thought impossible for farmers and conservation administrators to collaborate on the delivery of biodiversity goals within a workable farming system, even if both sides understood each other’s objectives. However, it is just such an approach which has been taken in the innovative Dartmoor Farming Futures (DFF) project³³.

An independent evaluation³⁴ by Cumulus Consultants concluded that the key strengths of the DFF approach include:

- Open process
- Improved dialogue between the parties and development of closer working relationships
- Improved understanding of environmental features, ecosystem services and agri-environment schemes
- Empowered commoners to take ownership of outcomes, management and monitoring
- Re-unitisation and re-assessment of SSSI
- Improved verifiability arising from the outcome-focused agreement
- Greater flexibility
- Increased likelihood of positive outcomes from the agreement
- Increased level of support for commoners
- Generated enthusiasm amongst commoners and partners
- Independent facilitator role

The main weaknesses identified included:

³³ http://www.dartmoor-npa.gov.uk/_data/assets/pdf_file/0008/164564/DFF-final-report.pdf

³⁴ <http://www.dartmoor-npa.gov.uk/lookingafter/laf-landmanagement/dartmoor-farming-futures/Dartmoor-Farming-Futures-Independent-Project-Evaluation.pdf>

- Lot of responsibility on the Commons Associations/Trustees
- Time required from commoners and partners to develop the project
- Not reaching/engaging some commoners

These strengths are all ones which would have a positive impact in the case study area. The Partnership should explore with the relevant authorities the possibility of rolling out this Farming Futures approach to the AONB, within the RDPE framework. This could fit with the top and middle tiers of the New Environmental Land Management Scheme, covering designated sites and landscape scale working, with delivery integrated at local level.

Independent advice provision

The value of independent, dependable advice is recognised in European rural development legislation. Comments from the interviewees reinforced how important it is that it should also be locally-tailored and delivered locally. While it is appropriate that some types of advice are paid for by the farmer, advice on the delivery of public goods should be available gratis (again, as the EAFRD Regulation foresees). This approach to advice is precisely the one taken by the Scottish Government through its programme of Advisory Activities, delivered by SRUC³⁵. It will be important however to integrate environmental/public good advice with commercial advice at farm level; a number of different approaches could be used to achieve this.

While advice provision in England could be delivered and organised at a national level, it does not seem likely at present that any such provision will fulfil the needs of upper dales farmers. However, the Welsh experience may indicate one way forward. The issue there was the perceived disadvantage at which commoners found themselves when it came to AE participation. A team of common land project officers was appointed to address this specific issue, with the result that uptake by commons ended up higher than uptake by individual applicants (a full evaluation report was produced³⁶). Although rather too much is made of the alleged 'Leader approach' to the issue (the project was run on a national basis using RDP Technical Assistance funds, albeit delivered at arm's length from central government by a consortium of three Leader companies), there is nothing to prevent a *real* Leader approach, with local-level advisory bodies delivering under the England RDP umbrella and using RDPE funding.

It would seem possible to combine public goods/ecosystem services-related advice and advice which, as in Wales, was aimed to overcome the specific additional transaction costs of commons and stunted pastures, with a paid-for service of assistance with partial budgeting and other business advice, livestock and grassland management, animal health and other regulations and of course CAP support payments.

Informing national policy: developing quantified case studies at system and field level

Our work has shown how failing to analyse issues at the system/farm level can have poor outcomes for both policy-makers and farmer. While it *may* be possible to put in place local-level mechanisms such as Farming Futures, many of the key decisions (payment levels; degree of integration of schemes; details of scheme rules etc.) are decided at a national level. Building on this report, the AONB partnership should endeavour to input real quantified examples into not only the current CAP consultations, but future policy shaping exercises. The opportunity should also be taken to involve farmers in the formulation of these messages. The data in this report can be made more robust (e.g. by actual accounts analysis, as opposed to asking farmers for percentages and bands).

³⁵ http://www.sruc.ac.uk/info/120417/advisory_activities

³⁶ http://www.ccri.ac.uk/wp-content/uploads/2013/07/CDO_Eval-Report_Reduced.pdf

And while we stress the farm level because it has been so neglected, specific aspects of the farm economy could usefully be examined – the additional costs/income foregone on specific hay fields, for example (national schemes usually rely on national averages which are not necessarily relevant, let alone representative of upper dales conditions) or the economics of seasonal lets. It would be interesting to try to monitor the changing relationships between farming activity and scheme participation, though this is easier said than done.

Preparing for future Payment for Ecosystem Services schemes

The North Pennines provide a wide range of valuable ecosystem services, many of which are influenced by and dependent on the activities of farmers. A number of pilot schemes have been developed around the country to demonstrate how PES could work in practice. These are identifying the desirable/necessary changes in environmental land management in a particular area, who the beneficiaries and payers might be; and the nature and level of payments, potentially, for participating farmers.

While it is still early days for these pilot schemes, and there is no scheme yet in the North Pennines, the AONB may wish to be engaged with Defra and the development of PES at national level, consider the lessons being learned, and apply these locally. It could assess the potential benefits, explore the shape of future services, engage with possible beneficiaries and providers, and begin to consider scheme details. This would prepare the way for more detailed development and roll-out in due course.

7.2.3. At the national level

Some changes can only be implemented nationally. However, the AONB, hopefully strengthened by an ever-improving relationship with local farmers, should be able to make informed comments on Government proposals on a range of issues.

Improving policy: rewarding activity, disincentivising inactivity

The project raised serious questions about the complete decoupling of activity from scheme payments, especially now that direct payment rules are not counteracting the incentive which already existed in AE schemes to be a slipper farmer. Minimum activity rules as part of the definition of an active farmer seem essential.

Payment levels for farmers who carry out at least this minimum should reflect the real costs of working in the local area; while it is perhaps unreasonable for payments to aspire to reflect the net costs of *all* systems in the upper dales, farmers delivering public goods should at least receive the minimum wage for their labour. This implies carrying out calculations for each of the likely scheme combinations and, most importantly, working out the costs relating to the obligations made in each scheme.

Improving policy: improving agri-environment and other rural development delivery

Whereas it may be desirable to deliver some or all agri-environment schemes locally, the AONB will need first of all to make comments on proposals for scheme design, delivery mechanisms, prescriptions, payments and so on at the national level. Defra is putting increasing emphasis on delivering multiple environmental benefits from its schemes in future; in other words, securing a

range of ecosystem services. The AONB may wish to try to pin it down on how this can and will be delivered in practice, and how publicly-funded schemes should be dovetailed with commercially funded PES schemes (referred to above). Over and above the concerns raised about area-based options, there was a clear call in the upper dales for long-term funding for wall repair and restoration.

Reference was made above to the advisory service – the AONB may want to put forward ideas on that, on training, both for existing farmers and new entrants (including apprenticeships), on support for diversification both on-farm and for businesses which directly impact on farming communities. Support from rural infrastructure is also seen as a key issue for the retention of young people – things like rural broadband and even mobile phone coverage; this can also be funded through the RDPE. The AONB has an important role in highlighting the need for an integrated approach to rural development in the North Pennines, and working with the farming community and other partners to put forward proposals to address issues most relevant to the upper dales.

Annex

North Pennines AONB - High Nature Value Farming Research Project Questionnaire

Section A - Farm Background

Q1. Name and contact details

Name of Farmer	
Name of Farm	
Study Area (<i>circle one</i>)	Upper Teesdale Upper Weardale Alston Moor

Q2. Very briefly outline your farm size and tenure

Farm Size <i>Area of core farming business in ha (not including common land)</i>	
Farm Tenure <i>Owner Occupier Tenant (FBT or AHA?) Landlord?</i>	
Common Grazing <i>Active or non active Rights held Rights exercised</i>	
Access to lower-lying land elsewhere <i>Area, type, tenure. Check if included in core farm area or not</i>	

Q3. A little more about you and your family

Farmer Age	Under 30	30 - 40	40 - 50
	50 - 60	60 - 65	65+
If you are over 65 are you planning to retire?	Yes	No	Don't Know
How long have you farmed the holding?			
How long have your family farmed the holding?			
Do you have children who are hoping to take on the farm?	Yes	No	Maybe

Section B – Stocking & Cropping

Q4. How would you describe your land use/type? What is the area roughly? Briefly describe your management systems e.g. cropping, silage/hay, yields, fertiliser inputs, cutting dates, reseeding, grazing, gathering etc.

Land Use	Area	Management
Arable		
Ley Grass		
Improved Permanent Grass <i>Inc. inbye pastures and meadows</i>		
Semi-improved Permanent Grass <i>Inc. inbye pastures and meadows, and semi improved moorland fringe/allotment etc.</i>		
Unimproved Permanent Grass (own) <i>Inc. wet grassland, unimproved moorland fringe/allotment etc.</i>		
Unimproved Permanent Grass (common) <i>Inc. wet grassland, unimproved moorland fringe/allotment etc.</i>		
Rough Grazing (own) <i>Inc. unenclosed acid grassland, heather moorland, blanket bog etc.</i>		
Rough Grazing (common) <i>Inc. unenclosed acid grassland, heather moorland, blanket bog etc.</i>		
Scrub & Woodland		
Other		

Q5. What breeding stock and followers do you have? Briefly describe your management systems e.g. breeds, calving and lambing dates, finishing or stores, marketing, hefted, housed or out-wintered, grass fed or mixed rations, disease issues etc?

Livestock	Breeding	Followers	Management
Dairy Cows			
Suckler Cows			
Ewes			
Other			

Q6. A few more questions about your system...

Are you involved in any farm assurance schemes? e.g. FABBL, Freedom Foods, PFLA, organic etc	
How many tonnes of artificial fertiliser do you purchase each year?	
How many tonnes of lime do you purchase each year?	
How many tonnes of additional forage (silage, hay, whole crop etc) do you purchase each year?	
How many tonnes of other feed (concentrate, molasses, grain etc) do you purchase each year?	

Q7. How does your landlord influence your farming system (tenants only)?
 For example, are there any restrictions or linkage with the sporting activity on the moor or has the landlord helped with diversification.

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Q8. What have been the biggest changes to the farming system over the last 10 years?

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Section C – Diversified Enterprises

Q9. Do you have any other enterprises based on the farm e.g. renewable energy schemes, farm tourism or food processing and direct sales?

If yes, please describe.

Section D – Farm Environment

Q10. What are the most important habitats and environmental features on your farm? Are they designated? Do you think they are in good, average or poor environmental condition? How have things changed over the last 10 years? What are the reasons for this change?

Habitat/Feature (designation)	Current Condition	Change	Reason for Change
<i>Species rich hay meadow – approx 5ha on farm (SSSI)</i>	<i>Good</i>	<i>Improved</i>	<i>HLS funding and advice has helped revert to late hay cutting and low level cattle grazing</i>
Etc.			

Q11. What are the most important species on your farm? Do you think they are declining or increasing in number/coverage? How have things changed over the last 10 years? What are the reasons for this change?

Species	Current Number	Reason for Change
<i>Black Grouse</i>	<i>Increasing</i>	<i>Better management on the fell</i>
Etc.		

Q12. What environmental schemes (ESA, ELS, HLS, EWGS etc) have you been involved in? What have been the positive and negative impacts of these schemes on your farm?

Scheme	Positive Impact	Negative Impact

Q13. Being a farmer in such a special landscape means you and your system provide many environmental and social goods e.g. food and habitat. You need a range of skills and knowledge to do this successfully.

Which of the following do you think your farm provides?

Which are you most interested in and would you like to provide more of?

In which areas do you possess most skills/knowledge?

Please score 1 – 5.

5 Very High	4 High	3 Medium	2 Low	1 Very Low
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Role	Provision	Interest	Knowledge	Comments
a) Managing livestock and producing food				
b) Managing and providing public access and tourism				
c) Managing natural habitats				
d) Protecting particular species				
e) Managing archaeological sites and features				
f) Protecting watercourses and water quality				
g) Managing the landscape				
h) Managing soil and carbon				
i) Managing the land for sporting benefit				
j) Preserving tradition and cultural heritage				

Section E – Farm Economics

Q14. Can I ask about your farm labour?

a) How many people work on the farm?	Full Time (more than 39hrs/wk)	Part Time (16 – 39 hrs/wk)	Part Time (less than 16hrs/wk)
b) Do you use contractors? If yes, for what?			
c) Do you also earn additional income off the farm?			
d) Does your partner also earn additional income off the farm?			

Q15. Can I ask a little about your farm income?

a) What was your approximate Farm Business Income (FBI)* from all sources? <i>Average over last 5 years if possible</i>	Net Loss	£0 - £5,000	£5,000 - £10,000
	£10,000 - £15,000	£15,000 - £20,000	£20,000 +
b) What has been your FBI trend over the last 5 years?	Up and Down	Falling	Improving
c) What are your FBI predictions for the next 5 years?	Up and Down	Falling	Improving

**Note: FBI = total output from agriculture (inc. SPS, agri-environment schemes and diversification), minus expenditure (inc. variable costs, fixed costs/overheads including paid labour). It excludes unpaid labour and off-farm income.*

d) Approximately, what percentage of your farm income comes from the following <i>e.g. 30%, 30%, 30%, 10%</i>	SPS	Agri-environment	Stock/Crop Sales	Diversification

Section F – The Future

So far, we have focused your current farming system. Can I ask for your thoughts on the future?

Q16. What are your objectives and future plans for the farm business?

For example, your objectives might be to develop a more viable beef and sheep enterprise which respects the natural environment. You plan to increase cattle but decrease sheep numbers now your HLS has started

<u>Objectives</u> <u>Plans</u>

Q17. What are the strengths and weaknesses of your farm business?

For example, you may feel that your skills as a stockman, the farms natural beauty and tourism facilities are all important strengths. The lack of buildings or improved inbye may be a weakness.

<u>Strengths</u> <u>Weaknesses</u>

Q18. What are the main opportunities and threats for the farm?

For example, you may see scope to add value to your beef, change your grazing system or to optimise agri-environment income. You may be worried about CAP reform and the likely decline in payments, increasing input costs or your age/ill health.

<u>Opportunities</u> <u>Threats</u>
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Q19. What do you see as the main barriers to your objectives and plans?

Barriers may include planning constraints, tenancy issues, finance, land availability, time etc

Please describe.

Q20. What support do you need to help realise your objectives and plans? This support might be from organisations such as the AONB Partnership or Natural England/Defra.

Please describe.

Q21. What do you see as the areas of potential conflict or compromise between your objectives and plans, and the environment?

Please describe.

Section G – Additional Comments

Q22. Your farm and farming system could be described as ‘High Nature Value Farming’. What do you think are the positives and negatives of being an HNV farmer?

Positives

Negatives

Q23. Are there any other comments or points you would like to raise?

*Thank you very much for taking part in this interview
Mention workshop/seminar date*