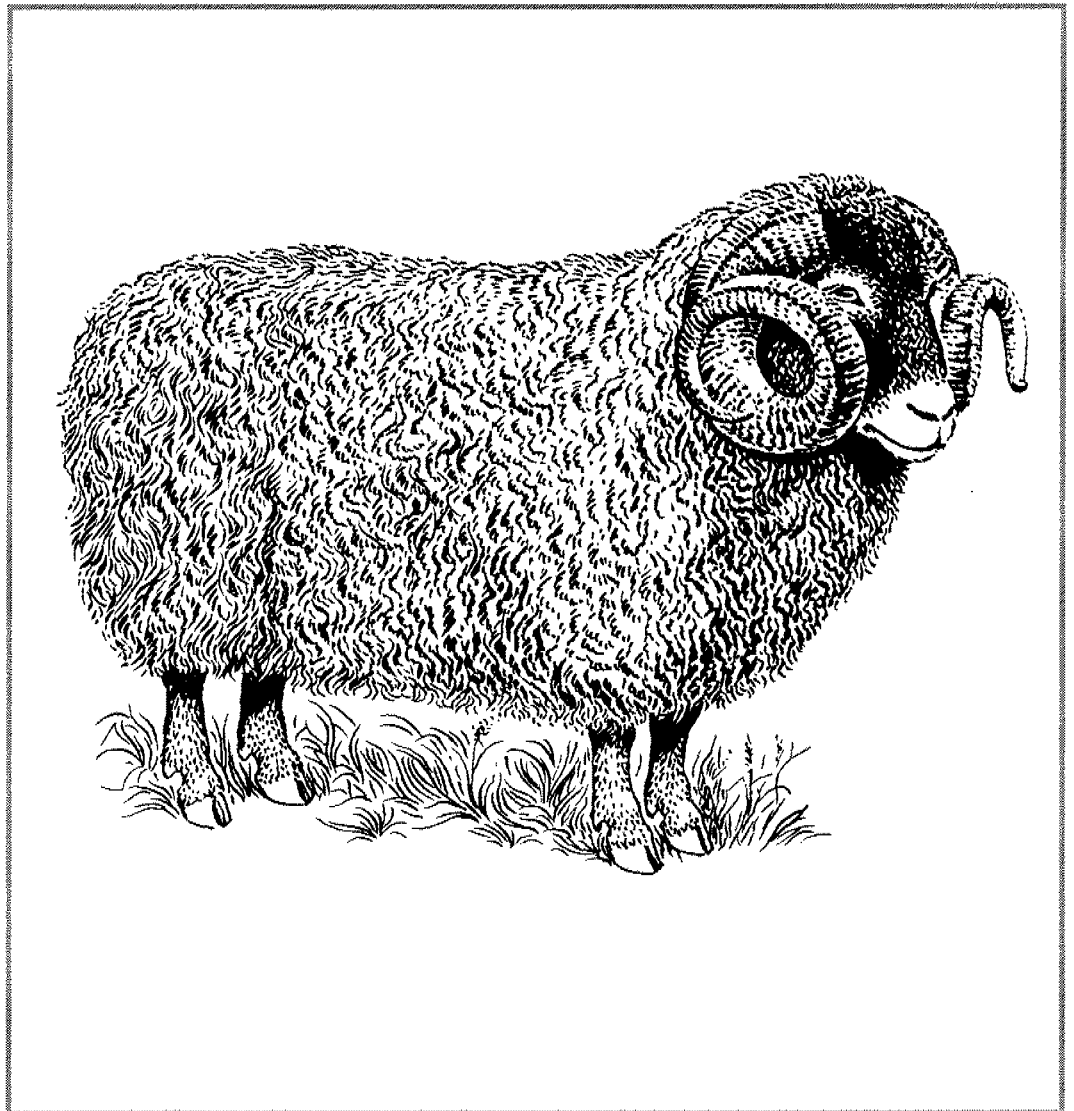


Conservation and the farm business

No. 255 - English Nature Research Reports



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ENGLISH NATURE RESEARCH REPORT

NO. 255

CONSERVATION AND THE FARM BUSINESS

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Report prepared for the Uplands Team

Contract KIU85

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FOREWORD

One of the five principles of English Nature's Upland Strategy involves:

"working with people who live and work in the uplands as well as those who visit the uplands."

Farmers are particularly important as the people who manage most of the uplands. With the appropriate support systems, support and advice they can deliver environmentally sustainable management on the ground.

This report is part of a wider project to provide training and demonstration of practical nature conservation management to farmers in the Yorkshire Dales. The approach, developed for English Nature by Newcastle University and the Farming and Wildlife Advisory Group, is an attempt to provide real information to farmers on how such management will affect their farm business in terms of its day-to-day running and income generated, and will be used as the basis for handouts at demonstrations and training days. Feedback already received from farmers and conservation staff shows that this sort of information has a role in planning the integration of nature conservation and agricultural management. It is hoped that this type of approach will be developed for other Natural Areas, farm types and conservation management in the next financial year.

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1 SUMMARY

This report summarises the findings of contract KIU85 undertaken by the Farm Management Unit at Newcastle University in association with FWAG on behalf of English Nature to investigate the economic effect of integrating conservation management into farm businesses located in the Yorkshire Dales area.

Two model farms 'representative' of the Yorkshire Dales area are created and used to investigate the impact of English Nature's Wildlife Enhancement Schemes on farm performance. The increasing environmental pressures and complexity of schemes mean that it is important for all parties concerned to have an understanding of how the performance of the farm business may be affected by entry into such a scheme.

The two model farms, Farm 1" and "Farm 2" are developed from the Askham Bryan Farm Business Survey (FBS) special study on hill farming for the 1995/96 year. Farm 1 has a suckler herd of about 22 breeding cows, producing 20 calves per year and a pure-bred sheep flock of 789 ewes with a lambing percentage of 104 lambs sold. There are 284 ha (702 ac) of rough grazing, 151 ha (373 ac) of common land and 58 ha (143 ac) of in-bye land. The profit for the 1995/96 year was £26,298. Farm 2 has a suckler herd of 51 breeding cows, producing 48 calves per year and a sheep flock of 445 ewes with a lambing percentage of 143 lambs sold. There are 34 ha (84 ac) of rough grazing, 28 ha (69 ac) of common land and 96 ha (237 ac) of in-bye land. The profit for the 1995/96 year was £9,775.

In order to assess the affect of adopting English Nature's Wildlife Enhancement Schemes operating in the Yorkshire Dales by, each farm is assumed to adopt separately the following:

- Case Study 1 North Pennine Moorland Sites of Special Scientific Interest WES
- Case Study 2 Craven Limestone Sites of Special Scientific Interest WES
- Case Study 3 Yorkshire Dales Meadows and Pastures WES

The impact of each of the Wildlife Enhancement Schemes (WES) on profitability varies greatly between the two farms and depends on the part of the scheme the farm enters into and the proportion of land affected. Generally the greater the proportion of land affected the greater the impact on farm performance. The impact of the WES is much more severe for Farm 2 as the greater use of fertiliser and higher stocking rate means that the farm is much less flexible and there are fewer options available to enable the farm to meet the management guidelines. The farm also has a much lower level of profit to start with which accentuates the impact of the various schemes.

2 OBJECTIVES

This report summarises the findings of contract KIU85 undertaken by the Farm Management Unit at Newcastle University in association with FWAG on behalf of English Nature to investigate the economic effect of integrating conservation management into farm businesses located in the Yorkshire Dales area.

The objectives of the contract are to:

- a) produce model farm financial scenarios investigating the impact of the Wildlife Enhancement Schemes (WES) on farm performance;
- b) condense the findings of each scenario into hand-out form for distribution at demonstration events in the Yorkshire Dales;
- c) produce detailed costings of specific nature conservation management practices e.g. grip-blocking, fencing etc., using local information and standard costs as necessary (see appendix 6).

3 INTRODUCTION

Conservation issues are of increasing importance to farmers in the UK, especially those in upland areas. Within the Yorkshire Dales a number of conservation schemes now affect farm businesses, including Environmentally Sensitive Areas, Countryside Stewardship, Wildlife Enhancement Scheme, etc. English Nature's Wildlife Enhancement Schemes (WES) are available for Sites of Special Scientific Interest (SSSIs) and cover various land/habitat types. The Schemes offer annual payments per hectare at a set rate for each habitat (hay meadow, moorland etc.) which are intended to reflect the extra cost of managing the land in a wildlife-friendly way.

The increasing environmental pressures and complexity of schemes mean that it is important for all parties concerned to have an understanding of how the performance of the farm business may be affected by entry into such a scheme. In order to give some indication of this a number of farm case studies have been developed to enable the impact of the Wildlife Enhancement Schemes to be estimated for two model farms.

4 MODEL FARMS

The case studies are based on two model farms, "Farm 1" and "Farm 2". Farm 1 is a representative hill farm and Farm 2 a representative upland farm of the Yorkshire Dales. The model farms are developed from the Askham Bryan Farm Business Survey (FBS) special study on hill farming for the 1995/96 year. The study includes Less Favoured Area (LFA) farms producing beef and sheep in the Yorkshire Region, the majority of which are located in the Yorkshire Dales.

Two farm types are identified in the study, Hill farms and Upland farms. Hill farms are those satisfying at least two of the following criteria, the remainder are upland farms:

- a) a ratio of rough and common grazing to in-bye is of least 5:1;
- b) 50% or more of total grazing livestock units made up of sheep;
- c) the grazing livestock density is two or more hectares per livestock unit.

All farms are in receipt of HLCA, but only those receiving higher rate SDA sheep subsidies are in the Hill group. On the whole hill farms have more extreme topographical and weather conditions, have a smaller proportion of in-bye land and greater access to common grazing than upland farms.

The FBS data forms the basis of the farm system carried out by each model farm, (i.e. stock numbers, land area etc.) and of farm financial performance. Standard figures are used to produce gross margins based on the FBS information and determine levels of physical performance. A number of assumptions, primarily in relation to land use and land quality, are necessary so that the two model farms reflect actual farm units.

In order to assess the effect of adopting the various parts of English Nature's Wildlife Enhancement Scheme operating in the Yorkshire Dales, each farm is assumed to adopt separately the following:

- Case Study 1 North Pennine Moorland Sites of Special Scientific Interest WES**
- Case Study 2 Craven Limestone Sites of Special Scientific Interest WES**
- Case Study 3 Yorkshire Dales Meadows and Pastures WES**

The impact on the farm business is then considered in each case.

4.1 FARM 1 - HILL FARM

Farm 1 is a tenanted hill farm in the Yorkshire Dales and has a suckler herd of 22 breeding cows, producing 20 calves per year and a pure-bred sheep flock of 789 ewes with a lambing percentage of 104 lambs sold. The land area available to the farm is given in table 1.

Table 1 Farm 1 - Land Area

Land area	Ha	Ac
In-bye	58	143
Rough grazing	284	702
Assessed common grazings	151	373
Total useable area	493	1218

Suckler Herd - Cows are Autumn calving and housed over winter between October and May in straw yards. The first Beef Special Premium and Extensification Premium is claimed on male animals and all calves are sold at 10 - 13 months old as stores. Suckler cow quota is available for 22 cows and Suckler Cow Premium, Extensification Premium and Hill Livestock Compensatory Allowances at the SDA rate are claimed. All replacements are bought in as in-calf heifers to join the herd in September. The annual replacement rate is about 14%. One stock bull is also kept on the farm all year round. (The enterprise gross margin is given in Appendix 1, page 35)

Sheep Flock - The ewes are bred pure to produce flock replacements and ewe lambs for sale, along with store and some finished lambs. Ewe lambs for replacements are away-wintered and all other lambs are sold before November. Replacements are first tupped as gimmers and the annual replacement rate is approximately 24%. Lambing takes place in late April. Ewe quota is available for 789 ewes and Sheep Annual Premium and HLCA at the higher SDA rate are claimed. (The enterprise gross margin is given in Appendix 1, page 36)

Land Use - During the summer cows and calves graze the rough grazing land (most of which is enclosed) along with ewes with singles, draft ewes and gimmers. Common grazing provides year round grazing for about 225 ewes with lambs. All the in-bye land can be cut and fertilised and is used to make silage for the cattle (with a one-cut system), hay for the sheep and to provide grazing for ewes with twins throughout the summer. At present fertiliser is applied at the rate of 50 kg/ha (40 units/acre) nitrogen, 25 kg/ha (20 units/acre) phosphate and 25 kg/ha (20 units/acre) potash averaged across all the in-bye land as a 20:10:10 compound. (Appendix 1, page 37 gives details of forage costs). All winter fodder required can be provided by the farm and the average annual stocking rate is 0.22 livestock units per hectare. (Appendix 1, page 38 gives details of grazing patterns and stocking rates).

Table 2 Farm 1 - Financial Performance 1995/96

		£/farm	£/ ha	£/ac
Output				
Cattle	Calves	9180	19	8
	Suckler cow premium	3147	6	3
	HLCA	1045	2	1
	BSP	1112	2	1
Sheep	Finished lambs	3198	6	3
	Store lambs	10496	21	9
	Ewe lambs	10650	22	9
	Draft ewes	4800	10	4
	Wool sales	1278	3	1
	Ewe premium	21264	43	17
	HLCA	4537	9	4
Valuation adjustment		-3253	-7	-3
Total Farm Output		67454	137	55
Variable Costs				
Livestock	Concentrates	7063	14	6
	Vet & med	2509	5	2
	Other	2755	6	2
	Agistment	1576	3	1
Crop	Seed	56	0.1	0.05
	Fertiliser	2219	5	2
	Sprays	149	0.3	0.12
	Other	77	0.2	0.06
Total Variable Costs		16404	33	14
Farm Gross Margin		51050	104	42
Fixed costs				
	Labour - paid	2837	6	2
	Machinery	9274	19	8
	General farm costs	4239	9	3
	Rent	8402	17	7
Total Fixed Costs		24752	50	20
Profit Before Finance		26298	53	22

4.1.1 CASE STUDY 1 - NORTH PENNINE MOORLAND SSSI WES

The North Pennine Moorland Wildlife Enhancement Scheme operates in areas making up the North Pennine Moorland Sites of Special Scientific Interest (SSSIs). The main objective of the scheme is to maintain and enhance the wildlife interest of existing heather ground through positive management. It is recognised that this scheme is designed to operate where the stocking rate is at about the required level. In circumstances where this is not the case it is hoped that a MAFF scheme (e.g. the Moorland Scheme) will reduce grazing pressure to this level with the WES providing a top-up payment for additional management. Nonetheless, the impact of the North Pennine Moorland WES on the model are assessed for information.

Payments are available on a per hectare basis to SSSI areas included in the Scheme in return for complying with the prescribed management guidelines.

Management guidelines:

- Grazing must be managed to maintain or enhance the heather;
- Cattle should not be grazed on heather ground;
- At least the same proportion of sheep should be away-wintered as at present;
- No artificial fertilisers, farmyard manure or lime can be used;
- Stock feeding in the SSSI area must be kept to a minimum;
- The following stocking rates usually apply:

Winter	1 October - 28 February	1 ewe/ha	(0.4 ewes/ac)
Summer	1 March - 30 September	1.5 ewes/ha	(0.6 ewes/ac)

Table 3 *Current payments for the North Pennine Moorland SSSI WES* (English Nature, 1996)

Category	Payment
First 100 hectares	£15 per hectare
Next 100 hectares	£10 per hectare
Further land	£3 per hectare
Maximum payment	£5,000

The aspect of the management guidelines that has the greatest impact on farm performance is the stocking rate restriction, particularly in the summer months. The impact varies according to the area affected. In general, the greater the area affected, the less flexibility the farm has to manage the situation and the more likely that stock numbers will need to be reduced. There are a number of ways in which farmers may react to cope with such restrictions. All involve reducing the stocking rate of animals grazing on the moorland during the critical months in some way, i.e. providing more grazing land by renting land or buying in fodder; reducing stock numbers, or any combination of these. The impact of each of two different areas being affected by this Scheme are considered below.

Scenario 1 - **Half of the rough grazing land (142 ha) and all of the common land (151 ha) falls within the SSSI** - The current grazing pattern (Appendix 1, page 38) and above stocking rate restrictions mean that the farm is overstocked from May to September by up to around 282 ewes with lambs, and from December to February by about 44 ewes (assuming that the stocking rate on other areas remains the same). The stocking rates on the common

land already fall within the limits of the Scheme, therefore the use of the rough grazing land needs consideration. As part of the Scheme the farm will be eligible to receive compensation payments as given in table 4 below. To enable the farm to meet the stocking rate criteria there are a number of options the farmer may consider, e.g.:

- Option 1a - Rent additional land**
- Option 1b - Buy all hay in and rent additional land**
- Option 1c - Reduce stock numbers by selling off-farm**
- Option 1d - Intensify the grazing on in-bye land**

It is assumed that everything else on the farm remains the same i.e. rent, machinery costs, labour costs etc., and that the farm is able to carry out all the suggested adjustments.

Table 4 *Payments to Farm 1 under the North Pennine Moorland SSSI WES - scenario 1*

Category	Payment
Area in Scheme	293 hectares
First 100 hectares	£1,500
Next 100 hectares	£1,000
Further land (93 ha)	£279
Total payment	£2,779

Option 1a - Rent additional land

Remove cattle from the rough grazing to meet the stocking rate limit of 1.5 ewes/ha during the summer. There is insufficient grazing area on the in-bye land to accommodate the cattle due to the large proportion of in-bye which is used to provide winter fodder. Therefore sufficient land must be rented to graze all cattle. In addition the number of animals grazing the rough grazing during the winter must be reduced by about 44 ewes. A cost for away-wintering these animals is included.

Original profit = £26,298
Rent* 86 ac @ £120 /ac = £10,320
Agistment 44 ewes @ £8/head = £352
WES payment = £2,779
Revised profit = £18,405

Option 1b - Buy all hay in and rent additional land

Remove cattle from the rough grazing to meet the stocking rate limit of 1.5 ewes/ha during the summer.. All hay is bought-in rather than made on farm. This releases in-bye land for grazing. If the grazing stocking rate is increased to 7 ewes/ha through increased grazing efficiency, 8 cows and 7 calves can be accommodated on the in-bye land. Therefore land will have to be rented to graze the remaining cattle. In addition the number of animals grazing the rough grazing during the winter must be reduced by about 44 ewes. A cost for away-wintering these animals is included.

<p style="text-align: center;">Original profit = £26,298 Hay 31 t @ £75/t = £2,325 Rent* 54 ac @ £120 /ac = £6,480 Agistment 44 ewes @ £8/head = £352 WES payment = £2,779 Revised profit = £19,820</p>
--

Option 1c - Reduce stock numbers by selling off-farm

Remove cattle from the rough grazing to meet the stocking rate limit of 1.5 ewes/ha during the summer. Reducing herd size by 12 cows reduces the amount of land required to for silage and releases enough land to allow the remainder of the cattle to graze the in-bye land, as long as the grazing stocking rate on the in-bye is increased to 7 ewes/ha through increased grazing efficiency. All winter fodder is made on the in-bye land. In addition the number of animals grazing the rough grazing during the winter must be reduced by about 44 ewes. A cost for away-wintering these animals is included. Reducing the herd size will not only have an effect on the long-term profitability of the business, but will also release capital that may be better used elsewhere. LFA suckler quota can be sold within the England LFA ring fence and average prices for 1995/96 were about £100/unit. 12 units would therefore be worth about £1,200. As well the quota there will also be capital released from the sale of the cows. This is estimated at about £6,000 (12 cows @ £500/cow). A reduction in suckler numbers by 12 therefore releases total capital of about £7,200.

<p style="text-align: center;">Original profit = £26,298 Income lost from cattle - 12 cows @ £483 /head = £5,796 Agistment 44 ewes @ £8/head = £352 WES payment = £2,779 Revised profit = £22,929</p>

Option 1d - Intensify the grazing on in-bye land

Increasing stocking rates on the in-bye land to the equivalent of 12 ewes/ha (5 ewes/acre) would enable suckler numbers to be maintained at present levels and grazed on the in-bye land rather than the rough grazing. This would require an increase in fertiliser use to 125 kg/ha N (100 units/acre) and an increase in grazing efficiency, and is only possible if half of the hay required is bought-in rather than made on the farm. In addition the number of animals grazing the rough grazing during the winter must be reduced by about 44 ewes. A cost for away-wintering these animals is included.

<p style="text-align: center;">Original profit = £26,298 Increased fertiliser cost = £3,002 Hay 15 t @ £75/t = £1,125 Agistment 44 ewes @ £8/head = £352 WES payment = £2,779 Revised profit = £24,598</p>

Scenario 2 - All of the rough grazing and common land (435 ha) falls within the SSSI
 - The current grazing pattern (Appendix 1, page 38) and above stocking rate restrictions mean that the farm is overstocked from May to September by up to about 565 ewes with lambs, and from December to February by about 89 ewes (assuming that the stocking rate on other areas remains the same). The stocking rates on the common land already fall within the limits of the Scheme, therefore the use of the rough grazing land needs consideration. As part of the Scheme the farm will be eligible to receive compensation payments as given in table 5 below. To enable the farm to meet the stocking rate criteria there are a number of options the farmer may consider, e.g.:

- Option 2a - Rent additional land**
- Option 2b - Buy all hay in and rent additional land**
- Option 2c - Reduce stock numbers by selling off-farm**
- Option 2d - Intensify the grazing on in-bye land**

Table 5 *Payments to Farm 1 under the North Pennine Moorland SSSI WES - scenario 2*

Category	Payment
Area in Scheme	435 hectares
First 100 hectares	£1,500
Next 100 hectares	£1,000
Further land (235 ha)	£705
Total payment	£3,205

Option 2a - Rent additional land

Remove cattle from the rough grazing along with about 222 ewes with lambs to meet the stocking rate limit of 1.5 ewes/ha during the summer. If the grazing stocking rate is increased to 7 ewes/ha through increased grazing efficiency there is sufficient grazing area on the in-bye to accommodate about 57 ewes with lambs. Therefore land must be rented to graze all cattle along with 165 ewes with lambs. In addition the number of animals grazing the rough grazing during the winter must be reduced by about 89 ewes. A cost for away-wintering these animals is included.

Original profit = £26,298
Rent* 127 ac @ £120 /ac = £15,240
Agistment 89 ewes @ £8/head = £712
WES payment = £3,205
Revised profit = £13,551

Option 2b - Buy all hay in and rent additional land

Remove cattle from the rough grazing to meet the stocking rate limit of 1.5 ewes/ha during the summer. All hay is bought-in rather than made on farm. This allows about 133 ewes with lambs to be grazed on the in-bye as long as the grazing stocking rate is increased to 7 ewes/ha through increased grazing efficiency. Land will have to be rented to graze the cattle and 89

ewes with lambs. In addition the number of animals grazing the rough grazing during the winter must be reduced by about 89 ewes. A cost for away-wintering these animals is included.

Original profit = £26,298
Hay 31 t @ £75/t = £2,325
Rent* 108 ac @ £120 /ac = £12,960
Agistment 89 ewes @ £8/head = £712
WES payment = £3,205
Revised profit = £13,506

Option 2c - Reduce stock numbers by selling off-farm

Remove cattle from the rough grazing to meet the stocking rate limit of 1.5 ewes/ha during the summer. Reducing herd size by 12 cows and ewe numbers by 140 ewes with followers releases enough land from silage and hay to allow the remaining cattle and 67 ewes with lambs to graze the in-bye land. However, to achieve this level of stocking the grazing stocking rate on the in-bye needs to be increased to 8 ewes/ha. This will require increased grazing efficiency and an increase in the level of fertiliser to 65 kg/ha N (52 units/acre) so that all winter fodder can continue to be made on the in-bye land. Reducing stock numbers will not only have an effect on the long-term profitability of the business, but will also release capital that may be better used elsewhere. LFA suckler quota can be sold within the England LFA ring fence and average prices for 1995/96 were about £100/unit. 12 units would therefore be worth about £1,200. As well the quota there will also be capital released from the sale of the cows. This is estimated at about £6,000 (12 cows @ £500/cow). LFA sheep quota can be sold within the England LFA ring fence and average prices for 1995/96 were about £35/unit. 140 units would therefore be worth about £4,900. As well the quota there will also be capital released from the sale of the ewes. This is estimated at about £5,600 (140 ewes @ £40/ewe). A reduction in stock numbers of this nature therefore releases total capital of about £17,700.

Original profit = £26,298
Income lost from - cattle 12 cows @ £483 /head = £5,796
Income lost from sheep - 140 ewes @ £54 /head = £7,560
Increased fertiliser cost = £600
WES payment = £3,205
Revised profit = £15,547

Option 2d - Intensify the grazing on in-bye land

Suckler numbers could be maintained at present levels and grazed on the in-bye land by increasing stocking rates on the in-bye land to the equivalent of 12 ewes/ha (5 ewes/acre). This would require increased fertiliser use to 125 kg/ha N (100 units/acre) and an increase in grazing efficiency. All winter fodder can be made on the in-bye. In addition ewe numbers would have to be reduced by about 200 ewes with followers to meet the stocking rate restrictions. LFA sheep quota can be sold within the England LFA ring fence and average prices for 1995/96 were about £35/unit. 200 units would therefore be worth about £7,000. As well the quota there will also be capital released from the sale of the ewes. This is estimated at about £8,000 (200 ewes @ £40/ewe). A reduction in stock numbers of this nature therefore releases total capital of about £15,000.

Original profit = £26,298
Increased fertiliser cost = £3,002
Income lost from sheep - 200 ewes @ £54 /head = £10,800
WES payment = £3,205
Revised profit = £15,701

DISCUSSION

Table 6 below gives a summary of the options considered and the resulting profit figures in each case.

Table 6 *Summary of the effect on profit for each option considered under the North Pennine Moorland SSSI WES for Farm 1*

	Original profit £	Resulting profit £	Difference £	Capital released £
Scenario 1 - Half the rough grazing and all the common land (293 ha)				
1a Rent additional land	26,298	18,405	-7,893	
1b Buy all hay in and rent additional land	26,298	19,820	-6,478	
1c Reduce stock numbers by selling off-farm	26,298	22,929	-3,369	7,200
1d Intensify the grazing on in-bye land	26,298	24,598	-1,700	
Scenario 2 - All the rough grazing and common land (435ha)				
2a Rent additional land	26,298	13,551	-12,747	
2b Buy all hay in and rent additional land	26,298	13,506	-12,792	
2c Reduce stock numbers by selling off-farm	26,298	15,547	-10,751	17,700
2d Intensify the grazing on in-bye land	26,298	15,701	-10,597	15,000

The implications for the farm are somewhat different depending on the proportion of land affected by the Scheme. Options a and b in each case rely on the availability and cost of land to rent for summer grazing and/or the availability and cost of bought-in hay. Summer grazing land is normally extremely scarce and expensive within the area and would therefore not be a valid option to many farms. The management of the farm would also be complicated by having animals and land some distance from the main holding. Relying heavily on bought-in hay can also be risky and expensive depending on the season, and may have conservation implications for the in-bye land. As well as exposing the business to more risk, both of these options have the greatest effect on farm profit and would therefore be unlikely.

Intensification through increased fertiliser use, stocking rates and grazing efficiency has the least effect on farm profit in both cases. However, a change of this nature would require a change in approach to grassland management. The level of intensification considered could also have conservation implications for the in-bye land.

Reducing stock numbers has the second largest effect on farm profit, but also has other benefits. Capital is released that could be put to other uses. The requirement for winter fodder is reduced along with the workload, particularly during the winter months. Where cattle numbers are reduced building space will also be released that could be used for other things, e.g. lambing ewes inside, in-wintering sheep or housing lambs for finishing over winter.

In both scenarios it would therefore seem that the most likely option would be a combination of intensification and reducing stock numbers. The extent of which will depend on land quality and personal circumstances. It must be noted however that the reduction in profit seen in scenario 2 is substantial, despite the payments, and could bring the viability of the farm into question depending on the level of profit required for the farm to be viable.

4.1.2 CASE STUDY 2 - CRAVEN LIMESTONE SSSI WES

The Craven area includes the largest expanse of upland limestone in Britain, most of which is notified as SSSI. The main objectives of the scheme are to increase the flowering and abundance of many special limestone plants and enhance wildlife through positive management.

Payments are available on a per hectare basis to SSSI areas included in the Scheme in return for complying with the prescribed management guidelines. In this case only Tier 1 is considered and the compensation level is given in table 7 below.

Management guidelines

- No artificial fertilisers, farmyard manure, slurry or lime can be used;
- Cattle should be grazed in preference to sheep in the summer;
- Stock feeding in the SSSI area must be kept to a minimum;
- The following stocking rates apply:
 - An 8 week period between 1 May - 31 August 1 ewe/ha (0.4 ewes/ac)
 - All other times 2 ewes/ha (0.8 ewes/ac)

Table 7 *Current payments for the Craven Limestone SSSI WES* (English Nature, 1996)

Category	Payment
Tier 1	£65 per hectare

The aspect of the management guidelines that has the greatest impact is the stocking rate restriction of 1 ewe/ha for an 8 week period between 1 May and 31 August. The impact on the farm will vary according to the area affected and the timing of the 8 week exclusion period. Generally, the greater the area affected, the less flexibility the farm has to manage the situation and the more likely that stock numbers will need to be reduced. There are a number of ways in which farmers may react to cope with the restrictions. All involve reducing the stocking rate of animals grazing on the moorland during the critical months in some way, i.e. providing more grazing land by renting land or buying in fodder; reducing stock numbers, or a combination of these. The impact of each of two different areas being affected by this Scheme are considered below.

Scenario 1 - **50 ha of the rough grazing land falls within the SSSI** - The current grazing pattern means that the farm is overstocked on this area from June to September by up to 124 ewes with lambs during the 8 week restricted stocking period (assuming that the stocking rate on other areas remains the same) (Appendix 1, page 38). The timing of the 8 week restricted stocking period could be critical to the farm, depending on current grazing pattern and stocking rates. In this case it is assumed to be during July and August. To enable the farm to meet these stocking rate criteria there are a number of options the farmer may consider, e.g.:

- Option 1a - Buy hay in**
- Option 1b - Rent additional land**
- Option 1c - Reduce stock numbers by selling off-farm**
- Option 1d - Intensify grazing on in-bye land**

It is assumed that everything else on the farm remains the same i.e. rent, machinery costs and labour costs etc., and that the farm is able to carry out all the suggested adjustments.

Option 1a - Buy hay in

Cattle remain on the rough grazing. All hay required is bought-in rather than made on the farm to release in-bye land which can be grazed by the sheep removed from the rough-grazing land. With no hay being made on the farm the 124 ewes with lambs can be grazed on the in-bye as long as the grazing stocking rate is increased to 8 ewes/ha. This will require increased grazing efficiency and an increase in the level of fertiliser to 65 kg/ha N (52 units/acre).

<p>Original profit = £26,298 Hay 31 t @ £75/t = £2,325 Increased fertiliser cost = £600 WES payments @ £65/ha = £3,250 Revised profit = £26,623</p>

Option 1b - Rent additional land

Cattle remain on the rough grazing. All winter fodder is made on the in-bye land. Additional summer grazing land is rented to accommodate the equivalent of 124 ewes with lambs. Continue to make all winter fodder on in-bye.

<p>Original profit = £26,298 Rent* 31 ac @ £120 /ac = £3,720 WES payments @ £65/ha = £3,250 Revised profit = £25,828</p>
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Option 1c - Reduce stock numbers by selling off-farm

Cattle remain on the rough grazing. Flock size is reduced by 108 ewes with followers to meet the stocking rate requirement during the 8 week period. Continue to make all winter fodder on in-bye. Continue to make all winter fodder on in-bye. LFA sheep quota can be sold within the England LFA ring fence and average prices for 1995/96 were about £35/unit. 108 units would therefore be worth about £3,780. As well the quota there will also be capital released from the sale of the ewes. This is estimated at about £4,320 (108 ewes @ £40/ewe). A reduction in stock numbers of this nature therefore releases total capital of about £8,100.

<p>Original profit = £26,298 Income lost from sheep - 108 ewes @ £54 /head = £5,832 WES payments @ £65/ha = £3,250 Revised profit = £23,716</p>

Option 1d - Intensify grazing on in-bye land

Ewe numbers could be maintained at present levels by increasing stocking rates on the in-bye land to 10 ewes/ha (4 ewes/acre). This would require increased fertiliser use to 90 kg/ha N (72 units/acre). All winter fodder is made in the in-bye land. Because the overall forage area and stock numbers have not changed there is no change in the eligibility for subsidies.

<p>Original profit = £26,298 Increased fertiliser cost = £1,601 WES payments @ £65/ha = £3,250 Revised profit = £27,947</p>
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Scenario 2 - Half of the rough grazing land (142 ha) falls within the SSSI - The impact on the farm in this case is much more severe. The current grazing pattern means that the farm is overstocked from May to September, by up to 353 ewes with lambs during the 8 week restricted stocking period (assuming that the stocking rate on other areas remains the same). To enable the farm to meet these criteria there are a number of options the farmer may consider, e.g.:

- Option 2a - Buy hay in and rent additional land**
- Option 2b - Rent additional land**
- Option 2c - Reduce stock numbers by selling off-farm**
- Option 2d - Intensify grazing on in-bye land**
- Option 2e - Sell suckler herd**

Option 2a - Buy hay in and rent additional land

Cattle remain on the rough grazing. All hay required is bought-in rather than made on the farm to allow ewes to graze in-bye land released from hay production. This provides sufficient extra grazing for 96 ewes, as long as the grazing stocking rate is increased to 7 ewes/ha through increased grazing efficiency. Therefore, additional summer grazing land must be rented to accommodate the equivalent of 257 ewes with lambs.

<p>Original profit = £26,298 Hay 31 t @ £75/t = £2,325 Rent* 64 ac @ £120 /ac = £7,680 WES payments @ £65/ha = £9,230 Revised profit = £25,523</p>
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Option 2b - Rent additional land

Cattle remain on the rough grazing. Additional summer grazing is rented to accommodate the equivalent of 353 ewes with lambs. Continue to make all winter fodder on in-bye

<p>Original profit = £26,298 Rent* 87 ac @ £120 /ac = £10,440 WES payments @ £65/ha = £9,230 Revised profit = £25,088</p>
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Option 2c - Reduce stock numbers by selling off-farm

Cattle remain on the rough grazing. Flock size is reduce by 309 ewes with followers to meet the stocking rates during the 8 week period. Continue to make all winter fodder on the in-bye. LFA sheep quota can be sold within the England LFA ring fence and average prices for 1995/96 were about £35/unit. 309 units would therefore be worth about £13,650. As well the

quota there will also be capital released from the sale of the ewes. This is estimated at about £15,600 (309 ewes @ £40/ewe). A reduction in stock numbers of this nature therefore releases total capital of about £29,250.

<p style="text-align: center;">Original profit = £26,298 Income lost from sheep - 309 ewes @ £54 /head = £16,686 WES payments @ £65/ha = £9,230 Revised profit = £18,842</p>
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Option 2d - Intensify grazing on in-bye land

Ewe numbers could be maintained at present levels by increasing stocking rates on the in-bye land to 14 ewes/ha (6 ewes/acre). This would require increased fertiliser use to 150 kg N /ha (120 units/acre). Because the overall forage area and stock numbers have not changed there is no change in the eligibility for subsidies.

<p style="text-align: center;">Original profit = £26,298 Increased fertiliser cost = £4,002 WES payments @ £65/ha = £9,230 Revised profit = £31,526</p>

Option 2e - Sell suckler herd

Selling the suckler herd releases sufficient in-bye land from silage to graze all the excess ewes from the rough-grazing. All winter fodder is made on the in-bye. There may be some reduction in fixed costs depending on the farm situation. In this case about £1,000 may be saved through reduced machinery costs. A knock-on effect of no longer having any cattle on the holding is that no farmyard manure will be available to be spread on the in-bye land. This may result in increased fertiliser requirements on some areas in the future. LFA suckler quota can be sold within the England LFA ring fence and average prices for 1995/96 were about £100/unit. 22 units would therefore be worth about £2,200. As well the quota there will also be capital released from the sale of the cows. This is estimated at about £11,000 (22 cows @ £500/cow). A reduction in suckler numbers by 22 therefore releases total capital of about £13,200. No farmyard manure would be available, but building space would also be released for other uses and winter management would be simplified.

<p style="text-align: center;">Original profit = £26,298 Income lost from cattle - 22 cows @ £483 /head = £10,626 Fixed costs saved = £1,000 WES payments @ £65/ha = £9,230 Revised profit = £25,902</p>
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DISCUSSION

Table 8 below gives a summary of the options considered and the resulting profit figures in each case.

Table 8 *Summary of the effect on profit for each option considered under the Craven Limestone SSSI WES for Farm 1*

	Original profit £	Resulting profit £	Difference £	Capital released £
Scenario 1 - 50 ha of the rough grazing land				
1a Buy hay in	26,298	26,623	+325	
1b Rent additional land	26,298	25,828	-470	
1c Reduce stock numbers by selling off-farm	26,298	23,716	-2,582	8,100
1d Intensify the grazing on in-bye land	26,298	27,947	+1,649	
Scenario 2 - Half the rough grazing land (142 ha)				
2a Buy all hay in and rent additional land	26,298	25,523	-775	
2b Rent additional land	26,298	25,088	-1,210	
2c Reduce stock numbers by selling off-farm	26,298	21,218	-5080	29,250
2d Intensify the grazing on in-bye land	26,298	31,526	+5,228	
2e Sell suckler herd	26,298	25,902	-396	13,200

The implications for the farm are somewhat different depending on the proportion of land affected by the Scheme. Options a and b in each case have a relatively small effect on profit, but rely on the availability and cost of land to rent for summer grazing and/or the availability and cost of bought-in hay. Summer grazing land is normally extremely scarce and expensive within the area and would therefore not be a valid option to many farms. The management of the farm would also be complicated by having animals and land some distance from the main holding. Relying heavily on bought-in hay can also be risky and expensive depending on the season, and may have conservation implications for the in-bye land. Both of these options therefore expose the business to more risk. The largest reduction in farm profitability is seen when stock numbers are reduced. However, capital is released that could be put to other uses and the requirement for winter fodder is reduced along with the workload, particularly during the winter months. In scenario 2 selling the suckler herd seems to be a better option than reducing flock size by 265 ewes, as the resulting profit is greater by £4,684. However, the amount of capital released is lower and removing an enterprise completely will increase the risk to the business as there is no longer a buffer between enterprises and fluctuations in the fortunes of the single enterprise left can have a substantial effect on farm performance.

Due to the level of payment received intensification through increased fertiliser use, stocking rates and grazing efficiency actually increases the farm profit in both cases. However, a change of this nature would require a change in approach to grassland management, particularly where 150 kg/ha N and a stocking rate of 14 ewes/ha is suggested (assuming that the land can sustain such levels). This level of intensification would also have conservation implications for the in-bye land.

It would therefore seem likely that the most likely option in each case would be a combination of intensification and reducing stock numbers depending on personal circumstances and land quality.

4.1.3 CASE STUDY 3 - YORKSHIRE DALES MEADOWS AND PASTURES WES

Many of the finest meadows in the country are found in the Yorkshire Dales and along with some in-bye pastures are often rich in a variety of plant species. The main objectives of the scheme are to increase the flowering and abundance of many special meadow and pasture plants and maintain the plant diversity as well as provide good breeding conditions for birds through reduced productivity.

Payments are available on a per hectare basis to SSSI areas included in the Scheme in return for complying with the prescribed management guidelines.

Management guidelines - Meadow Land

- No artificial fertilisers, slurry or lime can be used, limited farmyard manure is allowed;
- Stock feeding in the SSSI area must be kept to a minimum;
- Only hay must be made;
- The meadow must be shut up for at least 8 weeks from mid-May and cut hay from mid-July.

Management guidelines - Pasture Land

- No artificial fertilisers, farmyard manure, slurry or lime can be used;
- Avoid poaching;
- Keep the pasture stock free for an 8 week period between May and August.

Table 9 *Current payments for the Yorkshire Dales Meadows and Pastures SSSI WES* (English Nature, 1996).

Category	Payment
Meadow Land	£250 per hectare
Pasture Land	£150 per hectare

1. Meadow Land

With no fertiliser being applied the productivity of the grass is reduced. The fact that only 50 kg/ha N is applied in the first place means that the production lost from the SSSI area is not as great as would be experienced in higher fertility situations. In this case yields would be reduced by about 40%.

Scenario 1.1 - 2 ha of the meadow land falls within the SSSI - With such a small area affected there are basically two options the farmer may consider to cope with the reduction in grass yield:

- Option 1.1a - Buy hay in**
- Option 1.1b - Increase area cut for hay**

It is assumed that everything else on the farm remains the same i.e. rent, machinery costs and labour costs etc., and that the farm is able to carry out all the suggested adjustments.

Option 1.1a - Buy hay in

Buy hay in to make up the shortfall in production. This will require about 2 t to be bought and means that the area cut for hay stays the same.

<p>Original profit = £26,298 Hay 2 t @ £75/t = £150 Saving in fertiliser and spray on 2 ha = £86 WES payment 2 ha @ £250/ha = £500 Revised profit = £26,734</p>

Option 1.1b - Increase area cut for hay

Put aside an extra 1.5 ha of grazing land for hay production. A slight increase in the grazing stocking rate on the in-bye through increased grazing efficiency is required.

<p>Original profit = £26,298 Saving in fertiliser and spray on 2 ha = £86 WES payment 2 ha @ £250/ha = £500 Revised profit = £26,884</p>
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Scenario 1.2 - 10 ha of the meadow land falls within the SSSI - The same options as in the previous example apply:

Option 1.1a - Buy hay in

Option 1.1b - Increase area cut for hay

Option 1.2a - Buy hay in

Buy hay in to make up the shortfall in production. This will require about 9 t to be bought and means that the area cut for hay stays the same.

<p>Original profit = £26,298 Hay 9 t @ £75/t = £675 Saving in fertiliser and spray on 10 ha = £430 WES payment 10 ha @ £250/ha = £2,500 Revised profit = £28,553</p>
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Option 1.2b - Increase area cut for hay

Put aside an extra 5 ha of grazing land for hay production. An increase in the grazing stocking rate on the in-bye to 6 ewes per ha through increased grazing efficiency is also required.

<p>Original profit = £26,298 Saving in fertiliser and spray on 10 ha = £430 WES payment 10 ha @ £250/ha = £2,500 Revised profit = £29,228</p>

2. Pasture Land

With no fertiliser being applied the productivity of the grass is reduced. The fact that only 50 kg/ha N is applied in the first place means that the production lost from the SSSI area is not as great as would be experienced in higher fertility situations. In this case yields would be reduced by about 40%. The 8 week exclusion period also means that stock will need to be accommodated elsewhere over this period.

Scenario 2.1 - 2 ha of the in-bye land falls within the SSSI - With such a small area affected there is really only one option the farmer would consider to cope with the reduction in grass yield:

Option 2.1 - Increase stocking rate on other in-bye grazing areas

The stocking rate only needs to be increased slightly to cope with the reduction in productivity. This can be achieved through increased grazing efficiency. During the 8 week exclusion period ewes must be excluded from the SSSI area. These can be accommodated on the other in-bye grazing areas with an increase in stocking rate through increased grazing efficiency.

<p style="text-align: center;">Original profit = £26,298 Saving in fertiliser and spray on 2 ha = £86 WES payment 2 ha @ £150/ha = £300 Revised profit = £26,684</p>
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Scenario 2.2 - 10 ha of the in-bye land falls within the SSSI - Again there is really only one option the farmer would consider to cope with the reduction in grass yield:

Option 2.2a - Increase stocking rate on other in-bye grazing areas

The grazing stocking rate on the other in-bye pasture areas is increased to an average of 6 ewes per ha through increased grazing efficiency. During the 8 week exclusion period when ewes must be excluded from the SSSI area stock can be accommodated on other in-bye areas if the stocking rate is increased to 9 ewes per ha on the 18 ha of grazing land. An increase in fertiliser use to approximately 75 kg/ha N (60 units/ac) would be necessary to achieve this as well as increased grazing efficiency.

<p style="text-align: center;">Original profit = £26,298 Increase in fertiliser on 18 ha = £311 Saving in fertiliser and spray on 10 ha = £430 WES payment 10 ha @ £150/ha = £1,500 Revised profit = £27,917</p>
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DISCUSSION

Table 10 below gives a summary of the options considered and the resulting profit figures in each case.

Table 10 *Summary of the effect on profit for each option considered under the Yorkshire Dales Meadows and Pastures SSSI WES for Farm 1*

	Original profit £	Resulting profit £	Difference £
Scenario 1.1 - 2 ha of meadow			
1.1a Buy hay in	26,298	26,734	+436
1.1b Increase area cut for hay	26,298	26,884	+586
Scenario 1.2 - 10 ha of meadow			
1.2a Buy hay in	26,298	28,553	+2,255
1.2b Increase area cut for hay	26,298	29,228	+2,930
Scenario 2.1 - 2 ha of pasture			
2.1a Increase stocking rate on other in-bye grazing areas	26,298	26,684	+386
Scenario 2.2 - 10 ha of pasture			
2.2a Increase stocking rate on other in-bye grazing areas	26,298	27,917	+1,619

The payments for the meadow land seem to be at an appropriate level for this type of farm, bearing in mind the current low use of nitrogen fertiliser. The preferred option between buying hay in or putting aside a greater area on which to make hay would really depend on the availability and cost of bought in hay and the practicalities of making hay on a larger area, e.g. land quality, fields size etc. In the case where only 2 ha is affected the impact is more or less negligible due to the amount of in-bye available in the first place. Where 10 ha is affected there will need to be an increase in stocking rate on other areas if buying in hay is not feasible.

On the pasture land the findings are similar. The payments appear to be at an appropriate level for this farm and where only 2 ha are affected the impact is small. Where 10 ha are affected there will need to be an improvement in grassland management on other grazing areas so that the stocking rate can be increased sufficiently to accommodate stock from the SSSI during the 8 week exclusion period. This will depend on land quality and the level of grassland management that can be achieved.