Upland Farming and Biodiversity: What do we need to know?

A Rural Economy and Land Use Programme Research Project
Upland Farming and Biodiversity: What do we need to know?

_A Landscape-scale Analysis of the Sustainability of the Hill Farming Economy, and the Impact of Farm Production Decisions on Upland Landscapes and Biodiversity in the Peak District_

Executive Summary

This Rural Economy and Land Use Programme research project was funded to examine the impacts of agricultural policy reform on hill farming economics, upland landscapes and the associated upland biodiversity.

The UK’s uplands support traditional rural practices, such as hill farming, and are home to several emblematic species and habitats which are of conservation concern. These areas also provide a range of ecosystem goods and services, _e.g._ carbon storage. The upland landscapes that we see today have been shaped over many generations by the management practices of farmers and land managers, and these practices have partly been influenced by government policies on agricultural support. However, these policies are currently changing, therefore policy-makers need information which shows how ongoing changes are likely to affect farming communities and upland ecosystems, and whether these policies will deliver what the public wants from the uplands.

This project examined what was happening to the economics of hill farming and the impacts of changing agricultural practices on the upland wildlife in the UK, and used farms in the Peak District National Park as a case study. The primary aims of the project were to: i) Design a modelling approach that takes into account farm economics and farmland ecology; ii) Look at how hill farming will respond to changing policy frameworks; iii) Assess whether alternative policies could deliver sustainable hill farming economy and moorland conservation, and iv) Look at the public’s understanding of, and preferences for, different moorland futures.

The results of this project highlight that public policy support is very important in sustaining upland farming. However, the impacts of support vary between regions and different farm types. Agri-Environment Schemes provide additional support on which many farmers have come to depend. These payments are designed to encourage farmers to provide ‘public goods’, such as improved habitat for a particular species. However, agri-environment policies are also undergoing major changes and the effects on upland bird populations are mixed. Further work is being carried out to examine how agricultural subsidy schemes can be designed more effectively to provide benefits for farmland wildlife in a cost-effective manner.
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1. Introduction

The UK’s uplands support traditional rural industries, such as hill farming, and are home to emblematic species and habitats of conservation concern. They also provide a wealth of ecosystem goods and services. The landscapes that we see today have been shaped over many years by the management practices of farmers and others, partly influenced by government policies on agricultural support. However, these policies are currently changing. Policy-makers need information regarding how these ongoing policy changes are likely to affect farming communities and upland ecosystems, and whether these policies will deliver what the public want from the hills.

This project examined what was happening to the economics of hill farming and the impacts of changing agricultural practices on the hill farm biodiversity in the UK and used farms in the Peak District National Park as a case study.

The UK’s uplands have been shaped by centuries of human exploitation and now many characteristic upland habitats and wildlife are dependant on continued management. Heather moorlands are a prime example, with grazing and burning required to maintain habitat quality and therefore provide suitable habitats for several upland bird species, such as red grouse. The uplands are dynamic environments which have changed significantly over time, and policies which have under-pinned agricultural activity are currently undergoing significant upheavals. These changes are not only affecting farmers but also the flora and fauna, particularly birds, associated with upland farmed landscapes.

For many people upland landscapes provide an important and long-standing ‘sense of place’. However, an examination of historical records for the Peak District reveals a number of interesting changes that have occurred since 1900:

- There has been a five-fold increase in sheep numbers maintained by farms in the hill parishes
- Medium sized farms decreased in number as large farm businesses and hobby farmers emerged
- Farming simplified as traditional mixed enterprises disappeared, resulting in increased livestock specialisation
- Upland habitats are frequently changing, with areas of moorland being lost from some areas and gained in others

1.1. Project aims and objectives

The primary aims of the project were to:

- Design a modelling approach that takes into account farm economics and farmland ecology
- Look at how hill farming will respond to changing policy frameworks
- Assess whether alternative policies could deliver sustainable hill farming economy and moorland conservation
- Look at the public’s understanding of, and preferences for, different moorland futures
1.2. Methods

Economics: To examine the economics of hill farming farm surveys were carried out on 44 farms across the Peak District. Researchers interviewed farmers about a range of factors relating to the ways in which they manage their farms, including: what they produce (e.g. beef cattle, lambs, etc.); the prices of their main inputs (i.e. the price of fertilizers, fodder, etc.); how many people work on the farm; and, what subsidies they receive and the management they are required to carry out as part of the agreement. Six farm types were identified from the survey results and they are shown in Table 1.

Ecology: Farmland birds have been particularly affected by changes in land management practices throughout the UK, and the uplands are no exception. As a result, we chose birds as an indicator of how changes to upland farming practices was affecting wildlife. Bird surveys were carried out on all farms which had completed the farm survey. All species present on each farm were counted and recorded, and the information used as a measure of species richness, with a higher richness (i.e. more bird species) indicating that more environmentally beneficial farming practices were being used.

Modelling: The challenge currently faced by agricultural policy-makers is how to promote a sustainable farming economy but at the same time promote the conservation of farmland wildlife. We combined the economic and ecological data gathered from the farm and bird surveys to create ‘farm production models’ which allowed us to predict what the effects different policy scenarios would have on hill farmers, how they managed their land, and on the wildlife on their farms.

Valuation: We were interested to find out how the public perceived the UK’s uplands, how much they understood of how the uplands were managed, and what they preferred the uplands to be like in the future. To assess this we carried out a series of ‘choice experiments’ with local residents living near, but not within, the National Park. Participants were asked to complete a series of ‘choice cards’ (see Table 2) which listed different scenarios relating to the management of moorlands, moorland fringe habitats, valley bottom farmland and the quality of the footpath network within the National Park. Council tax was also included as a factor. Each scenario would either increase or decrease the intensity of management, and therefore have an impact on the Peak District’s landscape. There was also an option to ‘do nothing’. Each choice also had a cost associated with it. The design of the experiment allowed us to identify which features were most important to local people and how there views changed over time and with experience by asking them to complete choice cards before, during, immediately after and four months after a visit to the National Park.

1.3. Structure of this Report

Following a stakeholder meeting on 5th October 2009 in Edale we were presented with a list of questions relating to different aspects of our research that stakeholders were keen to be answered in more detail. Despite a wide range of interesting topics, some questions fell outside of the scope of this project, therefore we were not able to address all the questions that were put forward. As a result, we focused on a subset of questions which we were able to answer based on the research carried out.

This report presents the responses to these questions in a way we believe is easy and accessible, and which allows the reader to use this resource as a quick reference guide to the sustainability of hill farming in the Peak District. At the end of the report we provide some further references where readers can obtain more detail on the research underlying these responses. The list of stakeholder questions and the subset addressed are shown in Table 3.
Table 1. The six Peak District farm types identified through the farm survey and the main physical and socio-economic characteristics of each farm.

<table>
<thead>
<tr>
<th>Farm characteristics</th>
<th>Moorland Sheep &amp; Beef</th>
<th>Moorland Sheep &amp; Dairy</th>
<th>Moorland Sheep</th>
<th>Inbye Sheep &amp; Beef</th>
<th>Inbye Sheep &amp; Dairy</th>
<th>Inbye Beef</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total area (ha)</td>
<td>1018</td>
<td>304</td>
<td>639</td>
<td>120</td>
<td>107</td>
<td>127</td>
</tr>
<tr>
<td>% Moorland</td>
<td>86</td>
<td>64</td>
<td>85</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>% Inbye</td>
<td>14</td>
<td>36</td>
<td>15</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Store lambs for sale</td>
<td>111</td>
<td>77</td>
<td>437</td>
<td>162</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Store cattle for sale</td>
<td>24</td>
<td>0</td>
<td>0</td>
<td>27</td>
<td>0</td>
<td>19</td>
</tr>
<tr>
<td>Unpaid family labour (number of people working full time per year)</td>
<td>1.7</td>
<td>1.6</td>
<td>1.5</td>
<td>1.3</td>
<td>1.6</td>
<td>0.8</td>
</tr>
<tr>
<td>Hired labour</td>
<td>0.1</td>
<td>0</td>
<td>0</td>
<td>0.1</td>
<td>0.4</td>
<td>0.2</td>
</tr>
<tr>
<td>% of income from farming activities</td>
<td>82</td>
<td>89</td>
<td>70</td>
<td>58</td>
<td>95</td>
<td>54</td>
</tr>
<tr>
<td>% of income from off-farm activities</td>
<td>12</td>
<td>11</td>
<td>20</td>
<td>33</td>
<td>0</td>
<td>29</td>
</tr>
<tr>
<td>% of income from diversification</td>
<td>6</td>
<td>0</td>
<td>10</td>
<td>9</td>
<td>5</td>
<td>17</td>
</tr>
<tr>
<td>Income from subsidies (£/ha)</td>
<td>78</td>
<td>91</td>
<td>64</td>
<td>527</td>
<td>183</td>
<td>160</td>
</tr>
</tbody>
</table>
Table 2. Sample ‘choice card’ used in the choice experiment. Participants were given 16 different choice cards and required to fill in them in according to what they would prefer to see happen to the landscape within the Peak District National Park – either option A, B or do nothing.

<table>
<thead>
<tr>
<th>Landscape Area</th>
<th>Option A</th>
<th>Option B</th>
<th>Do Nothing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moorland – Intensity of Management</td>
<td>Less intensive:</td>
<td>No change</td>
<td>More intensive:</td>
</tr>
<tr>
<td></td>
<td>• Less sheep and burning</td>
<td></td>
<td>• More sheep and burning</td>
</tr>
<tr>
<td></td>
<td>• More bird species</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moorland Fringe – Intensity of Management</td>
<td>Less intensive:</td>
<td>Less intensive:</td>
<td>More Intensive:</td>
</tr>
<tr>
<td></td>
<td>• Less sheep and burning</td>
<td>• Less sheep and burning</td>
<td>• More sheep, increased fertilizer application and drainage</td>
</tr>
<tr>
<td></td>
<td>• More bird species</td>
<td>• More bird species</td>
<td></td>
</tr>
<tr>
<td>Valley Bottom Farmland – Intensity of Management</td>
<td>No change</td>
<td>Less intensive:</td>
<td>More Intensive:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Less sheep and less fertilizer</td>
<td>• More sheep, increased fertilizer application</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• More bird species</td>
<td></td>
</tr>
<tr>
<td>Footpath Network</td>
<td>Improved</td>
<td>Degraded</td>
<td>Degraded</td>
</tr>
<tr>
<td>Tax Cost</td>
<td>£5</td>
<td>£55</td>
<td>£0</td>
</tr>
<tr>
<td>Please tick the option you prefer</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 3: Questions put forward by stakeholders at Edale, 5\(^{th}\) October 2009.

**Acronyms:**  
*SFP* – Single Farm Payment  
*AES* – Agri-Environment Schemes

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**Questions**

A. **CAP & AES**  
1. What would be the effect of losing the SFP?  
2. What would be the effect of losing the SFP when AES payments are retained?  
3. What would be the effect of losing AES payments?  

B. **Market Forces**  
1. What are the effects of rising input and output prices?  

C. **Farm Types & Structure**  
1. What are the key factors influencing the future balance between sheep, beef and dairy farming in the Peak District?  
2. What are the effects of policy reform on the extent of part-time farming?  
3. What are the predicted changes in labour availability?  

D. **Biodiversity**  
1. What factors influence the abundance of different groups of birds?  
2. What area the relationships between land use, including intensity of inputs, and the number of different bird species?

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2. **Questions**

A. **Common Agricultural Policy (CAP) & Agri-Environment Schemes (AES)**

This section examines the impacts of the **Common Agricultural Policy (CAP)** and **Agri-Environment Schemes (AES)** on upland farming in the Peak District.

The CAP is the EU’s primary land use policy and has been instrumental in shaping farming in the UK and western Europe. The CAP was created in the 1950s with aim of providing the EU with an affordable supply of food and a viable agricultural industry. In order to achieve this high yields were encouraged through payments for production, which helped drive agricultural intensification throughout Europe. However, by the 1980s food surpluses were common and intensification was having a detrimental effect on the wildlife associated with farmed landscapes. As a result, the CAP now focuses on protecting farmland wildlife and encourages conservation through payments for the use of environmentally sensitive farming practices.

The **Single Farm Payment** (SFP) scheme was introduced in 2005 after several reforms of the CAP. Payments under this scheme are no longer linked to production, so farmers are now paid by the area that they farm regardless of the number of livestock they keep. This scheme has provided the EU with an opportunity to refocus its land use policy onto environmental and rural livelihood outcomes.

**Agri-Environment Schemes** (AES) provide additional support to farmers and aim to encourage the use of environmentally sensitive farming practices through payments to farmers and landowners. The main AES currently available in England are the Entry Level Stewardship (ELS) and Higher Level Stewardship (HLS) schemes.
### A1. What would be the effect of losing the SFP?

Over 90% of upland farmers in the Peak District received the Single Farm Payment (SFP) in and, on average, this payment contributed over £23,000 to farm income. As a result, the loss of the SFP is predicted to have a significant impact on upland farms. Of the six farm types found in the Peak District, five would have negative net farm incomes following the loss of this payment, and would therefore become financially unsustainable (Fig. 1). Only Inbye Sheep and Dairy farms would remain as viable farm businesses. However, sheep production is predicted to be lost completely from this farm type and flock sizes would be reduced across the remaining farming systems. Moorland Sheep farms are the exception and would increase their sheep numbers. Land management practices is also likely to change, with an increase in the area of abandoned land across all farms (Fig. 2)

![Fig. 1. Net Farm for each farm type, with and without the SFP.](image1)

![Fig. 2. The area of abandoned land for each farm type, with and without the SFP.](image2)
A2. **What would be the effect of losing the SFP when AES payments are retained?**

The loss of the SFP would have a serious impact on the economic viability of all Peak District farm types, even with farmers receiving payments from Agri-Environment Schemes (AES). Losing the SFP is predicted to result in negative net farm incomes for four of the six farm types, with only Moorland Sheep and Dairy and Inbye Sheep and Dairy remaining financially viable (Table 4). The inclusion of income from off-farm sources or diversification activities helps to boost income; however, Moorland Sheep and Beef and Moorland Sheep are still predicted to have negative net farm incomes and therefore become unsustainable under either scenario. The intensity of livestock production is predicted to remain unchanged as participation in AES results in low levels of livestock production.

Table 4: The effect on net farm income of losing the SFP for each farm type. The table shows the impact on income for two different scenarios: i) Where farmers only receive payments from AES, and ii) where income from AES is supplemented with other source of income, such as off-farm income or diversification activities. ✓ denotes a positive net farm income, × denotes a negative net farm income.

<table>
<thead>
<tr>
<th>Farm type</th>
<th>Net Farm Income (£/ha)</th>
<th>AES only</th>
<th>AES and other income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moorland Sheep &amp; Beef</td>
<td>×</td>
<td>×</td>
<td></td>
</tr>
<tr>
<td>Moorland Sheep &amp; Dairy</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Moorland Sheep</td>
<td>×</td>
<td>×</td>
<td></td>
</tr>
<tr>
<td>Inbye Sheep &amp; Beef</td>
<td>×</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Inbye Sheep &amp; Dairy</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Inbye Beef</td>
<td>×</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>

A3. **What are the effects of losing AES payments?**

The loss of AES payments would have a negative impact on net farm income and result in the intensification of livestock production in the Peak District. Net farm income is predicted to be positive for all farm types when farmers receive the SFP, payments from AES and income from other sources, such as diversification (Table 5). However, losing AES payments results in a net loss of income on Moorland sheep & Beef and Moorland Sheep farms, even when additional sources of income are included (Table 5). Greater loss of income is predicted for these two farm types if AES payments are lost and income from other sources is not included. Under this third scenario Inbye Beef farms also become unsustainable.

Without the restrictions imposed by AES agreements the area used for livestock production and flock sizes are predicted to increase on all farm types. However, fewer sheep are predicted on Moorland Sheep and Beef farms. Cattle numbers are expected to remain constant except on Moorland Sheep and Beef and Inbye Beef farms where beef production increases.
Table 5: The effect on net farm income of losing payment from AES for each farm type. The table shows the impact on income for two different scenarios: i) Where farmers receive the SFP and payments from AES and income from other sources is taken into account. ii) The SFP and AES payments are received but other sources of income are not included in total net farm income, and iii) only the SFP is received. ✓ denotes a positive net farm income, ✗ denotes a negative net farm income.

<table>
<thead>
<tr>
<th>Farm type</th>
<th>SFP &amp; AES &amp; other income</th>
<th>SFP &amp; AES</th>
<th>SFP only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moorland Sheep &amp; Beef</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Moorland Sheep &amp; Dairy</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Moorland Sheep</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Inbye Sheep &amp; Beef</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Inbye Sheep &amp; Dairy</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Inbye Beef</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
</tr>
</tbody>
</table>

**B. Market Forces**

This section examines the potential impacts of changing input and output prices on different key factors relating to upland farming. Inputs refer to the items that the farmer uses as part of the farming process, such as feeds and fertilizers. Outputs are the products of the farming process, such as lambs, calves or fodder crops.

**B1. What are the effects of rising input and output prices?**

The impacts of an increase in key input and output prices on specific outcomes for the most common sheep and beef farm types (Moorland Sheep & Beef, Inbye Sheep & Beef) in the Peak District were examined. A 25% increase in input and output prices were modelled. The price of concentrates was the key input modelled, and lamb and calf prices were the key outputs looked at. The key outcomes examined were: farm income, stocking rates, and land abandonment. Increasing input prices had different impacts on the two farm types, with net farm income, stocking densities and land management all affected on Moorland Sheep & Beef Farms. No change was experienced in these factors on Inbye Sheep & Beef farms. Increasing output prices had the same effect on both farms: stocking rates increased and all land available was brought into production.
C. **Farm Types and Structure**

Six different farm types were identified from the farm surveys, each with different characteristics (Table 1). As different production methods are used the costs of inputs and outputs vary, therefore the effects of policy changes on upland farming depends on the type of farm being studied. The relevant scenarios that we looked at in our farm production models were:

i) Farmers receive the SFP and payments from AES
ii) Only payments from AES are received
ii) Only the SFP is received

**C1. What are the key factors influencing the future balance between sheep, beef and dairy farming in the Peak District?**

The balance between different livestock produced on upland farms depends on the type of farm it is and therefore the response of that particular system to the scenarios we examined. In general, moorland farms are predicted to see a decline in the number of beef cattle and a reduction in sheep numbers where this is the only output or where the farmer also carried out dairy production. This occurred under scenarios i) and ii). In contrast, the number of beef and dairy cattle remain constant and sheep numbers significantly reduce on inbye mixed farms under all the scenarios we looked at.

**C2. What are the effects of policy reform on the extent of part-time farming?**

Many farmers in the uplands depend on non-agricultural sources of income, in addition to AES payments, to remain economically viable. All farm types benefit from additional sources of income suggesting some increase in part-time farming on all farms (Fig. 6). However, models suggest a more noticeable increase in part-time farming for Moorland Sheep & Beef and Moorland Sheep farmers, whose incomes are negative even with the SFP and payments from AES. Worryingly, when no SFP is available and only AES payments are received, income from diversification/off-farm activities is not enough to make these businesses sustainable.

**C3. What are the predicted changes in labour availability?**
D. Biodiversity

Agricultural intensification is still occurring in parts of the uplands, and this process is driving the decline of many bird populations in these areas. A number of factors acting together underlie this decline, e.g. the conversion of moorland to improved grassland. Socio-economic factors relating to farm management, such as the number of farm labourers or the intensity of fertilizer use, may also affect upland bird populations. This section therefore examines the impacts of some changes in farm management practices on biodiversity, specifically how changing practices affect farmland bird populations on hill farms. Species richness was used as a measure of bird diversity for all bird species recorded, upland species and species of conservation concern.

Species Richness: the number of different species found in a specific area. The greater the number of species recorded the greater the species richness, or diversity. In this study, higher species richness indicated the use of more environmentally friendly farm management practices.

Upland birds: species that predominantly breed in the uplands and range from wading birds, such as lapwing and curlew, to raptors, game birds and passerines (song birds). A total of 21 upland species were recorded across the farms surveyed and included:

- Lapwing
- Meadow Pipit
- Oystercatcher

Species of Conservation Concern: species which appear on the Red or Amber lists, the UK Biodiversity Action Pan (BAP) or are qualifying features for the South Pennine Moors Special Protection Area (SPA). As with upland species, this group ranged from raptors to waders and passerines. Altogether, 43 species of conservation concern were recorded across the farms surveyed and included:
D1. What factors influence the abundance of different bird groups?

The factors affecting bird groups on upland farms fall into four broad categories:

- Habitat characteristics
- Landscape context (i.e. the landscape which the farm is located in)
- Farm management
- Socio-economic

A range of influential factors fall into each category, and the affect of each factor depends on the bird group being examined, i.e. whether they are upland specialists, species of conservation concern or all combined into one group. The impacts of the different factors are shown in Table 6.

D2. What are the relationships between land use, including intensity of input, and the number of different bird species?

Intensive land uses often have a negative impact on the number of different species recorded on upland farms:

- Land used for hay and silage production (‘Mowed Land’) is usually sown with highly competitive grass species and subject to high fertilizer inputs. This can reduce the availability of insect prey for many bird species, and as result there are fewer upland birds recorded in these habitats.
- Similarly, fewer species of conservation concern and all species combined are found on farms with high levels of fertilizer use.

In contrast, higher cattle numbers increased the number of different upland species recorded on the farms studied. Cattle grazing is known to be beneficial to conservation and may explain the different relationship.
Table 6. The main factors influencing the abundance of the three bird groups found on upland farms in the Peak District: Upland Specialists, Species of Conservation Concern, and All Species. The table shows the impact of each factor on the species richness of each group. ✓ denotes that the factor has an impact on species richness, ✗ denotes that the factor has no effect on species richness.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Description</th>
<th>Impact on Species Richness</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Habitat Characteristics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mowed Land</td>
<td>Fields cut for hay or silage</td>
<td>✓</td>
</tr>
<tr>
<td>Vegetated Boundaries</td>
<td>The proportion of boundaries that were hedges/woods</td>
<td>✗</td>
</tr>
<tr>
<td>Trees</td>
<td>Total number of trees within a field</td>
<td>✗</td>
</tr>
<tr>
<td>Cows</td>
<td>Number of adult cows in a field</td>
<td>✓</td>
</tr>
<tr>
<td>Rush Cover</td>
<td>Fields containing rushes</td>
<td>✗</td>
</tr>
<tr>
<td><strong>Landscape Context</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moorland</td>
<td>Moorland located within 500m of farm</td>
<td>✓</td>
</tr>
<tr>
<td>Inland Water</td>
<td>Inland water located within 500m of farm</td>
<td>✗</td>
</tr>
<tr>
<td><strong>Farm Management</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Farm Type</td>
<td>Whether the farm was a sheep, cattle or mixed farm</td>
<td>✗</td>
</tr>
<tr>
<td>Predator Control</td>
<td>Number of days of predator control carried out</td>
<td>✓</td>
</tr>
<tr>
<td>Fertilizer Inputs</td>
<td>Nitrogen input from fertilizer and manure</td>
<td>✗</td>
</tr>
<tr>
<td><strong>Socio-Economic</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ownership</td>
<td>Proportion of the farm that was owned</td>
<td>✓</td>
</tr>
<tr>
<td>Farm Workers</td>
<td>Number of workers on the farm</td>
<td>✗</td>
</tr>
<tr>
<td>On-Farm Income</td>
<td>Proportion of farm income from farming activities</td>
<td>✗</td>
</tr>
<tr>
<td>AES Payments</td>
<td>Total AES payments</td>
<td>✗</td>
</tr>
</tbody>
</table>
Box 1: Valuation Study – The Choice Experiment Results

In the choice experiment participants were asked to complete a number of ‘choice cards’. They did this before, during, immediately after and four months after a visit to the Peak District National Park so that we could assess how their views changed with experience and over time. This method also allowed us to look at how participants’ Willingness To Pay (WTP – how much extra tax they would be willing to pay for a certain type of management or landscape) changes over time.

Main findings:

- Local people like the landscape of the Peak District National Park as it is at present, and would be willing to pay an extra tax to avoid changes in intensification of land management in the Park

How did participant’s views change over time?

- Before the visit: People would pay to avoid more intensive management on moorland and valley bottom habitats and therefore maintain present management practices
- During the visit: People’s view changed and they were less willing to pay for current management to continue, favouring more or less intensive management options instead
- Immediately after the visit: People would pay to keep the landscape of the National Park as it is at the moment, and the amount which they would be willing to pay increased from the start of the experiment (i.e. compared to before or during the visit)
- Four months after the visit: Participants are still willing to pay a tax to keep the land management in the Park the same, although the amount they’d pay decreased to the level it was before they took part in the experiment

What does this mean?

The results of our experiment show that people’s views change with experience and over time......?

3. What is happening to upland farming policy at the moment?

The Uplands Entry Level Stewardship (ELS) Scheme

The Uplands Entry Level Stewardship (ELS) scheme is a new initiative being introduced in 2010 as part of the existing ELS agri-environment scheme. A replacement to the Hill Farm Allowance (HFA) scheme which end this year, the Uplands ELS will provide farmers and land managers in Severely Disadvantaged Areas (SDAs) with a payment scheme that rewards them for using land management practices that are particularly beneficial to the wildlife and habitats found on upland farms. The initiative also has higher payment rates in recognition of the challenges faced by upland farmers.

Key points:

- The scheme is voluntary and farmers and land managers within SDAs are eligible to apply
- The scheme aims to promote good land management practices and retain the traditional character of upland landscapes
- The scheme aims to preserve traditional breeds of livestock
- Protect both historic features and natural resources
- There is greater support for organic farmers more in this section??
5. **In Summary.....**

5.1. **What has been the effect of the Single Farm Payment on the uplands?**

Socio-economic surveys of hill farm businesses have shown that farms depend on subsidy support to be viable. However, subsidies for hill farms have been undergoing major changes. Previously, farmers received a subsidy payment for each animal they produced as a ‘headage payment’. This has since been replaced by the Single Farm Payment (SFP) which is paid on an area basis, regardless of how many livestock farmers keep. This policy seems to encourage:

- A reduction in stocking densities
- A reduction in the application of chemical fertilizers to inbye land
- A reduction in the amount of labour employed on the farm
- Further specialisation by farms in what they produce
- Little abandonment of land, with farming likely to continue in a way that keeps the land in ‘Good Agricultural and Environmental Condition’ (GAEC)

However, the strength and direction of these incentives varies for farms in different regions and for farms producing different combinations of produce (sheep, sheep and beef, or sheep and dairy). The switch to the SFP resulted in minor changes to average farm incomes, with some farms seeing slight increases and other losses.

5.2. **What part do Agri-Environment Schemes play?**

Agri-Environment Scheme (AES), such as Environmentally Sensitive Area contracts, provide additional financial support on which many farmers have come to depend. These payments are designed to encourage farmers to provide ‘public goods’, such as improved habitat for a particular species or public access for recreation. However, agri-environment policies are also undergoing major changes. Currently, they play a role in moderating the likely effects of changing to the SFP by:

- Reducing the impact on farm incomes of decoupling
- Encouraging further reductions in upland beef cattle. However, they have a variable impact on sheep numbers

The evidence from our ecological surveys that AES improve the state of upland birds as an indicator of biodiversity is mixed:

- The types of land management practices specified in agri-environment agreements explain little of the variation in patterns of bird species richness
- Farms with agri-environment agreements tend to have fewer rather than more species

However, the influence of AES becomes clearer when looking at the species of conservation concern, with greater densities of key species recorded on fields where more of the farm and surrounding area are included in agreements.
5.3. **How could we design agri-environment policies better?**

Further work is being carried out as part of this project to examine how agricultural subsidy schemes can be designed more effectively to provide benefits for farmland wildlife.

- There might be benefits in allowing payment rates to vary across space or vary with the amount of wildlife benefit provided
- The cost-effectiveness of AES could be enhanced by recognising the different costs which farmers face in ‘producing’ environmental benefits
- The effectiveness of AES in conserving farmland wildlife could be improved by designing incentives which encourage coordination across several farms

5.4. **What else can we learn?**

The Edale stakeholder meeting in October 2009 generated a number of questions addressing a wide and varied range of topics which fell outside the scope of this project (Table 7). These questions were highly topically and highlighted the subject areas of interest to the different stakeholders local to the Peak District National Park and would form the basis for any future research into the agricultural and environmental issues associated with this dynamic and interesting upland region.
Table 7. List of further questions that would be interesting to examine in a future study.

<table>
<thead>
<tr>
<th>Acronyms</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>SFP</td>
<td>Single Farm Payment</td>
</tr>
<tr>
<td>ESA</td>
<td>Environmentally Sensitive Area</td>
</tr>
<tr>
<td>HLS</td>
<td>Higher Level Stewardship</td>
</tr>
<tr>
<td>AES</td>
<td>Agri-Environment Schemes</td>
</tr>
<tr>
<td>ELS</td>
<td>Entry Level Stewardship</td>
</tr>
<tr>
<td>HFA</td>
<td>Hill Farm Allowance</td>
</tr>
</tbody>
</table>

**Questions**

**A. CAP & AES**
1. What are the effects of the move from ESA to upland ELS/HLS?
2. What are the effects of the introduction of Uplands ELS on land use, farm income and bird populations, and the effect of loosing HFA?
3. What is the effect of moving support from the lowland to the uplands?

**B. Market Forces**
1. What is the impact of diversification/off-farm income?

**C. Farm Types & Structure**
1. How can (i) more cattle, (ii) mixed farming, be encouraged?

**D. Biodiversity**
1. What are the likely effects of reducing moorland stocking rates on bird populations on the inbye?
2. What farming system is needed to deliver biodiversity targets?
3. Are there trade-offs between species in this ‘optimal’ farm design?
4. What monitoring is required to assess the success of AES on bird populations?
5. What are the effects of recreational access on bird numbers?
6. Should lapwing conservation efforts be focused on reducing moorland stocking rates or predator control?
7. What are the effects of predator control on birds?
8. How could farmers be encouraged to carry out more predator control?

**E. Payments for Ecosystem Services (PES)**
1. What are the effects of alternative PES in Pillar 2, e.g. payments for carbon sequestration or flood control? Is this what the question meant?*
2. What are the effects of switching all support in the uplands to PES, i.e. losing SFP and increasing AES?
3. Do impacts on farmland birds act as a proxy for public goods?

**F. Sustainability and Climate Change**
1. Is upland farming viable in the long-term, given what is predicted by changes to policy and market prices or business as usual?
2. What are the overall impacts of hill-farming, e.g. effects on water quality and net greenhouse gas emissions?
3. What are the likely effects of climate change on land use and birds?
4. What are the likely impacts of bio-fuel production?

**E. Re-Wilding**
1. What are the effects of losing sheep and cattle grazing on moorland habitats?
2. What would be the effect of more tree cover in moorlands?
3. What are the economic incentives needed to encourage native woodland regeneration on the moorland edge?

**H. Advice**
1. What are the benefits of more targeted advice?
6. **Further Information**

This research has been carried out at the University of Sheffield, University of Stirling and the University of Nottingham, in association with the Moors for the Future Partnership.

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Email: n.d.hanley@stir.ac.uk  
Moors for the Future Partnership Website: www.moorsforthefuture.org.uk

7. **Useful Resources**

**Scientific Papers**


Tinch, D., Hanley, N. & Colombo, S. Experienced utility, decision utility and remembered utility: a choice experiment. [rest of ref??]

**Reports and Leaflets**

CAP and Agri-Environment Schemes: What does the future hold for upland farming? RELU Information leaflet. Stirling University and Moors For the Future Partnership. Available as a pdf online from:

Changes to Upland Agriculture: Peak District Farming in the 20th Century. RELU Information leaflet. Stirling University and Moors For the Future Partnership. Available as a pdf online from:

Upland Farming and biodiversity: What influences variations in the diversity of bird species found on upland farms. RELU Information leaflet. Stirling University and Moors For the Future Partnership. Available as a pdf online from:

[**Dugald’s leaflet**](#)
