



Green Futures

Practical environmental enhancements in the South West's improved grasslands

Matt Loble and Alan Hopkins

CRR Research Report No. 19

CRR Research Report No. 18
November 2006
ISBN 1 870558 98 7
£10

Green Futures

***Practical environmental enhancements in the South West's
improved grasslands***

Final Report

Matt Lobley and Alan Hopkins



November 2006

This report can be downloaded from the CRR website:
www.centres.ex.ac.uk/crr/

For further information, please contact Dr Matt Lobley, Centre for Rural Research, Lafrowda House, University of Exeter, St German's Road, Exeter, EX4 6TL.
Tel: 01392 264539. E-Mail: m.lobley@exeter.ac.uk

Acknowledgements

We are grateful to members of the Green Futures Project Board for comments on an earlier version of this report and for assistance and guidance throughout the project. We are also grateful to all the farmers who attended the discussion groups and those who attended the Grassland Summit and engaged with the issue of how to secure a greener future for the region's improved grasslands. All errors and omissions are the responsibility of the authors.

The views expressed in this report are those of the authors and are not necessarily shared by other members of the University, by the University as a whole or by IGER

The views expressed in this report are those of the authors and are not necessarily shared by members of the Project Board or the organisations they represent.

Contents

<i>Executive summary</i>	<i>i</i>
1.1 Background	1
1.2 Project aims	3
1.3 Project objectives	3
1.4 Project programme	4
2.1 Project approach	4
2.2 Farmer engagement	5
2.3 The farmer meetings	6
3.1 Options for change: outcomes of engaging with farmer groups	8
3.2 Knowledge transfer	8
3.3 Incentive payments	9
3.4 Capital support	10
3.5 Other issues	10
3.6 The bidding game	12
4.1 The grassland summit	13
5.1 Towards a greener future	16
5.2 An environmental land management package for intensive grassland	18
5.3 Other recommendations	20
5.4 Concluding comments	21
References	22
Glossary	23
Appendices	25

Green Futures for Grassland

Executive Summary

E1 The Delivery Plan for a Sustainable Farming & Food Industry in South West England identified action to improve environmental outcomes on the region's dominant land use – improved grasslands¹ – as a key activity. Funded through the Delivery Plan, the aims of this project were to stimulate and engage land managers in a collaborative movement with environmentalists and other stakeholders, and to recognise and emphasise their role in finding sustainable solutions. In doing so it sought contribute to informing the new opportunities in the Environmental Stewardship package and other existing and potential policy measures.

E2 The specific objectives of the project were to:

1. Raise awareness across the region of the environmental problems caused by the use and management of intensive grasslands.
2. Explain the range of environmental benefits that sward diversification could provide.
3. Identify the most promising management changes farmer stakeholders would be willing to undertake to test some approaches that emerge.
4. Host a grassland 'summit' to share with key audiences the progress made by the project and explore future opportunities.

E3 Given that key project objectives concerned awareness raising and dialogue with farmers, the project adopted a participative and flexible methodology based on engagement with farmer groups. Presentations were made at five farmer meetings and two further meetings were held with members of the policy community. Participants were predominately (64%) dairy farmers, although a significant minority (28%) were specialist beef or beef and sheep farmers. While only 22% reported having an ESA or CSS agreement, 67% either already had applied to ES or intended to do so. Few (8 individuals) intended to apply to HLS. Although the proportion indicating that that intend to apply (or had done so already) is high, the proportion willing to take up options likely to bring about in-field biodiversity improvements is not known. It is more likely that intensive grassland farmers will select options that can be easily incorporated within their farming system (e.g. hedgerow management).

¹ Typically lowland neutral grasslands that are the result of reseeding with perennial ryegrass and a few other sown species, or as a result of previously unimproved grasslands having been modified by fertilizers, drainage, frequent cutting (especially for silage) and/ or intensive grazing leading to botanical composition resembling that of reseeded grassland. Agriculturally improved grasslands are of low botanical interest and usually of low value for other wildlife.

E4 In order to discuss the outcomes of the project and to begin to identify the implications and next steps, a 'grassland summit' was held at the University of Exeter. The outcomes of the summit discussion combined with those from the farmer and policy stakeholder groups have closely informed the recommendations of the research team.

E5 The research team recommend that:

1. An Intensive grassland proofing exercise is undertaken (see main report for more details)
2. A knowledge transfer (KT) and awareness raising programme is targeted at intensive grassland farmers including a localised demonstration network
3. Geographically targeted initiatives are developed with a significant degree of farmer design
4. A mixture of existing, modified and new ES options are promoted to intensive grassland farmers (see below)
5. Any grant aid is made conditional on attendance at a KT event
6. An improved evidence base for policy making and delivery is developed: e.g. field survey of intensive grassland farms – current environmental services and future potential
7. Research is undertaken to explore social and cultural barriers to uptake of improved environmental actions
8. Research is undertaken to inform strategic thinking re. trends in grassland in region and implications for delivering environmental targets
9. In all of this public bodies and large landowners should have an enhanced role in demonstrating greener grassland management

E6 Our specific recommendations for an improved grassland environmental land management package are as follows:

1. Characteristics and principles

- Geographically targeted
- Significant degree of farmer design

2. Informing and persuading

- Systematic area-wide awareness raising activities
- Coordinated KT programme targeted at intensive grassland farmers

3. Environmental Stewardship options (A mixture of existing, modified and new options. See Appendix 4 of main report for further details.)

- Support for undertaking and acting on nutrient audits
- Land management incentive payments for increasing clover cover, varying sward height, introducing new swards with greater environmental value, hedgerow restoration and management
- Capital support towards hedgerow restoration and temporary fencing (and possibly improved slurry storage)

- Capital support conditional on attending KT event

E7 In the light of these recommendations the project's steering group (the Project Board) will be advocating the next steps.

Green Futures for Grassland

1.1 Background

Agriculturally improved grassland² is the dominant land use in South West England. Defra census data for 2004 indicates that 74% of the farmed area of the SW is under grass compared to 57% for England as a whole. Within the region, 28% of grassland is found on dairy farms and it can reasonably be assumed that the majority of this is improved grass. A further 26% of the region's grassland is located on lowland livestock farms (i.e. beef and sheep). Much of this will also have been subject to some degree of agricultural improvement but without more detailed field surveys it is not possible to estimate the area involved. The most recent detailed field survey of grassland farms in the region was carried out in the 1980s (Hopkins *et al.*, 1985) and found that 60% of the enclosed grassland had been reseeded within the previous 20 years and that fertilizer N use was higher than for England and Wales as a whole. The proportion of perennial ryegrass and other sown grasses – an indicator of improvement in older grassland – was generally above 30% in swards that received more than 100 kg fertilizer N/ha, while more than 60% of the old grass, and 75% of the total grassland, was then receiving amounts in excess of this. The same study also found that fertilizer N use on the region's dairy farms was more than double that on beef and sheep farms, being highest on silage fields. Further changes are likely to have further reduced the proportion of grassland that remains relatively unimproved. Whilst some areas of grassland in the region are currently of national and international significance, a large proportion of the area of improved grassland also has the potential to deliver improvements to the region's environment and biodiversity. These improvements can, in turn, enable other regionally important economic activities such as local food initiatives and tourism.

Grassland management, and changing the sward structure of grassland itself, can have significant implications for biodiversity. By extensifying improved grassland and implementing some relatively simple changes, the environmental value of intensively managed grass can be improved, even though reversing the loss of plant species diversity is much slower to achieve. Following the introduction of the new CAP from January 2005, the incentive for agricultural production to be driven by subsidies was effectively withdrawn, and Defra's flagship agri-environment scheme, Environmental Stewardship (ES) aims to see 75% of England's agricultural land brought into Entry Level Stewardship (ELS) agreement. If taken up widely, ES will contribute towards improved water quality and reduced soil erosion, improve conditions for wildlife on farms, maintaining the character of the landscape and help to protect the historic environment. However, attracting large numbers of farms previously not involved in agri-environmental schemes (particularly dairy farms) will be a considerable challenge. Within the SW however, the impact of ES may arguably be lessened because of the relatively large area of

² Typically lowland neutral grasslands that are the result of reseeded with perennial ryegrass and a few other sown species, or as a result of previously unimproved grasslands having been modified by fertilizers, drainage, frequent cutting (especially for silage) and/ or intensive grazing leading to botanical composition resembling that of reseeded grassland. Agriculturally improved grasslands are of low botanical interest and usually of low value for other wildlife.

land remaining in the so-called 'legacy' schemes³. In addition, it is quite likely that many of the region's grassland farms can be entered into ELS without making many (or any) changes to in-field management practices.

In contrast to the current drive for environmental improvements, most dairy farms, and also many other livestock farms have, for several decades, undergone fundamental changes in response to financial incentives combined with effective knowledge transfer to improve production. Since the 1970s management changes have resulted in increased grassland productivity, involving a combination of reseeded, increased fertilizer use, land drainage, increased stocking rates, and early cutting for silage rather than hay; these have collectively caused environmental damage. The area of botanically diverse grassland has been greatly reduced, while the intensive management of improved grasslands may be associated with problems of poor soil structure and soil compaction which, combined with high rainfall, steep slopes, vulnerable soils, and short-sward vegetation, can lead to significant runoff and diffuse pollution of surface waters across the region. The 'knock-on' impacts can affect in-field biodiversity and wildlife 'downstream' from the source of the problem, as well as leading to increased flooding risks to residential areas, transport infrastructure etc. Combined with this there have been structural changes in the farming sector, with farm amalgamations, larger dairy herds, increasing barriers to new entrants to farming, and relentless economic pressures that pose problems for farm businesses striving to remain viable. Despite the influx of new entrants to farming in the region (often by individuals with a strong environmental motivation), these tend to be drawn to farming systems with low capital start up costs (i.e. non-dairy).

The dairy sector, in particular, has experienced considerable change in recent years. The number of dairy holdings in the region has declined from 8,249 in 1990 to 4,800 in 2004 (a fall of 41%). In 1990 dairy farms accounted for 23% of all farms in SW. In 2004 they accounted for just 10%. At the same time, while the dairy breeding herd in the SW has contracted, yield per cow has increased and overall production has been relatively stable. Thus, dairy production is now concentrated in the hands of fewer, larger producers. The incomes of these producers are highly vulnerable to small movements in the farm-gate price of milk and changes in the costs of inputs. This coupled with the greater intensity of most dairy farming systems means that large number of dairy farmers (as well as other intensive grassland farmers) have remained outside of the growing body of farmers with an agri-environmental contract.

It is now being more widely recognized that if the familiar farmed landscape of the South West, the environmental goods and services that it is capable of supporting, and the sustainability of family-based farms as the basic unit of agricultural production are to be retained, then the present model will need to be adapted to one that is more multi-functional, and that elements of the incentives applied to more extensive farms (e.g. in upland ESAs) will need to be applied to lowland farms also. Every farm in the region can provide some degree of environmental

³ ie The Countryside Stewardship Scheme (CSS) and Environmentally Sensitive Areas (ESAs).

improvement: the challenge is to enable this to occur on farms that consist predominately of improved grassland.

1.2 Project Aims

Against this background, the aim of this project was to explore ways in which the region could be placed in a much stronger position to resolve environmental issues associated with improved grassland, and to do this more effectively. The Delivery Plan for a Sustainable Farming & Food Industry in South West England identified action to improve environmental outcomes on the region's dominant land use – improved grasslands – as a key activity⁴. Funded through the Delivery Plan for a Sustainable Farming and Food Industry in the South West, the project aims were to stimulate and engage land managers in a collaborative movement with environmentalists and other stakeholders, and to recognise and emphasise their role in finding sustainable solutions. In doing so it sought contribute to informing the new opportunities in the Environmental Stewardship package and other policy measures. That said, it is important to note that whilst the research team recognise that ES is the Defra flagship scheme for the foreseeable future, within the context of this project it was necessary to explore potential options that go beyond the current boundaries of ES, particularly those suited to intensively utilised grasslands.

The project was planned and structured to encompass a range of relevant stakeholder groups, with engagement by farmer/land managers and their interests at critical stages. The approach focused on developing a better-informed and enabled region to tackle what are regional-critical environmental issues that face the farming community. Although the environmental problems associated with improved grassland farming are an international and national concern, solutions have been poorly developed, and as a dominant land use in this region, the South West has an inherent opportunity to take the lead in solving its own problems in the most advantageous way for both farming and non-farming interests.

1.3 Project Objectives

The specific objectives of the project were to:

1. Raise awareness across the region of the environmental problems caused by the use and management of intensive grasslands.
2. Explain the range of environmental benefits that sward diversification could provide.
3. Test out through stakeholder dialogue the way in which particular sward structures could be manipulated by different grazing stock and regimes, within the context of farm and farming systems sustainability.

⁴ Making a Difference' (the Delivery Plan for a Sustainable Farming & Food Industry in South West England ([Making a Difference](#)) identifies action to improve environmental outcomes on the regions dominant land use – improved grasslands – as a key activity (e.g. Obj 4, page 20) under the 'Environmental Management' theme.

4. Identify the most promising management changes farmer stakeholders would be willing to undertake to test some approaches that emerge.
5. Host a grassland 'summit' to share with key audiences the progress made by the project and explore future opportunities.

1.4 Project programme

Following invitations to tender issued in December 2004 the contract was awarded to a joint team of staff from the Centre for Rural Research (CRR), University of Exeter and the Institute of Grassland and Environmental Research (IGER) at North Wyke, Devon, combining experience in farmer engagement, grassland science and agronomy, social science research, and the biodiversity and environmental implications of farmland management. An inception meeting with the Project Board was held on 3 March 2005 and meetings to review progress held at appropriate intervals subsequently. An initial internal project deliverable was the production of a discussion paper entitled "An overview of the environmental effects of modern agricultural grassland management and the potential for remedial measures" as a focus around which to develop the agenda of ideas for a Green Future. This is included as Appendix 1 to this report. It was recognized by the research team at the outset that the Project Board members had common interests in terms of the project's development and overall priorities, but that there were also differences in approach and detail, and on how production and conservation objectives might be achieved. The research team has sought to incorporate suggestions from the board members without bias.

2.1 Project Approach

Given that key project objectives concerned awareness raising and dialogue with farmers, the project adopted a highly participative and flexible methodology based on engagement with a range of farmer groups throughout the region. In the early stages of the project we identified (as far as possible) all the major stakeholding groups represented in the region. In consultation with the Project Board it was decided to focus efforts on farming groups (although not to the exclusion of other stakeholder groups). Because of the difficulties of convening *ad hoc* farmer groups (particularly to discuss environmental management) the approach adopted was to make presentations to existing south-west based farmer discussion groups, at local grassland society meetings, and to special focus groups within the Objective 1 Grassland Challenge project (see Glossary).

Given the highly specialised and intensive nature of dairy farming, in particular, it was recognized from the outset that farmer-engagement would require an approach that sought to develop win-win situations: techniques and management changes that could be good for farming and also good for the environment (and that there was little scope for an approach which prioritised the environment over farm survivability). In this context, it was understood that the research team would not be constrained by options within ES and that the stakeholder dialogue could explore all options including possible variants on existing ES options and new potential options. Invitations offering ourselves as speakers to the secretaries of many of the potential target groups were frequently ignored or refused, or

accommodated over a longer time scale than originally envisaged⁵. This in itself was an indication of the scale of the awareness-raising problem of addressing environmental issues in sectors of agriculture largely left out of the agri-environmental network. In addition to attending meetings, many additional farmer groups received information about the project (summary background, objectives, link to website, etc) via the Rural Enterprise Gateway.

2.2 Farmer engagement

In order to engage with farming groups a 60 minute interactive presentation was devised which consisted of a stepwise consideration of possible opportunities starting with actions that fit within farmers' terms of reference as good agricultural practice, such as improved nutrient use and introduction of grass-legume swards as an alternative to pure ryegrass, followed by actions that were progressively more likely to lead to environmental improvements (albeit more difficult for dairy farmers, in particular, to see as fitting within their system). This was followed by open discussions in which the audience would give their reactions, make alternative suggestions and comment on their perceived implications. The next stage involved a 'bidding game' in which participants were invited to make monetary bids indicating the minimum payment that would be necessary to induce them to enter land under specific management options. They were also invited to indicate how much land they would be willing to enter for this level of payment. This technique has been used in the past in the UK (see Potter and Gasson 1988) to gauge farmer willingness to enter land diversion schemes and more recently elsewhere in Europe (Gerowitt et al., 2003). The purpose was not to establish the 'price' of various options but, using the monetary and area bids as proxy indicators, to explore how willingness and resistance varied as the environmental benefits of the options increased.

The flexibility of the approach adopted meant that the content of the presentation varied in order to tailor it to meet the needs of each group. Consequently, and in contrast to a conventional research project, the information (data) gathered at each meeting varied, although a core set of data on the characteristics of participants and their farms and basic environmental management history was collected at each meeting.

The content of the presentation is summarized in Box 1. The basic PowerPoint presentation is included in Appendix 3 although, as noted above, the actual content varied slightly for each meeting. The presentation developed the issues from the agronomic through various levels of environmental improvement, with emphasis being adapted according to the specific interests of the group. The options included in the bidding game are listed in Box 2 and reflect the stepwise progression of the PowerPoint presentation i.e. the initial options provide clear agronomic benefits and limited environmental benefits while the latter options are clearly more beneficial in environmental terms but would be much more challenging to implement in an intensive grass based farming system.

⁵ See Appendix 2 for an example of a letter sent to grassland societies. Other approaches to farmer groups were made by email, fax and phone (sometimes through a third party).

2.3 The farmer meetings

The project did not set out with the aim of conducting a representative survey of intensive grassland farmers as the resources available did not allow such an approach. Rather, it was hoped to be able to engage farmers indicative of different farming situations, such as the coastal fringe of North Devon and the NVZ of Cornwall. Presentations were made at five farmer meetings (43 farmers) and two further meetings were held with members of the policy community⁶. All (farming) participants were asked to supply basic background data on themselves and their farms. As Table 1 indicates, participating farmers were responsible for managing over 5000 ha, of which 38% was temporary grass and 38% permanent grass. The average (mean) size of participating farms was 129 ha compared to a mean size of just over 44 ha for the region as a whole (although the latter figure includes over 21,000 'farms' of less than 5 ha).

Box 1: Summary of presentation to farmer groups

1. Background to the production / environment issue and where are we heading

Shift in grant aid; shifting of goal posts; progressive increase in legislative controls. Support payments from production to environment, and falling profits; may suit extensive farming, but where do dairy and intensive beef farmers fit in?

2. Intensive grassland and dairying: alternative approaches

Maintaining high output in relation to reducing input costs (treadmill approach).

Achieving potential for adding value (premium for something; direct sales etc) - less intensive but not extensive (semi-niche market).

Staying profitable from core business, while getting additional income (from results) or scheme-based (ELS).

3. Example of use of clovers:

N fixation and reduced fertilizer, soil and nutritional benefits, quality, intake; Improved animal performance; Some biodiversity benefits possible (sward structure/ flowering etc). Economically attractive (supported with relevant research data); Win-win certainly possible.

4. Example of adapting grazing management:

Avoiding poaching, overgrazing, soil / nutrient run-off; maintain a variable pattern of sward heights especially on permanent pasture; use of swards managed as buffer for summer drought (fodderbank approach); also options for periodically ungrazed buffer strips and sensitive areas (streams, hedge bottoms). Some win-wins identified.

5. Example of changes in mowing management

Integrated cutting and grazing where possible; use of hay (for young stock etc) when made can be from species-rich swards: yield, quality, other benefits.

Silage. Recognition of soil quality issues, nutrient input/ output, conservation values of field edges, wilting to high DM content etc. Various win-wins identified.

6. Introducing specific wildlife options

On most dairy farms will be specific areas rather than whole farm (margins, buffer strips, outer fields, slopes, corners)

Seasonal issues e.g. wintering and ground-nesting birds; timing of hedge trimming.

Hedges and headlands: diverse sowings on specific areas where possible (ELS HLS options) Good farming benefits: shelter, shade, stock boundary; good for birds, insects, plants.

Compatible with relatively intensive farming, with some field edge management changes.

⁶ The identity of the individual groups has not been revealed in order to maintain confidentiality.

Box 2: Management options included in ‘bidding game’

Greater use of white clover and other legumes

- White clover reseeded
- White clover oversowing/strip seeding
- Management to increase existing use of white clover
- Reseeding to Red Clover/Lucerne for silage crops as alternative to N-fertilized grass lays

Grazing management

- Varying sward height within fields to produce more varied sward structure
- Developing a ‘fodderbank’ for dry season grazing
- Limiting both access by stock and fertiliser/slurry near streams and hedge bottoms

Wildlife management

- Sowing species rich seed mixture and managing for wildlife
- Seasonal grassland ‘setaside’ to allow seed setting as source of bird food.

Table 1: Farm size and land use characteristics of Green Futures participants

	Area (ha)	%	Mean area (ha)
Temporary grass	1933	38	60
Permanent grass	1917	38	48
Arable	1016	20	33
Other	163	3	4
Total	5,029 ha	100%	129 ha

Those taking part in the discussion groups were predominately (64%) dairy farmers although a significant minority (28%) were specialist beef or beef and sheep farmers. 44% were owner occupiers and 32% operated mixed tenure businesses. The average age of participants was just under 50 (49.9) which means that they were, on average, 6-7 years younger than the ‘average’ farmer in England. Interestingly, while only 22% reported having an ESA or CSS agreement, 67% either already have applied to ES or intend to do so. Not surprisingly, few (8 individuals) intended to apply to HLS, although worryingly 4 thought that they could to apply to HLS without having first entered ELS! Although the proportion indicating that that intend to apply (or had done so already) is high it should be remembered that this is a relatively small sample and, moreover, that we do not know what proportion would be willing to take up options likely to bring about in-field biodiversity improvements. It is more likely that intensive grassland farmers will select options that can be easily incorporated within their farming system (e.g. hedgerow management).

3.1 Options for change: outcomes of engaging with farmer groups

This section discusses the qualitative and quantitative outputs from the farmer meetings, identifying barriers to change and areas of support need. Engaging with the farmer groups inevitably lead to some quite wide ranging discussions⁷ although a number of issues were raised several times. These can be grouped under the following headings:

- Knowledge transfer
- Incentive payments
- Capital support

Although some issues span more than one category, and there is an inevitable additional miscellaneous heading, the three-way categorisation suggested above nevertheless provides a useful means for considering the outcomes of the farmer meetings.

3.2 *Knowledge transfer*

A number of issues were identified that clearly imply the need for additional and more effective knowledge transfer (KT). For instance, **a clear knowledge gap emerged surrounding aspects of sward diversification**: Many farmers with land suited to permanent pasture do not want to plough unnecessarily, which was a reasonable justification for not sowing red clover, but in other cases it appears that farmers are even unaware of potential agronomic (let alone, environmental) benefits of legume-based systems. One specific knowledge barrier relates to fear of getting bloat (see glossary) in legume-based systems. There was a lack of understanding about bloat and how to manage to prevent or reduce the risk.

Concerns about weed control (particularly docks) in clover-based swards also emerged as a further deterrent to using legumes. Comments about using higher seed rates when sowing on dock-prone sites, or on control (weed wipe etc) suggests that there is a knowledge dissemination need. In addition, it was recognized that most grassland herbicides have a broad spectrum of activity and ways to reduce dose rates and effects on non-target plants could be improved.

Farmers suggested a need for demonstration sites that were meaningful in terms which they could relate to the environment of their own farm, such as soil type, i.e. a more localised network of demonstration farms/sites. More generally, there was a view that farmers need to try things like sward diversification out on their own farm. Seeing something on a research station or a neighbour's farm helped, but was not enough. They need to be persuaded to try things out gradually and gain confidence.

⁷ Given delays to receipt of SPS payments, difficulties with ES applications, etc this was inevitable and probably helps account for some of the more hostile responses.

The issue of **nutrient budgeting** also highlighted a knowledge gap about how soil analyses could be interpreted in term of the nutrient contents of fertilizers and farm manures. This issue was a recurrent theme. Although some farmers thought that they did this to some extent, e.g. applications of P and K based on soil analysis, it seemed clear that the concepts of **nutrient audits** were not really appreciated. Consequently, there is a knowledge gap which is preventing nutrient budgeting from being incorporated into farm decision making and this has implications for delivery of environmental outcomes. This is an issue that could potentially be addressed under the Catchment Sensitive Farming initiative.

3.3 *Incentive payments*

It was recognised that diversification of swards through the use of legume-based forages to reduce environmental impact, while producing high-quality feed and getting some structural diversity (and additional, albeit limited, botanical diversity) was a potential option for intensive grassland farmers. Some of the KT implications have been discussed above but **another barrier to greater use of legume-based systems was establishment cost**, either by oversowing (cost of seed) or reseeded (seed plus other establishment costs). In turn, it was suggested that an incentive payment would be necessary in many cases (see Section 3.6). A particular issue here relates to red clover leys as the write-off cost of establishment is over a short (2-3 year period).

The option for increasing white clover in existing swards or sowing ryegrass-white clover swards was intended to replace high-N fertilized pure ryegrass. Generally, farmer perception of these options was good, based on the recognition of such swards providing high yields of good quality forage. However, there were concerns of their potential to fail, which meant that a payment might be required to cover provision for risk of failure (and substitution with bought-in feed) at least until farmers had gained the experience to minimise the risk. Environmentally, this option has the potential to produce benefits in terms of a different sward structure and improved invertebrate habitat compared with intensively managed pure ryegrass, particularly as it would also have a reduced demand for nitrogen fertilizer. In the past there have been arguments against using white clover in agri-environment schemes because they may be seen as substituting biological N for mineral N, but the effect on sward structure has so far been overlooked. These potential benefits might be further enhanced in the context of sward structural change if the grasses present were to contain a proportion of species other than perennial ryegrass.

The combination of increasing fertiliser costs and growing appreciation of best practice suggests that intensive grassland farmers would be amenable to options incentivising **unfertilised margins**. For instance, one farmer commented that “If N increases in price further it will be more profitable to farm a greater acreage (buy/rent) than to apply N to grassland.” At the same time, there was farmer recognition that allowing spreaders and fertilizer spinners to add nutrients near the edge of fields was environmentally damaging, and contributed to high-fertility weeds such as docks growing vigorously on the edges and in the hedge bottoms, and was not therefore a good use of nitrogen.

One area where annual incentive payments and capital/restoration grants could play a role was improved **hedgerow management**. There are a range of suitable options already within ES and this was recognised as an achievable measure by farmers. For instance, it was suggested by one farmer as offering scope for some “win-win” with hedges providing shelter from wind and rain, shade from the sun, good stock boundaries between fields, as well as nesting and roosting sites for birds and mammals, berries, and flowers and long grasses in the bottoms as habitats for invertebrates. Moreover, with increasing awareness of climate change and its consequences resulting in changing weather patterns such as increased frequency of storms and heatwaves, the shelter value of hedges could be promoted further.

3.4 Capital support

In addition to annual incentive payments, it was apparent that in some circumstances market failure was perceived to lead to insufficient funds to support capital works from within the costs of production. For example, farmers identified improved slurry management so as to avoid having to spread at inappropriate times or on unsuitable sites. It was suggested that there was a **need for more slurry storage** and that this had cost implications. This raises some important issues regarding policy doctrines such as the polluter pays principle (ppp), the benefits of grant aiding environmental improvements and farmer perceptions. Whilst it is recognised that under cross compliance conditions farmers are expected to meet legislative standards without additional capital aid, it is also recognised that ppp is very far from uniformly adopted in agricultural or other policy areas. Even so, it is also possible to distinguish between policy principles and the policy framework and farmer need. Although the Single Farm Payment is intended as a reward reflecting farmers’ basic stewardship of the environment, in certain circumstance low returns coupled with a modest SFP was seen as a barrier to improving slurry storage, for example. Similarly, capital support towards the cost of temporary fencing of sensitive areas could assist in delivering environmental improvements and improve uptake of certain management options.

3.5 Other issues

A range of other issues were identified and discussed at the farmer meetings. Some of these were very specific and others more generic and concerned how to motivate farmers, particularly those who had so far been largely left out of the agri-environmental loop.

Planning for seasonal feed deficits and the potential for increased swards structural diversity: This was offered to groups to consider whether this might help with seasonal grazing shortages. Suggestions of setting aside specifically managed areas for summer feed deficits, e.g. through designated areas with drought-resistant species, were not favourably received (“There might not be a summer drought”). However, at least one farmer considered his use of turnips to be addressing this issue.

Other specific wildlife enhancement projects: One farmer commented that set-aside had missed an opportunity to incorporate environmental objectives. There

was farmer recognition that to sow species-diverse mixtures on most parts of dairy farmland would be unsuccessful because the soil nutrient status was generally too high for many plant species. However, that there might be scope for some degree of sward species diversity that would be compatible with existing high soil nutrient conditions, was not generally recognised. **(There is a barrier here in conveying that even some degree of sward diversity may help with wider biodiversity and environmental objectives)**. The option of very late cutting for what might be bedding hay (akin to the litter meadow system of central Europe) was accepted as a possible option (subject to the cost implications being addressed through ELS).

Another farmer commented that farmers needed to identify the positive environmental aspects of their management so that the negative aspects did not get an unfair recognition. It was important to have someone explain to the farmer what environmental features and plant and animal species were already present on his/her farm (and presumably those that had the potential to be there). This is needed, it was argued, in order to enthuse the farmer as an individual. Many farmers operating at the more intensive end of the spectrum assume that their farm has little or no wildlife value, or indeed potential value compatible with their farming operations. Their attitude would often be different if they had more knowledge of what was present (or which could be there, given the right management). Unfortunately, there is little chance of this type of interaction occurring under ELS although there is clearly a role here for the land based agencies and NGOs. There is also a role for well informed, enthusiastic farmers who would be able to 'spread the word'.

The question of how a farmer's environmental achievements are recognized by the wider community (neighbouring farmers, local communities, outside visitors) was discussed at the farmer meetings. We suggested that many livestock breeders derived great personal esteem from a herdbook cast sign outside the farm, and that those running hospitality enterprises had crowns and rosettes on a sign; while there are some annual awards, environmentally successful farmers have nothing that really compares to these. There was a positive reaction to this suggestion, but any visible mark of an award must be a quality one and not linked to a single body such as Defra or RSPB. Such an award could have a premium in the local community, where there was often a perception that managing for wildlife resulted in untidy farming and negative peer review from other farmers.

Although, generally, there was a positive reaction of the idea of improving environmental management and being seen to be improving environmental management, some farmers were very defensive and resentful about criticism (both implied and actual) of the environmental effects of their practices. For example in discussing the issue of nutrient pollution of inland waters one comment was: "Can't see what all the fuss is about. The rivers have never been cleaner than they are now." Several farmers rather predictably aired the view that they would rather have a decent price for their products than a subsidy. However, at present, many have not got the knowledge, skills or inclination to sell other than into bulk commodity markets. Others recognized that they had to work within the present system rather than think they could change things and welcomed the opportunity to contribute their views.

It was commented that farmers were getting mixed messages about the future of the countryside, at least as far as dairying was concerned, with a perception that the messages from the Haskins Review were seeming to advocate a decline of the smaller dairy businesses (and possibly at odds with the outcomes of the Curry Report).

In all of this it is important to recognise that one of the unique features of dairy farming is the tightness of the margin on milk price and the effect that a very small decline in milk yield, or increase in production costs or fall in milk price has on turning a herd that is in profit to one that is operating at a loss. Any changes in grazing management are affected by concerns of losing milk yield, problems with access to distant fields, cold and wet weather in spring and autumn. In the end, dairy farmers that rely heavily on ryegrass silage and purchased feed may continue to do so because of perceived simplicity compared with growing, say, legume silage crops.

3.6 The bidding game

The outputs from the farmer discussion groups clearly point to some potential for intensive grassland farmers to adopt practices which would produce some environmental gain although such practices must not conflict with the main thrust of the farming system and there would be attendant support needs, including incentive payments. In terms of the land and monetary bids made by farmers, the white clover options and actions to vary sward height emerged as the most popular (based on analysis of median values - see Table 2).

On average farmers would be willing to consider the white clover options for £69/ha⁸ and in return would consider enrolling an average of 19 ha. However, as the discussion above made clear, incentive payments alone would not necessarily be sufficient and a knowledge transfer and demonstration programme would also be required. **Increasing the use of clover and other legumes is not currently an option within ES and yet it is the most favoured option identified through this project.** Clearly, it would only provide limited biodiversity gains but could nevertheless represent an entry level option for otherwise intensively managed farms⁹. **The next most favoured option was varying sward height, recognised as leading to sward structural changes** that can affect invertebrates and foraging by birds (Buckingham et al., 2004). But beyond this, intensive grassland farmers are less willing (requiring higher payments and offering small areas of land) to implement more demanding management practices. This should come as no surprise as such options would be much more challenging to accommodate within intensive farming systems. Within ES varying sward height is covered to

⁸ The mean bid for all clover options.

⁹ Whilst it may be argued that value for money is not great given the value of the monetary bid in relation to existing ELS payments, it must also be recognised that these bids reflect a perceived degree of risk associated with increased use of legumes on the part of intensive grassland farmers. In addition, the environmental benefits of these options depend on the 'starting point' e.g. compared to very intensive dairy farming, an increase in legumes is environmentally beneficial whereas it would provide little or no benefit in the context of existing extensive grassland management.

some extent by buffer strip options. Under ELS the strips are not fenced although under the enhanced buffer strip option of HLS livestock must be excluded. ELS also includes a wild bird seed mix option for grassland farmer and the creation of species rich grassland on former leys under HLS. Indeed, the HLS payment for the latter is below the mean bid offered by farmers taking part in this project.

Table 2: Summary results of ‘bidding game’

Management option		Average Bid	
		£/ha	ha
White clover 1	Mean	114	24
	Median	50	20
White clover 2	Mean	108	18
	Median	90	16
White clover 3	Mean	79	37
	Median	68	20
Other legumes	Mean	209	21
	Median	200	20
Varying sward height	Mean	136	23
	Median	74	20
Fodderbank	Mean	241	5
	Median	125	4
Limiting stock access	Mean	129	31
	Median	100	10
Wildlife seed mix	Mean	300	5
	Median	200	4
Retaining seed heads	Mean	201	5
	Median	124	4

White clover 1: White clover reseeding

White clover 2: White clover oversowing/strip seeding

White clover 3: Management to increase existing use of white clover

4.1 The grassland summit

In order to discuss the outcomes of the project and to begin to identify the implications and next steps, a ‘grassland summit’ was held at the University of Exeter on June 12th 2006. The summit was widely advertised (e.g. on over 30 different websites) and personal invitations were sent to farming and policy stakeholders within the region and nationally. A total of 34 individuals attended the summit¹⁰ and they were presented with the following proposition:

¹⁰ Including 8 members of the Project Board and research team.

Box 3: Green Futures summit proposition

Towards a greener future for the South West's grasslands

Introduction

Grasslands occupy over two-thirds of the agricultural land in Britain. They are the dominant land use of the region, and the important source of much of the South West's agricultural economy. Over the last 50 years, farmers and farm policy have been extraordinarily successful in shifting stocking rates, milk yields, reseeding grasslands, and developing fertiliser regimes. Good for production - but not so good for the environment.

Structurally uniform dense swards dominated by ryegrasses, on soils managed to maintain high nutrient levels, don't do much for biodiversity. They provide little in the way of food for wildlife. Other environmental problems can come from poor soil structure and soil compaction, combining with high rainfall and steep slopes and poor nutrient management causing damaging runoff and diffuse pollution.

This 'green futures' project seeks to understand where we can match environmental goals with production requirements. If there are common interests here, how do we best develop these, test them for utility, and get on with greening the region's grasslands?

Into the Future – Environment as well as Production

Meat and milk may be the primary products of grassland farming, but their associated wildlife, soils and water quality are important objectives that can be factored in too. Getting beyond a cost-squeezed commodity market, to find win-win strategies that also build on public support for environmental outcomes, provides a way forward that this project explores.

We want to learn just how, in a very practical sense, we can fast-forward the South West, not just to meet the environmental challenge, but also to make the most of this opportunity for our farmers too.

Our Research – Testing Opportunities

From our work to date we know something about the options for building more environment into pastoral systems – including the most (or least) popular with our farmer colleagues. Options have included use of clover and other legumes, a focus on sward height, limiting stock access to some features (streams, hedge bottoms), and leaving some areas unmown and ungrazed for periods. We know there are other practical opportunities too.

We have also learnt something about awareness raising - how many farmers know about the environmental challenge? About training, and about knowledge gaps in key areas like nutrient budgeting. How should we best develop and share the necessary knowledge for a greener future?

Help Define a Next Step?

Let's match the broad environmental challenge with a good farming future. In this project we have gained some important information that we hope can help set out a next step. Let's focus on the most promising options, but let us also keep an eye on the wider issues too.

Today is a chance to help develop a new project. Help us make it practical for the farm, and effective for environmental improvement. Our goal is to put in place the field conditions for a staged return of biodiversity and other environmental enhancements to the region's agriculturally improved grasslands. We need to think hard and plan for effective training and advice, about demonstration and practical case study, about cost implications and possible new farm business opportunities. Help today to define a next step.

Summit participants broke in to small workshop groups in order to discuss the proposition and, in particular, to identify what would be the desired/expected outcomes, what would be the support needs and what type of delivery approach should be adopted. The workshop discussions helped identify a number of themes and principles to be considered in taking forward the green futures concept.

It was widely agreed that the outcomes of the project and any recommendations for specific land management practices must be both “**pragmatic and profitable**”. This reflects the sensitivity of income levels in the dairy sector, in

particular, but also a more general acceptance that intensive grassland farmers are not going to fundamentally alter their farming systems: in other words, the need for a 'win, win' approach adopted at the outset of this project was endorsed by summit participants. Linked to this, but nevertheless subtly different, is the need for the management options to be "**socially acceptable**" to farmers. This is a key point. Among more extensive livestock farming systems, in the lowlands and the uplands, environmentally friendly farming has become increasingly seen as a socially acceptable means of farming among farming peers. In sectors that have not seen widespread uptake of AES such social acceptability may not exist, may be more limited and needs to be carefully fostered. Such an attitude change can be a fundamental challenge to notions of what it is to be 'a farmer' and some resistance should not be unexpected.

In order for the ideas discussed through this project to become socially acceptable for the majority of more intensive livestock farmers it is essential that any practical recommendations have "**buy in**" from farmers and that options are developed through "**dialogue**" and "**partnership**" between farmers, practitioners and the wider policy community. Within this, it is important to recognise, respect and value the detailed lay knowledge held by members of the farming community. Recruiting farming leaders or mentors was suggested as one way of helping to develop social acceptability but it was also suggested that the role of CPD (Continuing Professional Development) should be considered in developing positive attitudes towards environmental management.

Discussions with farmer groups in the earlier phase of the project had identified the need for greater KT and demonstration activities and this was an issue that was also raised by the summit workshop groups. One of the issues here was the importance of establishing the **evidence base** and developing **evidence-based advice to farmers**. For instance, it was suggested that further survey work is needed to establish the association between contemporary farming practices and environmental outcomes on intensive grassland farms in the region. IGER conducted a survey of grassland farms in SW England in 1983 (Hopkins et al., 1985; Peel et al, 1985), which included a repeat study of a sample of farms surveyed in 1970; there has been no comparable regional information collection at the farm level carried out since.

In terms of the delivery of advice and information to farmers, **consistency and credibility** were identified as key factors. One example given was that of IGER who are seen as credible in terms of undertaking research and development activities which was then associated with improved KT activities such as through *Grassland Challenge*. The latter was seen as successful because it "**facilitated discussion rather than prescribing change**". It was suggested that KT activities should aim to balance business and environmental objectives and activities and that it should involve **locally applicable demonstrations**. In this context, one definition of local is that it would be within a 1 hour drive.

Few of the detailed land management measures identified earlier in the project were challenged¹¹ in the workshop groups, although there was a clear suggestion for a **stepped menu** which in turn, would facilitate a **stepped improvement** in both landscape and biodiversity and resources (soil and water). At the same time it was suggested that improved grassland plays an important part in the habitat/landscape mosaic of the region and that this characteristic should not be lost. In this context it was suggested that greater thought be given to the target population or indeed that sub-groups be recognised (e.g. small v. large dairy farms). Targeting is an important aspect of almost all policy delivery and further thought is necessary regarding the key target group(s) and/or locations. In terms of delivery mechanisms, most comments from the workshop groups referred to incentive payments and the now well established agri-environmental model. In particular, it was suggested that ELS needed modification in order to facilitate entry of intensive grassland farmers and that it should be much more localised to reflect differences between North and South Devon, for instance. Other suggestions included preferential bank lending rates linked to environmental outputs, increased opportunities for marketing 'wildlife friendly' produce and support for farmer cooperation so that areas under good environmental management on different farms could be linked together rather than existing as fragmented islands.

In terms of delivery, it was suggested that, while family farmers/land managers should represent the bulk (80%) of those involved in delivering environmental benefits on the ground, public bodies (particularly those with landholdings) should play an important demonstration role. Defra and Natural England were seen as likely lead government departments/agencies while it was suggested that the Environment Agency should play more of a background role. The discussion of delivery echoed earlier points in identifying the importance of **farmer buy-in** and **farmer ownership** of whatever initiative was developed. It was also suggested that there was an opportunity here for bringing the public on to farms in order to help make the link between farming and the public interest. As well as delivering (public) environmental benefits, farms could be used as venues for the public to get engaged, for farm walks, education, etc. One suggestion was to extend the existing 'Farm Sunday' initiative to encompass the idea of "**open farm weekends**".

5.1 Towards a greener future

It is clear from the discussions with farming and non-farming stakeholders throughout this project that there is an opportunity to advocate a realistic environmental land management package that fits intensive grassland farming (with a particular approach for dairy farming as a sub-set) and meets the challenge of improved environmental delivery. This would include support needs broader than, but building on the existing opportunity that ES provides. At the same time,

¹¹ At this point it is worth repeating the earlier statement that the research was not solely concerned with exploring new options for ES. The project was concerned with raising awareness of environmental issues associated with intensive grassland use and means of addressing these. Thus, some of the actions identified by farmers may already be available within ES, others may require new ES options and yet others may fall beyond the scope of ES. Appendix 4 identifies the extent to which the options explored through the *Green Futures* project are already potentially available to intensive grassland farmers through a variety of means.

environmentalists must have realistic expectations about what can be achieved in the short term.

If intensive grassland farmers are going to make a contribution to environmental improvement they need to be informed and persuaded of the implications for their business. This will involve incrementalism – a gradual stepwise movement rather than a rapid movement. Good uptake of ELS in the region is beginning this process. The environmental pay-off may primarily derive from the potential scale effects from the large areas of land that could be involved rather than from a significant short term reorientation of land management practices.

There is a uniqueness to the dairy farming sector in that profitability can easily be seriously affected by very small management changes. Thus, the need for ‘win-win’ strategies is very great if environmental actions are to be introduced. Linked to this, two further principles emerged equally strongly from the grassland summit: **farmer stakeholders must be involved in the design of any initiatives which derive from this work.** They must have a sense of ownership and be willing and able to act as advocates. If this is not achieved then the sense of social acceptability that was identified as so important may also fail to materialise. In addition, **any practical policy intervention must be at an appropriately local scale in order to make it meaningful for participants.** These generic principles should apply to whatever decisions are made regarding the shape of the next stage of the Green Futures initiative.

We need to consider how to take forward the Green Futures agenda with demonstration farms or through farm-scale engagement at one or several localities in the region, capitalising on regionally distinct attributes and marketing opportunities (e.g. links with farm tourism, local food production that has environmental quality embedded). A full list of recommendations can be found in Box 4. We have indicated where recommendations relate to existing or potential new/modified ES options and where they fall outside the scope of ES. The first recommendation of the research team is that consideration of an ‘intensive-grassland-proofing’ exercise be undertaken by the organisations represented on the Project Board. Such an exercise should be designed to discover the extent to which existing and planned initiatives are consistent with the requirements of intensive grassland farming and identify any steps needed to make them more so: i.e. are there any changes that could be made to policy initiatives that would make particular management options, training events, etc more relevant and more appealing to intensive grassland farmers?

Box 4: Recommendations of the research team

- Intensive grassland proofing exercise
- KT and awareness raising programme targeted at intensive grassland farmers
- Localised demonstration network
- Geographically targeted initiatives with significant degree of farmer design
- Promote mixture of existing, modified and new ES options (see Box 5)
- Any grant aid conditional on attendance at KT event
- Improved evidence base for policy making and delivery: field survey of intensive grassland farms – current environmental services and future potential
- Research to explore social and cultural barriers to uptake of improved environmental actions
- Research to inform strategic thinking re: trends in grassland in region and implications for delivering environmental targets
- Enhanced role for public bodies and large landowners in demonstrating greener grassland management

5.2 *An environmental land management package for intensive grassland*

This section outlines some of the characteristics and elements of an Environmental Land Management package for intensive grassland (see also Box 5). This builds around the existing England ES programme, for which there is a well defined development path. Whilst it may be argued that some measures for environmental improvements can be met through existing mechanisms such as cross compliance, Catchment Sensitive Farming and the England ES options, there is nevertheless a clear need for a more coordinated approach, rather than individual measures, that focuses on achieving improved environmental outcomes for the intensive grassland sector.

One of the driving principles behind Green Futures was the need to raise awareness of grassland biodiversity issues (in particular) among the community of intensive grassland farmers. As we discovered, there is still a degree of resistance from the production-centred farming community and there is a failure to understand many of the reasons for environmental objectives. Consequently, **there is a need for further awareness raising activity** as a precursor to any more ambitious initiatives. **An important finding from this work is that there is a clear lack of effective KT on issues of environmental importance.** That is not to deny that professionals are involved in agri-environmental KT but, for whatever reason, intensive grassland farmers appear less likely to be involved in such activities. There is, therefore, **a need for an effective and coordinated programme of KT ranging from ‘simple’ awareness raising activities through to detailed and specific KT activities**, for example, regarding the establishment and management of legume based swards. The approach adopted should be flexible, recognising that the target audience will include ‘resistors’ as well as those who recognise the importance of improving environmental management but

require technical assistance. The KT programme should include localised examples. Indeed, **there is a need for a localised demonstration network within easy access of most potential users. In this context one hours drive was thought to be acceptable.**

The project considered farmer acceptability of a number of technical land management options, many of which were relatively unattractive to intensive grassland farmers. However, various options to increase clover cover (particularly white clover) received a more favourable response as did options for varying sward height. Any pilot project based on this work should include these options (closely linked to the KT needs outlined above). Depending on the results, following a pilot project a case could be made for additional options within ES or for delivery through CSF.

As well as incentive payments, the project identified farmer demand for capital grants for improved slurry storage, hedgerow restoration and for fencing sensitive areas. Consideration should be given to developing a pilot system of grant aid tied to improved grassland management and attendance at KT events in order to increase farmer understanding of why they are being encouraged to adopt modified practices. Indeed, it should be a condition that any additional public funding received by a farmer under a Green Futures pilot project should be conditional on attendance at at least one awareness raising/KT event.

Box 5: Characteristics and elements of a improved grassland Environmental Land Management package

Characteristics and principles

- Geographically targeted
- Significant degree of farmer design

Informing and persuading

- Systematic area-wide awareness raising activities
- Coordinated KT programme targeted at intensive grassland farmers

Environmental Stewardship options¹

- Support for undertaking and **acting on** nutrient audits
- Land management incentive payments for increasing clover cover, varying sward height, introducing new swards with greater environmental value, hedgerow restoration and management
- Capital support towards improved slurry storage, hedgerow restoration and temporary fencing
- Capital support conditional on attending KT event

¹ A mixture of existing, modified and new options. See Appendix 4 for further details.

5.3 Other recommendations

Securing a greener future for the region's improved grasslands requires more than just a new ELM package. For instance, as well as farmer KT gaps there are knowledge gaps for researchers and providers of information for policy development, e.g. about the breakdown of farms in the region by intensity of management, pasture types and existence of swards of different types, structures, farm features, etc. **Consideration might be given for examination of a sample of farms that could provide information on current environmental benefits and potentials and the implications for up-scaling of findings.** In addition, researchers and the policy community need to better understand why there is continuing resistance by some to adopting improved environmental management: is it simply that environmental actions are considered likely to be unaffordable, or a cultural issue, or a fear of change?

One of the themes to emerge from the grassland summit was the role of public land owning bodies. A number of land owning bodies (National Trust, County Councils, RSPB, WTs and large estates such as the Duchy of Cornwall) could be involved in developing the ideas that the region's farms develop a sustainable future based on a production system that also delivers improved environmental benefits. **Consideration should be given to convening a meeting with representatives from the major public land owners and larger private estates to explore what role they could play in demonstrating greener grassland management.**

There is also a need to think further ahead to consider strategic issues concerning the type and structure of agricultural activity required to underpin the region's environment and how to deal with challenges such as further CAP reform and climate change. The time scale of this project was not clearly defined but was largely structured around the next CAP reform period (around 10 years – notwithstanding the mid-term 'health check'). The effects of the possible shrinking of the Single Payment Scheme budget and its impact on farm businesses (post 2012) are potentially very significant. *Green Futures* for grassland in the South West also needs to take account of other drivers of change. The survival of small and medium scale family farms, especially dairy farms, is not assured. The potential situation that the trend towards a smaller number of mega-herds of highly capitalised and highly productive farms serving the commodity milk market is one scenario (e.g. Rickard, 2000). Indeed, that is the logical consequence of the existing trend which has seen dairy production capacity concentrated in the hands of fewer, larger producers. The region's policy community needs to think strategically about the implications of such a scenario, and farmers who at present see little scope for a "greener" system of dairy farming at the current family-farm scale need to consider whether they are likely to have a future that is not part of a multi-functional system.

Green Futures is concerned about improving the region's grassland environment but also making the region more resilient to future change. In this context there may also be scope for linking dairy agri-environmental management with measures to help with adapting dairy farms to future climate change: management for better water resources, better regulation of run-off, soil structure/ percolation,

developing swards that improve the resilience to dry seasons (e.g. with deeper rooting species), shade and windbreaks from trees and hedges, swards (e.g. legumes) that respond to warmer spring conditions.

5.4 Concluding comments

This project has focused on the improved grasslands which are such a characteristic feature of much of the lowland South West Region. We have begun to raise awareness of the issues (Objective 1) through publicising the project with a wide variety of farmer groups, presentations to farmers and stakeholder groups and through the Grassland Summit held in June 2006. The project explored the benefits of sward diversification (Objective 2) through considering the increased use of legumes (which, among other things, adds to sward diversity) and by a range of other methods such as buffer strips, temporary fencing, leaving grass/flowers to set seed, etc. These and other technical land management options were tested out through stakeholder dialogue (Objective 3) with farmers and policy stakeholders in order to identify those options that farmer stakeholders would be most willing to undertake (Objective 4). The Grassland Summit (Objective 5) endorsed many of the project's findings, whilst also generating additional policy ideas and suggesting ways forward through existing programmes such as ES and also other more localised initiatives. By building on the work undertaken for this project, and the evidence it offers, it will be possible to secure a greener future for our grasslands. We understand that the Project Board will be advocating a next step.

References

BUCKINGHAM D.L., ATKINSON P. W. and ROOK A.J. (2004) Testing solutions in grass-dominated landscapes: a review of current research. *Ibis*, **146** (Suppl. 2), 163–170.

GEROWITT B., ISSELSTEIN J. and MARGGRAF R. (2003) Rewards for ecological goods—requirements and perspectives for agricultural land use. *Agriculture, Ecosystems and Environment*, 98, 541–547.

HOPKINS A., MATKIN E.A., ELLIS J.A. and PEEL S. (1985) South-west England grassland survey 1983: 1. Age structure and sward composition of permanent and arable grassland and their relation to manageability, fertilizer nitrogen and other management features. *Grass and Forage Science*, **40**, 349-359.

PEEL S., MATKIN E.A., ELLIS J.A. and HOPKINS A. (1985) South-west England grassland survey 1983: 2. Trends in cropping pattern, reseeding and sward composition 1970-83. *Grass and Forage Science*, **40**, 467-472.

POTTER and GASSON (1988) Farmer participation in voluntary land diversion schemes: some predictions from a survey. *Journal of Rural Studies*, 4, 365-75.

RICKARD S. (2000) British farming: time for a new mindset. *Journal of the Royal Agricultural Society of England*, 161, 8-20.

Glossary and expanded definitions of terms used in the report

Agriculturally improved grassland

Typically lowland neutral grasslands that are the result of reseeded with perennial ryegrass and a few other sown species, or as a result of previously unimproved grasslands having been modified by fertilizers, drainage, frequent cutting (especially for silage) and/ or intensive grazing leading to botanical composition resembling that of reseeded grassland. Agriculturally improved grasslands are of low botanical interest and usually of low value for other wildlife.

Bloat

An acute digestive disorder of ruminants in which excessive amounts of gas accumulate in the rumen, associated usually with ingestion of lush herbage, particularly white clover. The economic implications can be particularly serious for dairy farmers and the risk of bloat is often cited as the reason for not adopting legume-based swards as an alternative to using high nitrogen fertilizer inputs on ryegrass swards

Catchment Sensitive Farming

Catchment Sensitive Farming is a targeted initiative between Defra, Environment Agency and the Natural England partnership to reduce agricultural sources of diffuse pollution within river catchments to ensure that emissions to water are consistent with ecological requirements. The initiative focuses at local level and pulls together farmers, farm advisers, conservation bodies, water companies, and a wide range of other interests.

Countryside Stewardship

The Countryside Stewardship Scheme (CSS) was launched in 1987 with objectives to protect and enhance landscape wildlife habitats, access, and conservation of historic features. The scheme covered all land in England outside Environmentally Sensitive Areas. Farmers chose from a menu of options to put together a package which would work for their farm. CSS is now closed to new entrants. It has been replaced by the Environmental Stewardship scheme.

Environmental Stewardship

Environmental Stewardship is a voluntary whole-farm national agri-environment scheme which replaced the Countryside Stewardship and Environmentally Sensitive Areas schemes in 2005. The scheme has two tiers: Entry Level Stewardship (ELS), which all farmers are eligible to join, and Higher Level Stewardship (HLS), which is competitive. Its objectives are public access, the historic environment, landscape, wildlife conservation and natural resource protection. HLS has two additional objectives to address flood management and genetic conservation. Farmers can vary management of the scheme to help them achieve the results of their own agreement.

Environmentally Sensitive Areas (ESAs)

Designated areas in which measures were introduced through voluntary management agreements to support farming practices that help protect landscape, historical features and wildlife habitats. ESAs were introduced from 1987-1994, eventually with seven areas in the South West: West Penwith, the Somerset Levels and Moors, South Wessex Downs, Exmoor, Dartmoor, Blackdown Hills, Cotswold Hills.

Grassland Challenge

<http://www.farm-management-sw.co.uk/grasslandchallenge/gcmain.htm>

A partnership project led by [Duchy College](#) on behalf of the Cornish Grassland Societies in association with the Institute of Grassland and Environment Research ([IGER](#)) North Wyke. The project was officially launched in October 2003 and aims to improve the competitiveness of grassland and forage producers in Cornwall through technology transfer and dissemination of best practice. The project is part financed by the European Guidance & Agricultural Fund (EAGGF) and DEFRA and through sponsorship from the private sector. The Objective One Programme for Cornwall and the Isles of Scilly has invested in the Grassland Challenge through the EAGGF.

Unimproved grassland

Enclosed grassland that is the product of natural ecological succession but maintained by low-input agricultural management, retaining a generally diverse botanical composition with spatial and structural heterogeneity. Most grassland in this category consists predominantly of unsown species with variable levels of value for wildlife. Its forage production value is low compared with heavily fertilized improved grassland but may be relatively high in relation to its inputs.

Appendix 1

Green Futures Discussion Paper : An overview of the environmental effects of modern agricultural grassland management and the potential for remedial measures

Agriculturally improved grassland has long been the dominant land use in South West England. In the past, variations in local environment and management practices combined to deliver a range of grassland types, supporting plant biodiversity and habitats for other wildlife, and contributing to the distinctiveness of local areas. When the use of inputs such as mineral fertilisers and agro-chemicals was low, stocking rates and farm production were also generally low by today's standards, but the overall farm management was perceived as generally beneficial to the wider environment. Since the late 1980s the adoption of management agreements, in ESAs and under Countryside Stewardship, has, locally, helped to protect or improve habitats and environmental quality, e.g. on parts of the Somerset Levels and Moors, and on the remaining fragments of Culm grassland. However, over large areas of the region grassland is now managed relatively intensively and has minimal value for wildlife, and can in some instances contribute to other environmental problems. This is particularly true on dairy farms, of which there are over 4000 in the region (with c. 500,000 dairy cows), and most have not been successfully targeted by agri-environmental schemes. The same comment applies to many of the lowland livestock farms, of which there are over 9800 in the region.

'Making a Difference' (the Delivery Plan for a Sustainable Farming and Food Industry in South West) England has identified action to improve environmental outcomes from improved grasslands as a key activity under the 'Environmental Management' theme. The objective now is to place the region in a much stronger position to resolve environmental issues associated with improved grassland, more effectively and more rapidly. This discussion paper seeks to address the management issues that have brought us to the present position and to present a framework to stimulate debate and discussion with all stakeholders. How can we tackle the problems in ways that recognize the multi-functional needs of grassland in the South West for the future?

There is no single component of grassland management that can be considered responsible for having led to the loss of biodiversity value and other environmental problems. This means that there is no easy solution to the problems we now face. Agricultural improvement has included all of the following, and the environmentally adverse effects, as well as the agricultural production benefits, are the result of all these factors and processes operating together.

- The development and availability of improved strains of cultivated grasses, mainly ryegrasses, to be sown and managed as a crop, rather than accepting the growth rate and possible feed value limitations of permanent pastures and meadows. (This has had a major impact on the loss of semi-natural grasslands, and has been progressive, since at least half a century.)
- The availability of fertilizers, particularly inorganic N at prices which (until recently) have justified high-dose applications in the SW region where

responses are favoured by a long grass growing season with mild winters and a seasonally well distributed rainfall. N use on grassland increased, from a low base, by about 7% per year during the 1960s and 1970s. (As high nutrient availability leads to competition in which the plant species that respond to nutrients (notably perennial ryegrass, docks) survive whilst poor competitors (most dicot species) disappear, this has had a marked impact on the botanical composition of permanent pastures and older sown leys. Nutrients, especially N and P, also have potentially serious environmental impacts beyond the field boundary.)

- The adoption of silage making technology (in place of traditional hay) has enabled farmers to take advantage of the agricultural benefits of the improved ryegrasses and earlier growth resulting from N fertilizers to harvest grass early in the season. Early season mowing coincides with a leafy growth stage enabling utilization at a high feed value (compared with most hay crops), thus supporting a potentially greater number of livestock per unit area of grassland. (However, repeated early cutting, even without taking account of the additional effects of fertilizers and reseeding, leads to the loss of most plant species that depend on seeding for regeneration; hence the relative paucity of botanical diversity in silage fields compared with hay fields.)
- Improved herbicides and other plant protection products that help increase the success of reseeding to the sown grass (or grass clover) ley and its persistence. Herbicides have also been widely used on many permanent pastures that have not been reseeded, e.g. to target undesirable weeds (creeping buttercup, thistles). Their use has also inevitably affected many non-weed species).
- Improved land drainage (mainly through grant-aided tile drainage schemes in the 1960s/70s/ early 1980s) enabling grazing and field operations (tractor work, fertilizer and manure applications) to take place early (or late) in the season. (In addition to enabling more intensive utilization this has led to widespread loss of wetland habitats, e.g. Culm grassland, river meadows and the plant and animal and bird species they support.)
- Improvements in livestock breeding (particularly of dairy cattle) with animals of high genetic merit able to utilize the increased intakes of high value feed produced by the management changes described above. Milk yield per cow per lactation has increased considerably and largely offsets the reduction in the numbers of cows in the national dairy herd that has occurred in the past decade.
- Improved understanding of grassland utilization and the options for extended-season grazing (including seasonal use of sheep flocks), of managing for grazing at target sward heights, and of the role of white clover to improve feed value and intake: these factors have helped raise the utilization efficiency of grazed grass. (However, adoptions may also contribute to reduced structural heterogeneity in swards, and to the removal of seasonal surplus growth which might otherwise provide a habitat or feed source for other wildlife).
- Importantly, these management impacts have largely been policy driven. Twentieth century grassland improvement had its origins in the WW2 campaign to increase food production, but it was the post-war policies of

successive governments to increase national self-sufficiency, raise rural incomes and ensure plentiful cheap food that have been the driving factors leading to the present situation. Most farmers simply responded to the demands placed upon them and, for several decades (to the mid-1980s) received grants, advice and other inducements to enable this. Since the late 1980s the agenda has changed to incorporate environmental objectives, but large areas of former species-rich grassland are now of minimal ecological value and the surviving species-rich habitats are highly fragmented.

Grassland management in the region and its effects are now a cause of environmental concern. The changes in grassland management which have led to the present situation – in which output from grassland is high, agricultural efficiency of utilization is high, but with greatly reduced biodiversity and habitat quality for wildlife, and associated environmental problems – are well documented¹. The wider social and economic consequences of the imbalance between agricultural production of basic commodities, and other functions of agricultural land management, are now being recognized. The environmental problems that have arisen extend beyond the biodiversity loss of former areas of botanically diverse (and structurally diverse) grassland. For example, improved grasslands may suffer from problems of poor soil structure, and soil compaction, which combined with high rainfall, steep slopes, vulnerable soils, and short-sward vegetation, can lead to significant runoff and diffuse pollution of surface waters across the region, affecting biodiversity and wildlife ‘downstream’ from the source of the problem, as well as increased flooding risks to residential areas, transport infrastructure etc.

The challenges

The major challenges are to tackle the environmental problems that modern improved agriculture has brought, whilst recognizing that on most farms the primary business of land management is to run a successful farming business producing safe, quality food for human consumption. We cannot realistically turn the clock back to some past period of extensive farming. Dairy farms, in particular, are relatively capital and labour intensive and it is the attention to detail in farm management that separates profitability from business failure. In discussing how ‘environmental amelioration’ measures might be successfully incorporated into modern farm management we need to consider the environmental ‘symptoms’ of the management improvements that were described above, as well as what the impacts on a farm business might be of measures to address these.

- Botanical composition of grass swards. Can there be incorporation of additional plant species, e.g. grasses and dicots whose foliage or nectar supports particular invertebrates, or which produce seeds for birds, in ways that do not adversely affect agricultural utilization? What scales can be employed, e.g. field margins or whole-field for some areas? Is there an agronomic role for multi-species swards to be sown, perhaps on *some parts* of farms and which can be managed for multi-functional objectives (e.g. biodiversity/ soil conservation/ and dry season grazing, a topical issue in the context of adapting to climate change effects).

- Sward structure. This has significant implications for biodiversity. For instance, it is well established that sward density affects seedling recruitment and habitat quality for invertebrates. In turn, abundant populations of invertebrates are indicative of a healthy ecosystem able to support the food chains for breeding and migratory bird species. Sward density is highly variable, spatially and temporally, and can be altered rapidly and significantly by sward management, e.g. by extensification - reducing nutrient inputs together with reducing the defoliation intervals. There have been relatively few attempts to apply this knowledge to promote the development of plant species diversity. At a farm level we need to determine what are the barriers (and farm business consequences) of managing a specified area of farmland to achieve sward heterogeneity (e.g. margins of silage field, or temporarily fenced areas of grazed paddocks).
- Soil nutrient status It is well recognized that inputs of nitrogen fertilizers and other (P and K) nutrients, including indirect inputs from excretal returns (partly derived from other feedstuffs brought onto the farm) have markedly affected sward botanical composition and grassland potential, as well as contributing to eutrophication of soil and water on and beyond the farm. Legislative changes (the WFD) and fertilizer prices are likely to focus attention on the issue of reducing fertilizer use in the near future. This creates opportunities for greater spatial variation in nutrient inputs, perhaps managing some areas without fertilizers or slurries (possible agronomic link with multi-species swards and field margins).
- Soil physical status Two important issues to consider are soil hydrology (including drainage) and soil compaction. Past drainage improvement has been damaging for wetland habitats but has improved grassland farm utilization potential (though not necessarily for total grass production). Whilst certain areas (e.g. parts of the Somerset Moors) have been subjected to ESA scheme winter flooding measures to improve habitat quality for wading birds and wildfowl, 'reversing' the effects of past drainage improvement is not a realistic option on a wide scale. However, farmland hydrology has wider significance when linked to rate of run-off, e.g. following storm rain; thus wetland areas on farms may have additional potential roles as temporary stores for water that might otherwise cause a dangerous peak discharge. Frequency of extreme rainfall events is predicted to increase under the currently accepted climate change scenarios.

Soil compaction problems have increased with the use of heavier machinery and greater stocking densities. This creates agricultural problems (reduced root development, poor nutrient utilization, increased poaching and surface ponding), and also leads to the loss of soil invertebrates (and in turn the food chains which they support) as well as other environmental problems, especially on slopes (increased run-off and movement of sediment, nutrients and faecal pathogens). Opportunities to consider are the use of deep-rooting multi-species swards on compaction-prone soils, and the scope for biological barriers, e.g. appropriately managed scrub plantings, or long grass areas, on the lower slopes of affected fields.

Finally, there is the issue of farm size and the impacts of farm amalgamations on the long term viability of the family farm as the basis of agriculture in the region. The emergence of mega-herds in the dairy sector, and a reduction in dairy producers (by c.25% since 2002) does indicate that the viability of smaller dairy farm businesses may be dependent on additional income sources, niche-product marketing based on distinctiveness if they are to survive.

Appendix 2: example of letter sent to local grassland societies

Addressee

20 June 2005

Dear Mr

South West Grassland Societies

From time to time, organizations like IGER and Exeter University are approached to provide a speaker for farmer discussion groups and county grassland society meetings in the region, and where possible we like to be able to help. On this occasion we are contacting society secretaries and volunteering our services. There is just a small catch. One of our research projects requires some feedback – farmers' opinions and ideas – and we thought a good way to do this was to tie it in with the evening meetings of local societies.

We are looking at the whole subject of sustainable solutions for future grassland management. The new Environmental Stewardship scheme has generated a lot of interest and it also builds on some of the work on areas such as improved manure management, more efficient N use, clovers for improving feed value etc that IGER has been working on for some years, as well as aspects such as protecting wildlife and waters. We want to get views from farmers about this.

The particular project that IGER and Exeter University's Centre for Rural Research are working on is funded through the Delivery Plan for a Sustainable Farming and Food Industry in the South West (there is an article about this enclosed). It aims to engage with farmers and other land managers, as well as environmentalists etc, recognising their role in finding sustainable solutions. Other regions will be doing something similar, but the South-west seems to be leading the way.

What we are offering to do is to come and speak to some of the societies in the region this autumn along the theme of "Grassland management: overcoming environmental problems and delivering environmental benefits." The talk would draw on some of IGER's recent research findings in this area, and hopefully lead the discussion into how farmers regard these issues to be led by myself from IGER and Dr Matt Lobley from Exeter University).

We your society will be interested in including this topic in your autumn programme. If so, please contact me and we will try to agree a date that suits us all.

Yours sincerely

Alan Hopkins

Email : alan.hopkins@bbsrc.ac.uk Direct phone line 01837 883536

Green Futures for Grassland

A project searching for practical environmental enhancements in the South West's improved grasslands

The aim of this project is to place the region in a much stronger position to resolve environmental issues associated with improved grassland and to do this more effectively.

This is your chance to influence the evolution of Environmental Stewardship and other approaches to land management. During the autumn we will be convening a range of stakeholder events in order to explore the issues and opportunities facing improved grassland in the South West. The results of the project will be presented and discussed at a *Grassland Summit* to be held in 2006. For details of this and the stakeholder activities please contact the research team (details below) or visit www.green-futures.co.uk

Funded through the Delivery Plan for a Sustainable Farming and Food Industry in the South West*, the project aims to stimulate and engage land managers in a collaborative movement with environmentalists and other stakeholders, and to recognise and emphasise their role in finding sustainable solutions. In doing so it will contribute to informing the new opportunities in the Environmental Stewardship package and their development

To be successful the project needs to identify and understand easy to apply extensification opportunities. More demanding options will also be captured for development, but will be firmly based in a sense of their real world application at a farm level.

The specific objectives of the project are to:

6. Raise awareness across the region of the environmental problems caused by the use and management of intensive grasslands.
7. Explain the range of environmental benefits that sward diversification could provide.
8. Test out through stakeholder dialogue the way in which particular sward structures could be manipulated by different grazing stock and regimes, within the context of farm and farming systems sustainability.
9. Identify the most promising management changes farmer stakeholders would be willing to undertake to test some approaches that emerge.
10. Host a grassland 'summit' to share with key audiences the progress made by the project and explore future opportunities.

* To view the Delivery Plan for a Sustainable Farming and Food Industry in the South West

[CTRL CLICK HERE](#)

Appendix 3 Green Futures PowerPoint presentation

“GREEN FUTURES”

**Achieving intensive production while meeting
environmental goals –**

Can we have a “win-win” situation ?

Matt Loble

Exeter University Centre for Rural Research

Alan Hopkins

IGER, North Wyke

Production / Environment ?

- In the past farmers often got grant aid for things that would now be illegal !
- Shifting of goal posts; progressive increase in legislative controls.
- Support payments from production to environment, and falling profits.
- May suit extensive farming, but where do dairy and intensive beef farmers fit in ?

Legislative changes

- Effluent / pollution control – now built in to normal management, but 20+ years ago this was a real problem for compliance.
- Farm habitats: EIA on reseeded old grass etc.
- Water quality (N leaching)
- Safety, animal welfare and biosecurity
- Cross-compliance, stewardship etc

Achieving intensive production while meeting environmental goals –

Can we have a “win-win” situation ?

- *Nutrient budgeting to treat manures as a resource rather than a problem, and to improve targeting of fertilizers.*
- *Greater use of legumes in cutting and grazing.*
- *Refining both grazing and mowing management to reduce pollution, soil damage and habitat damage, as well as improve utilization, plus options for positive wildlife benefits.*
- *Specific safeguarding of wildlife habitats (with compensation for time spent/ output foregone ?)*

Codes of Practice and other considerations

- Water, soil and air codes and WFD.
- Improved use of input efficiency, esp fertilizers, supplementary feed and chemicals.
- Issues of production standards; power of retailers
- Present systems have “oil dependency”

Intensive grassland and dairying: alternative approaches ...

- Maintaining high output in relation to reducing input costs (treadmill approach).
- Achieving potential for adding value (premium for something; direct sales etc) : less intensive but not extensive (semi-niche market).
- Staying profitable from core business, while getting additional income (from results) or scheme-based (ELS)

Nutrient management

- Nutrient budgeting. Accounting for N,P and K. Improving the utilization value of farm manures. Improving the response rate of N applied to grass. Save ££s, reduce eutrophication.
- FYM/slurry in spring/summer. Accurate spreading. Reduce silage effluent through high DM silage. FYM – worms- soil structure
- Target to avoid sensitive areas (margins, slopes, and wet ground)

Example 1: White clover

- N fixation and reduced fertilizer
- Can leach N
- Soil and nutritional benefits, quality, intake
- Improved animal performance
- Some biodiversity benefits possible (sward structure/ flowering etc)
- Economically attractive
- Win-win certainly possible

How to get (more) white clover into the sward

- 1. Complete reseedling**
- 2. Oversowing/strip seeding**
- 3. Management to increase the existing clover : sward management to allow seed shed, stolon growth etc**

Keeping white clover and making the most of its benefits

Limit fertilizer N to tactical use and adopt clover-safe weed management

Rotationally graze rather than continuous severe grazing; avoid excessive growth

Or incorporate rest periods from continuous grazing (e.g. for a silage cut)

Avoid management likely to cause bloat

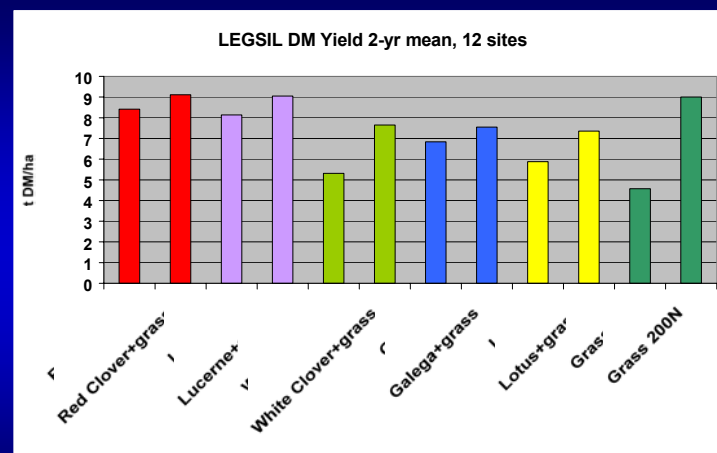
Accept seasonal and between-years fluctuations

Example 2: Other legumes

- Red clover, Lucerne and Lotus (Birdsfoot trefoil)
- As with WC: soil and nutritional benefits, silage, improved animal performance
- Economically attractive cf. fertilized N grass and/or concentrates
- Some biodiversity benefits possible (swards support invertebrates; improve sward- structural variation across farm)
- Win-win again possible

Silage crop yields

- Potential for comparable dry matter yields from red clover and lucerne (under nil-N fertiliser) to exceed grass at 200 kg N.
- Grass with white clover at nil N about 10% less than RC and lucerne (or from grass at 200N).



Crude protein (% of DM) Legume + grass - Means for 12 sites, 2 years

	Cut 1	2	3
Red clover	14.1 18.0	19.2 21.3	21.3 22.7
White clover	11.5 19.3	17.2 20.9	21.4 25.1
Lucerne	12.3 16.3	18.1 19.8	21.4 22.2
Lotus	10.4 17.5	16.2 20.0	18.8 22.6
Grass + N	10.2	13.6	16.6

Grass + legume

(legume only)

Economic comparison: grass+N versus legumes

N-fixation and feeding value confer financial gains cf. grass plus N fertilizer.

Greatest for 200 kg N/ha comparison.

Not so economically attractive cf. >300 kg N/ha with high SR because grass/wc has lower carrying capacity (though N price now affecting this)

Legume system may be part of an agri-environmental or organic conversion with additional income.

Other Economic Considerations:

- LEGSIL economic study showed 12-20% increase in profits from using grass-legume silages cf. grass +N200 for UK sites.
- Production costs per kg are lower, but economic values are similar to grass silage.
- Great potential for greater adoption of legume-based systems.

Example 3: changes to grazing management

- Extended grazing to increase use of grazed grass (cheapest feed) while avoiding poaching, overgrazing, soil / nutrient run-off.
- Maintain a variable pattern of sward heights esp on PP.
- Summer drought: fodderbank approach
- Options to periodically ungrazed buffer strips and sensitive areas (streams, hedge bottoms)

Grazing management: any win-wins?

- Extended grazing : cost savings but possible soil and environmental problems depending on attention to detail ✓
- Sward height: seasonal and spatial variation for plants, insects etc ✓ or ✓✓ if sown under ELS
- Dry season “fodderbank”. Strategic feed reserve, option for a sown multi-species sward, range of plant species, ungrazed in early summer ✓✓✓
- Options to periodically limit access to and fertilization of sensitive areas (streams, hedge bottoms) ELS payment possible ✓✓

Example 4: changes in mowing management

- Integrated cutting and grazing where possible
- Hay (for young stock etc) when made can be from species-rich swards: yield, quality, other benefits.
- Option of very late-cut hay for bedding (alternative to buying straw).
- Silage. Recognition of soil quality issues, nutrient input/ output, conservation values of field edges, wilting to high DM content etc.

Changes in mowing management: any win-wins ?

- Integrated cut & graze: grazing then late cutting allows long grass and late flowering plants over a longer period ✓
- Environmentally benign hay from species-rich swards, but cutting-baling interval issues of shatter vs seed drop ✓✓ or ✓✓✓ if created under ELS
- Silage: aspects of detail ✓ ; field edge conservation values ✓✓ and additional ELS income possible ✓✓✓


Wildlife management



- On most dairy farms will be specific areas rather than whole farm (margins, buffer strips, outer fields, slopes, corners)
- Seasonal issues e.g. wintering and ground-nesting birds; timing of hedge trimming.
- Diverse sowings on specific areas where possible (ELS HLS options)

LEAF: “Time well spent” guide

- As custodians of the land, farmers do care about the environment. However, it is essential that this responsible attitude is clearly demonstrated by improvements in the quality of soil, water, air, wildlife habitats and landscape.
- IFM in terms of consumer concerns, market preference and political priorities

Appendix 4: a comparison of green futures and existing scheme options

Green futures option	Cross compliance	ES option ¹	Catchment sensitive farming
Hedgerow management	No cutting or trimming at certain times (exceptions apply)	EB1 Hedgerow management (both sides); EB2 Hedgerow management (single side); EB3 Enhanced hedgerow management; HB12	
Increasing sward diversity via white clover reseeded	X	X	
Increasing sward diversity via white clover over sowing/strip seeding	X	X	
Management to increase existing cover of white clover	X	X	
Reseeding to other legumes as alternative of n fertilised grass leys	X	X	
Varying sward height within field to produce more varied sward structure	X	 Although not a specific option, likely to result from the prescriptions for ELS options EK2 & EK3 (low/very low input permanent pasture), EK4 (rush pasture management) and EK5 (mixed stocking). HLS options HK15-17 specifically aimed to achieve varying sward heights.	
Developing a 'fodderbank' for dry season grazing	X	X	
Buffer strips: limiting stock access to field bottoms and other sensitive areas	No cultivation within 2m of centre of hedge or watercourse ²	EE4 2m buffer strips on intensive grass; EE5 4m buffer strips on intensive grass; EE6 6m buffer strips on intensive grass; EE7 buffering in-field ponds in improved grassland ³ ; HE11 enhanced buffer strips on intensive grassland ⁴	Grant aid towards cost of fencing watercourses
Buffer strips: limiting fertiliser/slurry near hedge bottoms and other sensitive areas	No cultivation within 2m of centre of hedge or watercourse ¹	EE4 2m buffer strips on intensive grass; EE5 4m buffer strips on intensive grass; EE6 6m buffer strips on intensive grass; EE7 buffering in-field ponds in improved grassland ²	
Sowing species rich seed mixture for wildlife	X	EG2 wild bird seed mixture in grassland; EG3 pollen and nectar seed mixtures in grassland areas	

Green futures option	Cross compliance	ES option ¹	Catchment sensitive farming
Seasonal grassland 'setaside' to allow seed setting for bird food	X	EE4-EE6 buffer strips and EK1 field corners can be used to achieve this	
Capital support for slurry storage	X	X	X
Capital support for hedgerow restoration	X	HR – capital support for laying, coppicing & gapping; HSC – substantial pre-work; HSL top binding & staking	
Capital support for fencing of conservation margins	X	Capital assistance for various types of fencing available under HLS	
KT programme	X	X	
Nutrient audits	Nutrient management plan considered to be feature of good soil husbandry but not include as part of Soil Protection review	EM2/HM2 Nutrient management plans	

¹The existence of an ES option does not necessarily indicate that it has been designed to be attractive to intensive grassland farmers. E.g. EK2 & EK 3 (low/very low input permanent pasture) would lead to varied sward structure but is unlikely to be adopted by intensive grassland farmers.

² No fertiliser, slurry, manure or pesticides

³ Fencing buffer strips is not a requirement under ELS.

⁴ Stock must be excluded.



Centre for Rural Research
Lafrowda House
St German's Road
Exeter UK EX4 6TL

Telephone: +44 (0)1392 263836

Fax: +44 (0)1392 263852

www.exeter.ac.uk/crr