An Chomhairle Oidhreachta
The Heritage Council

A National, Outcome-based Agri-environment Programme Under Ireland's Rural Development Programme 2014-2020

IT Sligo
An Institiúid Teicneolaíochta, Sligeach

European Forum on Nature Conservation and Pastoralism

The Heritage Council has grant-aided the 'European Forum on Nature Conservation and Pastoralism' (EFNCP) to undertake work on high nature value (HNV) farming since 2010. Building on the work of existing studies (e.g. the Burren Life project, the Burren Farming for Conservation Programme, the HNV farmland pilot in Connemara and the Aran Islands, the BioUp research project in Kerry and the Irish Uplands Forum work in Sligo/Leitrim and south Leinster) and liaison with farmers, government bodies and other interested parties, EFNCP in partnership with IT Sligo has developed the basis of an outcome-based agri-environment programme which can be used by policy makers to support HNV farmland in the RDP post 2014.

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Status of the Report

This report has been prepared for the Heritage Council by the European Forum for Nature Conservation and Pastoralism (EFNCP) and the Centre for Environmental Research Innovation and Sustainability (CERIS) at the Institute of Technology Sligo. Please note that this report does not necessarily constitute the views of the Heritage Council, but will be considered by the Heritage Council as it develops its work on High Nature Value farming and may inform future Heritage Council Policy on this and other related matters.

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Executive Summary

Restoring, preserving and enhancing ecosystems dependent on agriculture focusing on biodiversity - including Natura 2000 areas and High Nature Value farmland is one of the main objectives of the European Union's Rural Development Policy post-2013. Agri-environment programmes are the main tool that allows Member States to achieve this objective. However, there has been criticism of the impacts of past programmes, with the European Court of Auditors calling for more targeting of agri-environment payments. The European Commission acknowledge that better targeting of agri-environment payments is necessary and is envisaged in the framework of the CAP post-2013.

Outcome-based agri-environment programmes are highlighted as an effective means of delivering better environmental outcomes from agri-environment programmes with a range of successful programmes throughout Europe and within Ireland e.g. Burren Farming for Conservation Programme. Not only do they produce improved environmental outcomes, they allow the farmer more flexibility in the management of the land, taking account of local conditions and maximising the farmer's skills and knowledge of the land. Such programmes, if properly conceived and delivered, can also enhance farm viability and competitiveness by reducing costs as well as diversifying and enhancing farm income streams.

Outcome-based programmes can be implemented in Ireland to target areas of semi-natural farmed vegetation, specifically heathland incorporating dry heath, wet heath and blanket bog; semi-natural grasslands (both wet and dry types) and breeding wader sites. Improving management on these sites will also enable the delivery of the Prioritised Action Framework (PAF) which sets out the main priorities in Ireland for managing the Natura 2000 network, to achieve the objectives of the EU Biodiversity Strategy 2020.

The basis of this proposed outcome-based programme is the development of a 10 point "health check" scoring system which quantifies the environmental output and payments made per eligible field. Farmers will be encouraged to manage the land in a manner that will improve the individual field score through advice and training and utilising the farmer's own knowledge. The programme will also incorporate a range of site enhancement capital works, co-funded by the farmer to enable the necessary environmental improvements needed. The programme itself will be conveyed in simplified map and aerial photo-based farm plans with a high level of farmer input detailing the proposed works to be completed.

A major part of the programme will be the provision of training and advice through an upskilled knowledge transfer advisory service, which can be funded through Article 15 and 16 of the European Agricultural Fund for Rural Development (EAFRD).

The cost of an outcome based agri-environment programme targeted at areas of semi-natural vegetation based on this proposal is likely to cost in the region of €127 million, equating to 53% of the agri-environment expenditure for 2012. Additional expenditure can then be directed to the more intensive agriculture areas to improve their farm biodiversity.

The development of cost effective targeted outcome-based agri-environment programme has the flexibility to encompass all farm types; will encourage the maintenance and restoration of Ireland's semi-natural agricultural habitats and associated ecosystem services (C sequestration, water quality and storage, biodiversity, landscape, cultural heritage, etc.); achieve Ireland's legal obligations to protect and improve the status of our species and habitats; and help maintain the agriculture presence that is an essential component of our rural landscape.

1. Introduction

One of the three objectives in the European Union's Rural Development Policy post-2013 is the sustainable management of natural resources and climate action. The achievement of this objective is to be pursued through six Union priorities, including "restoring, preserving and enhancing ecosystems dependent on agriculture", focusing on biodiversity (including Natura 2000 and High Nature Value farming) and the state of European landscapes. In this report we have focused on restoring and preserving biodiversity; improving water management and soil management. This in turns promotes climate change adaptation through enhanced carbon sequestration, fire risk prevention and management, due to the significant linkages and synergies between various ecosystem management and climate operations. These linkages and synergies have been highlighted by the EU Commission[1] as important elements that should be taken into account in the design of successful rural development programmes.

Box 1: High Nature Value Farming

The High Nature Value (HNV) farming concept was established in the early 1990s and describes those types of farming activity and farmland that, because of their characteristics, can be expected to support high levels of biodiversity or species and habitats of conservation concern. One of the main characteristics of HNV farmland is a high percentage of semi-natural vegetation under low-intensity use for livestock rearing. The grazed semi-natural vegetation may be grassland, scrub or woodland, or a combination of different types. The survival of these habitats and associated species is dependent on the continuation of this low intensity agricultural management.

The Commission's October 2011 proposal on support for rural development by the European Agricultural Fund for Rural Development (EAFRD) outlines the range of measures available to Member States to deliver these priorities and includes agri-environment programmes, thematic sub-programmes, co-operation measures and advisory services (Figure 1). Of these available measures, the Commission's proposal states that Agri-environment programmes are to give specific attention to the additional needs of farming systems that are of high nature value.

[1] European Commission, 2012. Elements of strategic programming for the period 2014-2020. DG Agriculture and Rural Development. Working paper prepared in the context of seminar on "Successful Programming" EAFRD 2014-2020, Brussels 6th and 7th Dec 2012

Previous agri-environment measures in Ireland have not been well targeted towards HNV farming and have taken a "one-size-fits-all" approach. Evaluations conducted in recent years have shown that traditional type programmes partly fail to achieve the desired results and could be improved in terms of their cost-effectiveness (e.g. Kleijn *et al*., 2001, 2006; Kleijn and Sutherland, 2003; COM, 2004; Pullin and Knight, 2009; Hodge and Reader, 2010). The European Court of Auditors called for more targeting of agri-environment payments**,** while the European Commission acknowledges that better targeting of agri-environment payments is necessary and envisaged in the framework of the CAP post-2013. Ireland therefore needs to consider a more targeted and cost effective agri-environment programme in the forthcoming Rural Development Plan if it is to meet the objectives of the EAFRD.

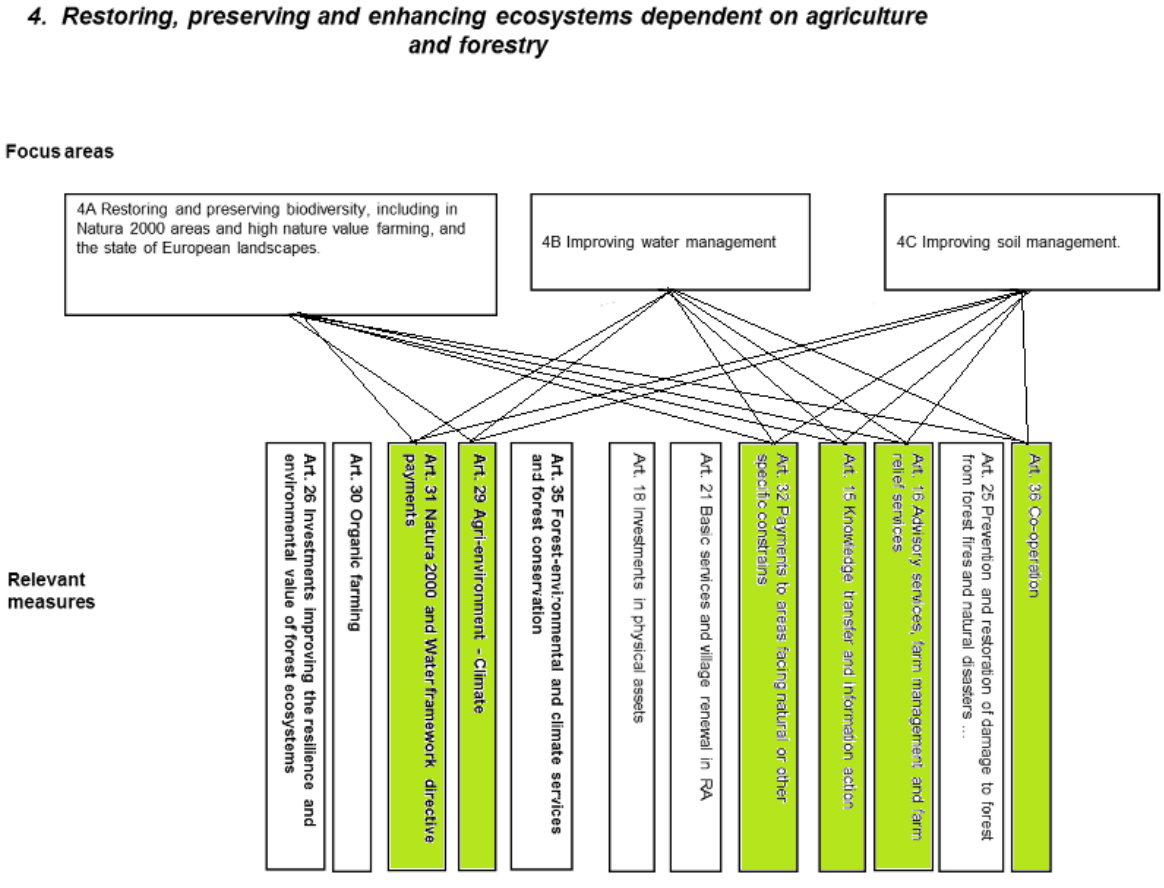

Figure 1: Measures necessary to aid the delivery of Priority 4 (Source: European Commission 2012).

The purpose of this report is to outline a model of delivery of agri-environment programmes, results orientated and outcome driven but complemented by (farmer nominated) actions. The flexibility afforded by the proposed model facilitates the design of a programme that can be adapted for both intensive agricultural areas and high nature

value farmland areas in a tiered system (see section 3). This can be adopted nationally to target High Nature Value Farmland areas requiring specific management.

2. Agri-environment programme design: "Outcome" versus "Results" based approaches

Agri-environmental programmes are an important instrument for the conservation and promotion of environmentally friendly agricultural land use, and are a mandatory part of the Rural Development Plans (RDP) in all EU Member States. The payment structure of agri-environment programmes can be divided into two categories (DEFRA, 2010, OECD, 2010 and Zabel and Roe, 2009):

- Outcome/results-based payments (also called payments by results or performance payments) based directly on the delivery of ecosystem or environmental services
- Prescription/action-based payments for the adoption of particular land uses or land management practices that are expected to deliver additional ecosystem services and benefits.

Prescription based approaches to agri-environmental programmes are by far the most dominant means of implementation by EU member states. However, evaluations of the effectiveness and efficiency of agri-environmental programmes to date has shown that they could be much improved through better design and a refocusing on results-orientated remuneration as opposed to measure orientated programmes (Matzdorf *et al*., 2008). Results orientated agri-environment programmes have been highlighted as an effective means of delivering better environmental outcomes if they are well designed and accompanied by robust environmental indicators to measure outcomes (Matzdorf and Lorenz, 2010; Osbeck *et al*., 2013). They offer the opportunity for non-market values of the environment to be converted into real financial incentives for farmers to provide environmental outcomes (Engel *et al*., 2008). The prescription-based approach has been the main focus of past agri-environment programmes, supplying participants with a set of rules (prescriptions) for the management of a particular habitat type. It takes no account of local conditions, farmer knowledge and can lead to a negative change in management. Payment-by-results programmes can improve the environmental targeting of agri-environment measures in comparison to the payments based on management prescriptions. As a result, the potential for payment-by-results as an alternative approach is generating increased

interest (Matzdorf and Lorenz 2010; Burton and Schwarz, 2013; Sabatier *et al*., 2012; Osbeck *et al*., 2013). An essential requirement of results orientated programmes is the identification of the required outcomes, be that the presence of specific bird species, the flowering and successful seed production of plant species or the provision of a specified vegetation condition.

Burton and Schwarz (2013) synthesise the current scientific discussion on outcome-based and action-based approaches and highlight a number of reasons why environmental improvements can be better achieved with outcome-based approaches.

- Outcome-based approaches permit farmers to innovate to improve environmental outcomes, allowing them to incorporate existing knowledge that is more context specific (Swagermakers *et al*., 2009). Although farmers' understanding of biodiversity production may initially be limited, over time they should be able to utilise the same skills developed for conventional production in the pursuit of environmental production (Burton and Schwarz, 2013). To support this process, training courses can be offered to farmers and trials can be conducted to test prototype programmes.
- Removing managerial restrictions leads to more flexibility for the farmer in the management of the land, can improve the environmental targeting and is likely to increase the uptake of any programme (e.g. Wittig *et al*., 2006; Klimek *et al*., 2008).
- The initial uptake rates of outcome-based approaches are at the very least as attractive as action-based approaches (Matzdorf & Lorenz, 2010).
- Linking payments to specific environmental goals means farmers see environmental objectives as environmental goods (so-called 'Non-Commodity Outputs', NCO (OECD, 2001)). Outcome-based payments incentivise the use of land for production that will produce the best environmental results (Matzdorf *et al*., 2010) – negating the 'adverse selection' effect, i.e., farmers relegate the delivery of environmental goods to the least productive land where it 'does least harm' to their system (Quillérou and Fraser, 2010). On the contrary, it prompts farmers to develop the type of whole-farm approach to environmental provision that researchers have suggested is likely to deliver improved environmental benefits (Mander *et al*., 1999; Butler *et al*., 2007).

In addition when comparing an outcome-based approach with the action based approach, the relationship between the programme manager and participant is different. Under the action based approach the emphasis is very much on establishing whether the farmer is

adhering to a list of prescriptions in the hope that the desired outcome is achieved. Thus the only real control is imposing penalties on the participant leading to poor working relationships. With the outcome-based programmes the programme manager is paying for results and hence not looking for breaches resulting in a better working relationship and less non-compliance issues.

There is also considerable debate in the literature in relation to the potential problems with outcome-based approaches (see Burton and Schwarz 2013 for full details) and these are summarised under two main areas:

- Increased risk for the farmer as desired outcome may be dependent on factors outside their control, but there are counter-arguments that risks are reduced in other areas because of the increased flexibility noted above, allowing the farmer to respond to adverse weather conditions and make locally adapted decisions.
- Difficulty in developing suitable indicator that can effectively measure the successful delivery of the desired outcome.

However, these problems can be resolved in well-designed programmes and despite the dominance of action based agri-environment programmes across Europe, a number of examples of outcome-based programmes do currently exist (Table 1).

Table 1: Overview of European out-come based examples of agri-environment programmes based on a review carried out by Schwarz *et al*. (2008). (taken from Osbeck *et al*. (2013)).

Examples	Country/Region	Objective	Ecological targeting	Outcome-based mechanism
Farm Conservation Scheme	Peak District National Park, England	Biodiversity conservation on grasslands	Plant species / grassland habitat	Payments based on indicator species and differentiate between different ecological qualities
East of Scotland Grassland Management Scheme	Eastern Scotland	Biodiversity conservation on grasslands	Plant species / grassland habitat	Payments based on habitat indicators
Preservation and advancement of biodiversity on farmland	Switzerland	Biodiversity conservation on grasslands	Plant species / grassland habitat	Payments based on indicator species
MEKA programme	Baden-Württemberg, Germany	Biodiversity conservation on grasslands	Plant species / grassland habitat	Payments based on indicator species/genera
NAU/BAU programme	Lower Saxony, Germany	Biodiversity conservation on grasslands	Plant species / grassland habitat	Payments based on indicator species and differentiate between different ecological qualities

Conservation & enhancement of species-rich grassland	Brandenburg, Germany	Biodiversity conservation on grasslands	Plant species / grassland habitat	Payments based on indicator species
Flowering Meadows	France	Biodiversity conservation on grasslands	Plant species / grassland habitat	Payments based on indicator species/genera
Meadow Birds Agreement	Netherlands	Conservation of breeding waders	Animal species / grassland habitat	Payments for the number of clutches on the farm land
Breeding Birds Contracts	Schleswig-Holstein Germany	Conservation of breeding birds and bird colonies	Animal species / grassland habitat	Payments for endangered bird species differentiated between single breeding birds and colonies
Conservation Performance Payments	North Sweden	Conservation of carnivores on reindeer grazing land	Animal species / grassland habitat	Payments per carnivore offspring, also differentiating between regular and occasional occurrence
Reduction of N-emissions (RDP)	Brandenburg, Saxony Anha Thuringia	Enhancement of water and air quality	Diffuse pollution Field N-surpluses as indicators	Payments linked with field N-surpluses as indicators. Some management prescriptions defined
Higher Level Stewardship	England	Wide range of objectives with regional targeting maps	Farm habitats	Payment based on indicators of success and prescriptions
Oekopunkte-Programme	Federal State of Lower Austria	Maintenance and enhancement of the ecological and recreational value of cultural landscapes	Farm habitats	Payments based on accumulated bonus points for specific actions and outcomes

The Burren Farming for Conservation Programme (BFCP) is an example within Ireland of a successful outcome-based programme funded under Article 68.1 (a) (i) of Council Regulation (EC) 73/2009 which makes provision for the use of unused Single Payment Programme funds for specific types of farming which are important for the protection or enhancement of the environment. BFCP objectives include the sustainable agricultural management of High Nature Value farmland across the Burren and maintaining or enhancing the conservation status of Annex I habitats. While participants are provided with advice on how to maximise the environmental benefit from their land (via a site visit, development of farm plans and provision of best practice guidance), farmers are expected to use their own initiative to deliver the optimal outcome of species-rich grasslands. The programme is predicated on awarding higher payments to farmers who produce better quality species rich dry grassland. Some of the key elements of the BFCP include:

- development of a 10 point “health check” scoring system which is the basis of the environmental outcome-based payments made per eligible field;

- Capital works which aid in the delivery of enhanced environmental quality;
- simplified map and ortho-based farm plans with a high level of farmer input;
- innovative solutions to long term problems (e.g. silage replaced by tailored complementary concentrate feed, rainwater harvesters, solar powered electric fences and water pumps);
- up skilled and well-trained knowledge transfer and advisory support service.

3. A National Outcome-based programme in Ireland's RDP 2014-2020: Overall Structure

Any new programme must be consistent with other aspects of CAP implementation. For example, the requirements of a new output-based AE programme must go beyond those required under Good Agricultural and Environmental Condition (GAEC). It would also differ from (and complement) any Area of Natural Constraints (ANC-previously named LFA) scheme, as the new measure would be targeted to semi-natural areas, with specific interventions available to enhance their condition. Such an approach is vital to ensure that Ireland acts in accordance with EU law, but will also deliver more targeted payments, tailored to the needs of the site/farm. Targeted programmes also results in the best value for money. Armsworth *et al*. (2012) highlighted that the lower administrative burdens that accompany commonly employed, simple programme designs offer false economies.

The overall structure of the programme is best visualised as fitting within a tiered structure of direct payments (Figure 2). The bottom level (Tier 0) is comprised of all farmers meeting the necessary requirements of Single Farm Payment (SFP) and Areas of Natural Constraints schemes. This would include all greening measures and any required cross compliance measures. Tier I is for all farmers willing to do additional environmental works to enhance their farm. Examples of work under Tier I would include options for hedgerow management, stone walls, margins, native tree planting, riparian margins, wild bird cover, nutrient management, rare breeds, green cover, and management of heritage sites. This tier would be applicable to intensively managed agricultural fields (improved agricultural grassland, tillage) where actions are, in general, targeted at mitigating the environmental impacts of intensive agricultural production. Tier I actions may also be undertaken on semi-natural vegetation where the action is compatible with the enhancement of these areas. The final tier, Tier II is targeted at farmers with areas of semi-natural vegetation. They must

be willing to manage these areas to achieve specific agreed outcomes based on the type of semi-natural vegetation or for specific species such as freshwater pearl mussel, lesser horseshoe bat, hen harrier, chough and other upland birds of conservation concern as listed on amber and red lists, e.g. Red Grouse (Figure 3). These HNV farmland groups identified in figure 3 have similar attributes, a high percentage of semi-natural vegetation, economically marginal and are under threat from intensification and/or abandonment. They are all key providers of public goods and ecosystem services, the delivery of which is to be supported under CAP. In a multifunctional model of agriculture these are high production areas in terms of biodiversity, climate change mitigation, water quality, landscape and cultural heritage and quality food products. Despite their lower agricultural produce output, they need active management, often with a higher labour input than more intensive farming systems.

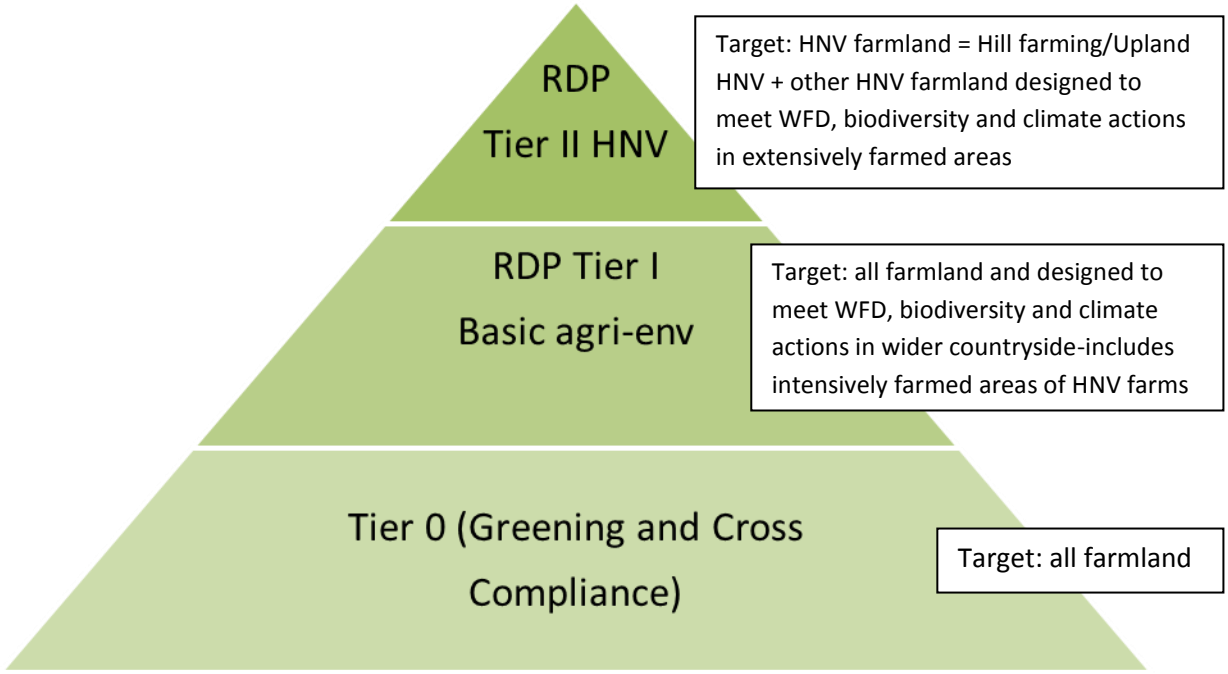

Figure 2: A proposed tiered approach to the implementation of pillar 1 direct payments and pillar II agri-environment programmes in Ireland (gold, silver and bronze environmental outputs – an integrated sustainable model of agricultural production)

This tiered structured is part of an overall vision of a truly sustainable, integrated model of agricultural production in Ireland, where product delivery is targeted at the type of lands best suited to produce it. From its natural resource base, society needs a range of ecosystem services including production (e.g. food, fibre, medicine), regulatory and support (C sequestration, water quality and quantity regulation, climate regulation, pollination and pest control, etc.), cultural and aesthetic services (heritage, landscape, etc.). Through a targeted, tiered approach to CAP implementation, Ireland can deliver this range of services

from its agricultural land base. Pillar 1 payments concentrate on production services with inbuilt elements to support the delivery of other ecosystem services (greening), while pillar II (in particular agri-environment, Natura 2000 and other supporting articles) payments focus on regulatory, support, cultural and aesthetic services, while also producing a high quality food products.

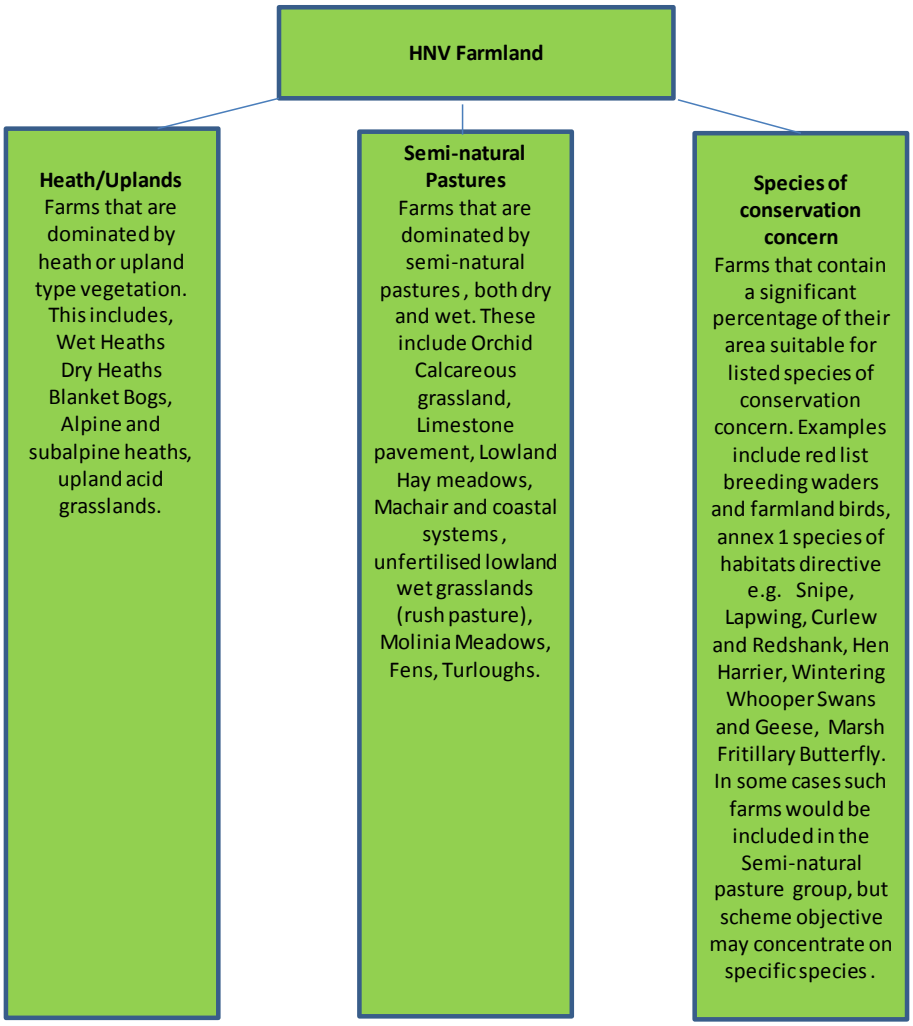

Figure 3: HNV farmland areas targeted under Tier II in proposed national outcome-based agri-environment programme.

Both Tier I and Tier II are agri-environment measures and would be administered under the one system to reduce administrative costs and burden and to improve efficiencies from both a government and farmer perspective.

The following sections of this report are confined to the possible design and content of the top Tier – a HNV farming programme for Ireland. This must encourage farmers to manage land in a way that will improve the overall condition of the habitat(s) and associated environmental services. Two components are proposed for Tier II:

1. a targeted outcome-based area payment
2. a targeted programme of capital works/actions

It must be noted that we are not proposing that Tier I and II are mutually exclusive as almost all farms with semi-natural vegetation will have areas of improved agricultural land where Tier II options should be available. Each tier is additive to the next and should be thought of as gold (Tier II), silver (Tier I) and bronze (Tier 0) standard in relation to delivery of public goods and ecosystem services.

3.1 Tier II Component 1: Targeted outcome-based area payment

Component 1, an outcome-based area payment, which reflects the condition of specific semi-natural vegetation types. This will be achieved through:

- an initial habitat assessment undertaken by a trained advisor in conjunction with the farmer and based on a simple, user-friendly, standardised scoring system on a scale of 1 (poor) to 10 (excellent).
- the score achieved should attract a specific payment, with higher payments received for higher scores. Payments should start from a high rate per hectare, and should be degressive, for example 100% for the first 40ha, with a reducing payment per hectare above this to ensure effective levels of support for smaller farms, that have higher costs per hectare and to take into account the economies of scale on larger farms. Without a degressive payment, some farmers could receive excessively large payments, which is not an efficient policy design.
- the provision of advice and guidance to the farmer that sets out additional management required to improve the environmental health of the farm.
- farmers can then manage the land to improve their scores and hence payments over time resulting in increasing environmental quality of the semi-natural vegetation.
- a reassessment of the land each year to determine the new score and to provide further management advice for the participant.
- Compliance inspections by the programme manager to ensure the adherence to a consistent scoring procedure.
- An appeals procedure carried out by an agreed independent body.

3.2 Tier II Component 2: Associated Capital works/actions

The type of associated capital works will depend on the habitat type and specific issues on site. In a heathland/upland example associated capital work could include:

- **Fencing to aid management of specific habitats:** Erection of temporary or permanent stock-proof fencing to control grazing distribution on certain habitat types.
- **Control of weed species and encroaching scrub (unwanted vegetation - non-native and native species):** Rhododendron, *Gunnera*, Whins, Willow, Bracken, Blackthorn, Non-native Conifers (encroaching from neighbouring forestry), Birch can encroach onto farmed areas, reducing their ecological integrity. Component 2 should fund selective and sensitive control of encroaching species using best practice methods that cause minimum damage to the underlying vegetation and soil structure. Note: mature native woodland and scrub is a valuable habitat and is not targeted by this action.
- **Regeneration of heather through burning and flailing:** The aim of such work is to achieve structural diversity of the heather, which will increases grazing quality, encourages livestock to graze the whole area and benefits wildlife. Heather regeneration plans will be produced for appropriate sites. Such plans should outline their ecological objective outlining the extent and location and size of the areas to be burnt or flailed and the timing of same. Funding should be available for appropriate burning or flailing of blocks of heather moorland in a planned sequence to encourage regeneration.
- **Specific site works:** Some sites will have specific problems that create difficulties in adopting the correct management of the habitat. Therefore the programme needs flexibility to fund additional work required to aid management. Examples of such work include protection of water courses and provision of water, improvements in access and equipment to aid the management of grazing livestock
- **General environmental works:** Previous agri-environment programmes (REPS, AEOS) incorporated a range of field based enhancements which were widely accepted by the agricultural community. Under this proposal general environmental works will be available under Tier I as outlined above. This type of work is likely to occur on the more agriculturally improved areas of farms or

depending on the amount of funding available apply to more intensive farms with little or no semi-natural vegetation. Examples of associated capital work could include amongst others: Tree planting, Hedge planting, Hedge restoration, Stonewall building, Wild birdseed cover, management of historic monuments and cultural features. Farmers entering Tier II with semi-natural vegetation can complete specific actions on the semi-natural land and also the more general environmental work on the agriculturally improved areas.

4. Administration procedures

The proposed programme should be open to all farmers in the country. Tier I allowing a range of environmental works on the more agriculturally improved farms and could incorporate existing AEOS actions, with Tier II targeted at farms with specific habitat. Farms entering Tier II could still avail of the capital measures incorporated into Tier I if required, but would also be eligible for the specific capital works required for the management of the habitats and species targeted by the tier.

Thus, the proposed programme could apply to all farms within Ireland if sufficient funding was available. The availability of funding will limit this aspiration and therefore targeting will be required.

In line with the RDP policy of restoring, preserving and enhancing ecosystems dependent on agriculture, the initial aim should be to target active farmers (that is, those receiving Single Farm Payments or making DAS) within Natura 2000 designated areas and also farms whose land contains greater than 30% semi-natural vegetation[2]. Further details of possible administration procedures are outlined in Appendix 1.

4.1 The case of Commonages

Common land is a significant element of the land use system in Ireland's more fragile rural areas and provides a wide range of public goods in association with socio-economically weak agricultural systems. Any future agri-environment programme needs to incorporate commonage.

[2] This is a relatively simple task if you take your total UAA and subtract the improved agricultural areas (fertilised, drained, reseeded) and built areas, the remaining area of the farm would be mainly composed of semi-natural vegetation.

The Oireachtas Joint Committee on Agriculture, Food and the Marine held a total of seven days of hearings on the issues surrounding commonage between December 2012 and June 2013 during which presentations were made by a wide range of witnesses including the Department of Agriculture, Food and the Marine, the National Parks and Wildlife Service (NPWS), farmers' representative bodies, Teagasc, conservation and interest groups, and individual farmers and recommended an outcome-based model as developed in the BFCP (See Box 2).

Box 2: Recommendation of the Oireachtas Joint Committee on Agriculture, Food and the Marine:

The Committee "Report on Review of Commonage Lands and Framework Management Plans" made several recommendations including the need for an outcome driven model as an approach to achieving the objectives of Commonage Framework Plans. They specifically urge the Department of Agriculture, Food and the Marine to consider the outcome-driven approach developed in the Burren LIFE Project and adopted for use in the Art. 68 Burren Farming for Conservation Scheme, noting that it has provided considerable environmental, agricultural, social and economic benefits in a way that appears to be efficient and effective. They also stated that they felt such an approach will encourage the management of commonages along co-operative lines so as to reduce the problems caused by dormancy or disagreement among shareholders, and promote the involvement of younger farmers and other young unemployed people.

4.2 Administration procedures for Commonage

The management of Commonage areas could fit within the overall proposed outcome-based agri-environment programme but would require some procedural differences due the collective ownership and/or management. The eligible applicants for the programme would ideally manage their commonage through collective arrangements, represented by a Commonage Management Group; additional financial incentives within the programme should encourage this. However, such committees do not presently exist and their initial establishment may be problematic. In the short term at least, mechanisms need to be put in place whereby individual active shareholders (i.e. those submitting a SFP or DAS claim) on the commonage could apply for the programme and would qualify for entry providing a sufficient proportion of shareholders enter. The Joint Committee on agriculture and Food suggest that a programme should be open to all commonages where at least 80% of active farmers participate in the programme.

The additional transaction costs associated with an agreement incorporating collective arrangements can be met through the use of Article 36, the Co-operation Measure or within Article 29, the agri-environment climate measure. This offers an innovative way for farmers

to work together along with state bodies to ensure good commonage management. Article 36 allows support for drawing up a management agreement with shareholders, running costs of the co-operation, direct costs of specific projects and promotional costs, whilst Article 29, allows for a top up of 30% for transaction costs to facilitate farmers co-operating instead of 20% for transaction costs, where individual farmers participate in agri-environmental programmes.

Further details of proposed administrative procedures are outlined in Appendix 1.

5. Outcome-based Agri-environment Programme implementation at farm level and development of indicators for Tier II

In this section we go into more detail on the proposed structure, costings and implementation at farm level of an outcome-based agri-environment programme on the main agriculturally utilisable semi-natural vegetation classes (HNV farmland types) found on agricultural land, namely:

- heathlands incorporating wet heath, dry heath and blanket bog,

- semi-natural grasslands including wet and dry types,

- breeding wader sites.

Areas of woodland would be incorporated under the Native Woodland Scheme but could also fit into the overall agri-environment programme where applicable. The programme could also be adopted to include the management of archaeological and culture features on the farm using the existing mechanism for the conservation and repair of traditional farm buildings. Historic monuments on the farm can be identified using the National Monuments Service and agri-environment actions can be incorporated into Tier I of the agri-environment programme to improve the condition for specific sites.

A key component in the success of any outcome-based programme is the development of appropriate indicators that can measure successful achievement of desired outcomes. As part of this study we have developed a range of composite health assessment indices for each of the main semi-natural vegetation classes which are the target of this programme. The result is a composite index which reflects the overall environmental health of the assessed area. The selection of criteria/indicators to be used in the calculation of the health assessment score are based on a number of key principles:

- Applicable to the range of semi-natural vegetation types in Ireland;
- Easily measured by non-specialist following initial training;
- Criteria must be indicative of outcome/result required i.e. correlated with biodiversity, C sequestration potential, and water quality.

The proposed criteria that we have included in the health assessments include grazing levels, evidence of burning, bare soil, encroaching scrub level, bracken and non-native species (negative indicators species); plant litter and rank vegetation; water supply, feed site damage, ecological integrity-percentage cover of positive indicator species.

It must be noted that validation and testing of these proposed health assessments indices is required over the next number of months to validate them across a range of semi-natural vegetation conditions. This testing could be achieved using available national datasets and using expert focus groups.

Details of how the programme is to be implemented on each of the semi-natural vegetation classes/HNV farmland types is outlined in sections 5.1 to 5.3.

5.1 Heathlands/Uplands

The condition of heaths varies from site to site based on present and past management. It is possible to create a scoring system by using a simple health assessment procedure based on a number of indicators (See Appendix 2A and B for details). From this assessment, a site can be given a score from 1 to 10 reflecting the quality of the site. An example of each score and the work required to improve the score is outlined below (Table 2).

Table 2: Illustration of heathland/upland scoring system and works that may be used to improve score

Score 1	Attributes Severe over grazing, bare soil, low vegetation cover, high water run off **Works to improve score:** Cessation of grazing to allow recovery	

Score 2	Overgrazed, bare peat areas and presence of rhododendron species. **Works to improve score:** Reduction in grazing, restoration of damaged areas, rhododendron control.	
Score 3	Undergrazed, poor species diversity. Molinia dominated, poor level of heather species. **Works to improve score:** Reintroduction of grazing, small pockets of flash burning.	
Score 4	Some areas with undergrazing, some areas of bare peat and presence of Rhododendron and conifer trees. **Works to improve score:** Improved grazing, conifer and rhododendron control.	

Score 5	Slightly overgrazed. Dominant areas of Molinia. **Works to improve score:** Better targeting of grazing, reduction in some areas.	
Score 6	Recovering wet heath, good species diversity though heather species struggling. **Works to improve score:** Off winter grazing to improve heather content, better targeting of grazing.	
Score 7	Overall diversity good though undergrazing occurring leading to scrub encroachment. **Works to improve score:** Removal of encroaching scrub, some flailing or burning of heather.	

Score 8	Blanket bog/wet heath with good species diversity, slightly undergrazed and Rhododendron establishing. **Works to improve score:** Slight increase in grazing, removal of Rhododendron.	
Score 9/10	Good mosaic of wet heath/dry heath, good species diversity and adequately grazed. Some small areas of Whin/Gorse becoming dominant but add to overall diversity. **Works to improve:** Maintain grazing levels, prevent livestock trampling and scrub encroachment**.**	
Score 9/10	Wet heath in favourable condition, good species diversity, adequately grazed. **Works to improve:** Continue existing management.	

High scoring sites have the following characteristics:

-good vegetation structure with a range of indicator species reflecting the type of heath.

-adequate grazing levels to maintain vegetation structure.

-absence of invasive species.

-no negative water impacts.

-improved C sequestration potential.

Delivering these characteristics involves management decisions that will lead to trade offs between agricultural production and environmental services. This will lead to income loss from lower agricultural output unless these losses are covered in a payment for delivery of these environmental services i.e. an output based agri-environment payment. There are also additional transaction costs and capital costs associated with the delivery of optimum environmental outputs at any one site. Payments for ongoing management are quite appropriate where that management is in danger of being abandoned (which includes changing significantly in a negative direction) (Commission officials through pers. Comm. to EFNCP). Capital costs can be on actual costs basis or based on a standard cost which reflects the expected level of expenditure.

5.1.1 Component 1: Costings for outcome-based area payments on heaths/uplands

There is a difference between the grazing rates needed to maintain the best ecological output and those producing the optimum agricultural output. Research within Ireland and Britain indicates that small increases in inputs can increase outputs allowing higher stocking rates leading to changes in plant community composition (Liliensiek 2012). This type of management would still be within cross-compliance rules. Agronomic stocking rates which still could achieve cross compliance standards are in the region of 3 ewes/ha (2.5 ewes per hectare allowance for Mountain Type Grazing Land under DAFM Sheep Grassland Scheme). Thompson *et al*. (1995) estimated that sheep grazing densities of greater than 2 ewes ha^{-1} are likely to damage heather moorland. Therefore any farmer trying to maintain or achieve an optimal ecological output under this agri-environment programme (favourable conservation status of EU priority habitats, improved carbon sequestration, high water status under WFD, high landscape quality) will need to maintain stocking rates of approximately 0.75-1 ewe/ha, which is lower (Milne *et al.* 1998, Thompson *et al*. 1995, Martin *et al.* 2013) than the maximum achievable agronomic stocking rates. Therefore

parcels achieving top score in this output based system will result in a potential decrease in livestock numbers in the region of 2 ewes/ha and commensurate income foregone.

Additional management costs include, off farm grazing of sheep during the winter period to protect heather and reduce trampling damage and additional time involved in shepherding sheep, which could involve moving flocks around the mountain to achieve more targeted grazing, restricting grazing in some areas and re-introduction of cattle. Based on the above information, the following costs per hectare can be calculated for a parcel achieving the highest environmental output (score):

Agri-environment programme costs per hectare for highest environmental output

Income foregone in gross margin from potential stocking rate[1]	€60
Additional winter grazing costs[2]	€12
Additional time allowed for shepherding[3]	€14.00
20% incentive payment (30% for commonage)[4]	€17.20
Total cost per hectare to maintain heath in favourable condition	**€103.20**

[1]Based on the difference between the optimal stocking rate and the potential agricultural stocking rate (2 ewes/ha), and an average gross margin figure of €30 per ewe from 2009-2011 (Teagasc Better Farms).

[2]Off farm wintering some sheep for a period of time during the winter to encourage heather growth based on 3 months at €4 per month which is typical cost presently paid by farmers.

[3]Acheiving and maintaining favourable condition will require greater shepherding of sheep above the normal requirement of good welfare management. This is based on an average flock of 150 ewes + ewe hoggets and wethers (50) managed in 2 flocks (additional 2 days shepherding per week (2 hours per day) while grazing hill = 35 weeks = 35*2*2=140 hours * 150 ewes= 56mins per ewe*€15/hr=€14/ha assuming a stocking rate of 1 ewe/ha).

[4]30% can be added to allow for the additional transaction costs. This is allowed under Article 29 where commitments are undertaken by groups of farmers.

€103.20 (rounded down to €100) is in line with a recent study by IEEP for DG Environment on the Costs of implementing Target 2 of the EU Biodiversity Strategy (https://circabc.europa.eu/w/browse/1023ff4f-069f-4e8f-bb55-123f21090719). They calculated an average combined maintenance management cost of 111 €/ha/year for lowland and upland heathland (59 €/ha/year for upland heath management, lower due to economies of scale).

The payment structure across the range of possible health assessment scores and farm areas (Table 3) highlight that parcel must achieve a score of 4 before any payment is received. The payments are structured in order to incentivise farmers to improve their score

and quality of the environmental output from each parcel. Payments would be based on the eligible area claimed by the participating farmer.

Table 3: Output based payments for heaths/uplands highlighting payment rate per hectare for each score.

score	1-3	4	5	6	7	8	9	10
0-40 ha.	0	€20	€40	€60	€70	€80	€90	€100
40-80ha.	0	0	€20	€25	€30	€35	€40	€45
80-120+ ha.	0	0	0	€20	€25	€30	€35	€40
120ha+	0	0	0	0	10	€15	€20	€25

5.1.2 Component 2: Capital payments for associated works to achieve optimum environmental output

Capital works will be required on many sites as an aid to improving the management of areas of semi-natural vegetation. This component will include a list of likely capital works but also an option for site specific actions. These have been costed based on local costs and in line with those reported in study by IEEP for DG Environment on the Costs of implementing Target 2 of the EU Biodiversity Strategy (https://circabc.europa.eu/w/browse/1023ff4f-069f-4e8f-bb55-123f21090719). The expenditure per farm will depend on whether work is required and nominated by the farmer. As in Component 1, payments will be tiered allowing expenditure up to €100 per hectare on the digitised map area for the first 40ha, €50 for areas 40-80ha and €25 for areas 80-120ha. This expenditure limit will include works planned under Tier II of the plan such as hedge planting. It is envisaged that these actions will be part funded by the participating farmer ranging from 25-75% depending on the relative agricultural and environmental value of the specified work. For example actions that have a higher environmental value such as control of bracken would be eligible for 75% funding, where works that have a higher agricultural value such as improved water supply would be eligible for 25% funding. Total costs for a selection of actions are listed in Table 4 below.

Table 4: Total costs for a selection of capital works that would be eligible for funding under component 2 on heath/upland areas

Capital Works	Amount (total costs)
Restoration of damaged areas	€100 per hectare
Control of purple-moor grass (*Molinia*)	€400 per hectare
Control of Bracken	€500 per hectare
Fencing to aid management of specific habitats	€10.00 per metre
Control of weed species (unwanted vegetation - non-native and native species)	€1100 per hectare
Control of Scrub	€1100 per hectare
Regeneration of heather through flailing	€400 per hectare
Regeneration of heather through burning	€200 per ha limited to 0.5ha blocks
Water Supply	€200
Site specific actions (e.g. fence removal)	75% of actual cost basis
Hedgerow planting and restoration	As per AEOS
Traditional Stone Walls	As per BFCP
Wildbird seed Cover	As per AEOS
Rare Breeds	As per AEOS
Tree Planting	As per AEOS
Riparian Margins	As per AEOS

5.1.3 Total payments for an upland farm

Payments on an average farm, with 30ha of eligible area, will vary depending on score and the amount of capital works undertaken. The payment for an average 30ha would range from €3,000 to €6,000 depending on score obtained (Table 5). It assumes the same score on all the land and full uptake under the capital works programme. Capital works are co-funded by the farmer ensuring that only capital works undertaken will result in an increase in output or aid in the overall management of the area.

Table 5: Example of how payment on average 30ha farm varies with score, assumes all capital works are undertaken at each step in order to improve score.

Score	1-3	4	5	6	7	8	9	10
Component 1	€0	€20	€40	€60	€70	€80	€90	€100
Component 2	€100	100	€100	€100	€100	€100	€100	€100
Total Farm payment (30 ha.)	€3000	€3600	€4200	€4800	€5100	€5400	€5700	€6000

5.1.4 Costs of including Commonage in the Proposal

Work from the Commonage Framework review has established the present condition of the different commonages throughout Ireland. These assessments can be converted to a score and an estimated expenditure can be calculated (Table 6). This shows that the total costs for a programme which included all commonage areas of the country based on 100% uptake and 50% uptake amount to approximately €55.5 million and €27.5 million respectively.

Table 6: Estimated total programme expenditure on commonage areas of Ireland based on existing commonage health assessments.

CFP damage category	Site Score	Payment (€) C1 (100% uptake 330,000ha)	C2 Capital works (€) (100% uptake)	Payment (€) C1 (50% uptake 165,000ha)	C2 Capital works (€) (50% uptake)
S*	1	0	1,391,370	0	695,685
S	2	0	1,334,045	0	667,022
MS	4	424,601	2,123,008	212,300	1,061,504
MM	5	1,418,321	3,545,802	709160	1,772,901
MU	7	4,789,180	6,841,686	2394590	3,420,843
U	9	15,944,703	17,716,337	7972351	8,858,168
Total		22,576,805	32,952,248	11,288,401	16,476,123

5.2 Semi-natural grasslands

Semi-natural grasslands occur throughout Ireland and are associated with low intensity agricultural systems. They can generally be split into semi-natural wet or dry grasslands (see Fossit, 2000). The condition of grasslands varies from site to site based on present and past management. It is possible to create a scoring system by using a simple grassland assessment procedure as outline in Appendix 3A and B. From this assessment, a site can be given a score from 1 to 10 reflecting the quality of the site. An example of each score and the work required to improve the score is outlined below (Table 7).

Table 7: Examples of scoring system and works that may be used to improve score on semi-natural grasslands

Score 1	Permanent pasture with no reseeding history but now dominated by agriculturally preferred grasses, very low biodiversity. **Works to improve score:** None, unlikely to revert back to species rich without nutrient stripping and supply of seed source.	
Score 2	Heavily modified agricultural field as a result of past reseeding and nutrient input. Contains 1-2 indicator species **Works to improve score:** Some rush control and cessation of fertiliser, limited reversion potential.	

Score 3	Very heavy soft rush dominated land usually as a result of poaching. 1-2 indicator species and small patches of species rich grassland **Works to improve score:** Rush control through bi-annual cutting, limit poaching and likely that species richness will increase.	
Score 4	A past species rich field that has been reseeded and then followed with low agricultural intensity management. 2-3 species indicators present mainly competitor type **Works to improve score:** Low intensity management, possible late hay cutting.	
Score 5	Species rich field with 5 or more indicator species but areas of both poaching and scrub encroachment. **Works to improve score:** Avoid grazing during wet periods, removal of encroaching scrub leaving small pockets heavier scrub.	

Score 6	Species rich field with 5 or more indicator species but slightly under grazed leading to increased encroachment of alder and gorse. **Works to improve score:** Improve grazing, cut and remove encroaching scrub.	
Score 7	Species rich field with 5 or more indicator species but under grazed leading to increased encroachment of hedges and build up of grass vegetation **Works to improve score:** Improve grazing, cut and remove encroaching scrub and hedges.	
Score 8	Species rich field with 5 or more indicator species with Marsh Fritillary present. Grazing level good. **Works to improve score:** Some small areas of scrub encroachment, mainly gorse.	

Score 9/10	Species rich field with 5 or more indicator species, grazing level good, soft rush controlled and no encroaching scrub **Works to improve:** Maintain grazing levels, prevent livestock trampling and scrub encroachment**.**	
Score 9/10	Very species rich hay meadow well managed cut annually and aftermath grazed. **Works to improve:** Continue existing management.	

High scoring semi-natural grassland sites have the following characteristics:

-good vegetation structure with a range of indicator species reflecting the type of wet or dry grassland, e.g. Lowland wet meadows, Molinia meadows, limestone grasslands.

-adequate grazing levels to maintain vegetation structure.

-absence of invasive species, including scrub.

-no negative water impacts.

-improved C sequestration potential.

As in the upland example, to achieve the desired outcomes the agri-environment programme is divided in to 2 different components.

5.2.1 Component 1: Costings for outcome-based area payments on semi-natural grasslands

Farmers' perceive that biodiversity targeted management of semi-natural grasslands is a limitation to potential livestock production. Tallowin and Jefferson (1999) showed that the herbage growth rate and harvestable yield of semi-natural grasslands were at least 50% lower compared to intensively managed meadows. The application of fertiliser can increase the livestock carrying capacity of a field but has a negative effect on the species composition of the sward. Plantureux *et al*. (2005) found a reduction of half of the total number of plant species observed for fertiliser rates between 20 and 50 kg of nitrogen per hectare per year, and the average number of forbs species was very low where nitrogen inputs exceeded 75kg of nitrogen per hectare per year. Several years of work at Castle Archdale Experimental Centre on semi-natural wet grasslands showed that applying fertiliser to existing swards resulted in considerable yield increases. O'Neill (1981) showed that for every one kg of additional nitrogen applied, there was a 21kg dry matter/ha increase in yield on natural (sic) Fermanagh swards. Therefore from an agricultural viewpoint it is financially advantageous to apply fertiliser to semi-natural grasslands and within the rules of cross compliance.

To maintain or achieve the optimal condition on semi-natural grasslands, the following conditions will be required:

- a reduction in the application of fertiliser to a level sufficiently low to have no affect on species composition – in the vast majority of cases this will mean a complete cessation in artificial and/or organic fertiliser.
- No further intensification.
- Low stocking rates most likely in the region of 0.5-1 LU/ha. This equates to a minimum potential reduction of 0.6 LU/ha based on the research quoted above.
- Delayed grazing/mowing

Other additional costs include increased winter feeding costs as semi-natural grassland tends to show lower levels of spring growth particularly when combined with no additional fertiliser. Some semi-natural grasslands require a once per year mowing to control vegetation e.g. Soft Rush on wet grasslands and Creeping Thistle on dry grasslands.

Agri-environment programme costs per hectare for highest environmental output

Loss foregone in gross margin from potential stocking rate[1]	€141
Additional winter housing costs[2]	€ 30
20% incentive payment	€34
Total cost per hectare to maintain grassland in favourable condition	**€205**

[1] Based on the difference between the optimal stocking rate and the potential agricultural stocking rate (0.6 cow/ha) and a gross margin figure of €235 per cow (Teagasc 2008 gross margin per suckler system. The good level of performance was chosen as this is the gross margin farmers would push for in a purely agricultural output driven model).

[2]This assumes allowance of one extra tonne of silage per cow per month or additional concentrate to cows allowing restricted feeding for a longer time.

€205 (rounded down to €200) is lower than the €250 shown in a recent study by IEEP for DG Environment on the Costs of implementing Target 2 of the EU Biodiversity Strategy (https://circabc.europa.eu/w/browse/1023ff4f-069f-4e8f-bb55-123f21090719. (Equivalent payment in N Ireland under the NICMS is £265/ha (€315 with no tiered payments).

The payment structure across the range of possible health assessment scores and farm areas for semi-natural grasslands (Table 8) highlight that parcel must achieve a score of 4 before any payment is received. The payments are structured in order to incentivise farmers to improve their score and quality of the environmental output from each parcel. Payments would be based on the eligible area claimed by the participating farmer.

Table 8: Output based payments for semi-natural grasslands highlighting payment rate per hectare for each score.

score	1-3	4	5	6	7	8	9	10
0-40 ha.	0	€50	€80	€110	€140	€170	€190	€200
40-80 ha.	0	€5	€8	€10	€40	€70	€90	€100
80-120ha.	0	0	0	€5	€25	€45	€65	€75
120+ ha.	0	0	0	0	€20	€25	€30	€35

5.2.2 *Component 2:* Capital payments for associated works to achieve optimum environmental output

Capital works will be required on many sites as an aid to improving the management of areas of the semi-natural wet and dry grasslands. This component will include a list of likely capital works but also an option for site specific actions. These have been costed based on local costs and in line with those reported in study by IEEP for DG Environment on the Costs of implementing Target 2 of the EU Biodiversity Strategy (https://circabc.europa.eu/w/browse/1023ff4f-069f-4e8f-bb55-123f21090719. As in Component 1, payments will be tiered allowing expenditure up to €100 per hectare for the first 40ha, €50 for areas 40-80ha and €25 for 80-120ha.. It is envisaged that these actions (Table 9) will be part funded by the participating farmer in the same manner as that detailed for heaths/upland in section 5.1.2.

Table 9: Total costs for a selection of capital works that would be eligible for funding under component 2 on semi-natural grassland areas

Capital Works	Amount (total costs)
Restoration Mowing	€160 per hectare
Fencing to aid management of specific habitats	€10.00 per metre
Control of weed species (unwanted vegetation - non-native and native species)	€1100 per hectare
Control of Scrub	€1100 per hectare
Water Supply	€200
Site specific actions (e.g. fence removal)	75% on actual cost basis
Hedgerow planting and restoration	As per AEOS
Traditional Stone Walls	As per AEOS
Rare Breeds	As per AEOS

5.2.3 Total payments per farm

Payments on an average 30 hectare farm will vary depending on the percentage of semi-natural vegetation, health assessment score and the amount of capital works undertaken. It assumes the same score on all the eligible land and full uptake under the capital works programme. The payment for farm with 30ha of semi-natural grassland would range from

€3,000 to €9,000 depending on score obtained (Table 10). It assumes the same score on all the land and full uptake under the capital works programme. Capital works are co-funded by the farmer ensuring that only capital works undertaken will result in an increase in output or aid in the overall management of the area.

Table 10: Example of how payment on average 30ha farm varies with score, assumes all capital works are undertaken at each step in order to improve score.

Score	1-3	4	5	6	7	8	9	10
Component 1	€0	€50	€80	€110	€140	€170	€190	€200
Component 2	€100	100	€100	€100	€100	€100	€100	€100
Total farm payment (30 ha.)	€3000	€4500	€5400	€6300	€7200	€8100	€8700	€9000

5.3 Breeding Wader Sites

Breeding waders, namely Curlew, Snipe, Redshank and Lapwing can nest in a range of habitats in Ireland, from wet grasslands such as the River Shannon Callows to marginal hill land, and Lapwing can also be found nesting in arable land. All 4 species have suffered population declines in recent decades. Lapwing and Curlew are on Ireland's Red-list of Birds of Conservation Concern due to a 50% decline in their population in the last 25 years, while Redshank and Snipe are on the Amber List having suffered a decline of more than 25%. All four birds are of European Conservation Concern, listed as either SPEC 2 or SPEC 3, due to their unfavourable conservation status in Europe. Curlews in particular are of very high conservation concern. They tend to favour damp semi-natural pastures grazed lightly by cattle, with a scattering of rush tussocks for nesting in and access to wet areas to provide insects for their chicks to feed on. Changes in the uplands, such as the degradation of peatlands, afforestation, more intensive management of farmland and the abandonment of some lands, leading to encroachment by scrub, gorse and dense rushes, have all affected Curlew breeding habitat. In the lowlands, drainage of wetlands and intensive management of grasslands have degraded much of their habitat, while under-management of rushy pastures (particularly loss of grazing pressure, no rush control, increase in predator vantage points), fragmentation of suitable breeding habitat, reduction in the size of breeding colonies and consequent increases in predator impact have all had an impact.

In an outcome-based agri-environment programme the ideal payable end product would be the presence of breeding birds, however paying on presence of a particular species can be problematic as it does not recognise the range of other services, the effect of external factors beyond habitat management factors (e.g. predator-prey interactions) and the non-linear relationship between habitat management and the numbers of individuals of rare species on individual pieces of land. This increases the risks for the participating farmer. However, it is possible to create a scoring system by using a simple breeding wader assessment procedure as outline in Appendix 4. From this assessment, a site can be given a score from 1 to 10 reflecting the quality of the site. An example of each score and the work required to improve the score is outlined below (Table 11).

Table 11: Examples of scoring system and works that may be used to improve score on breeding wader sites

Score 1	Intensified breeding wader site no longer suitable for nesting wader **Works to improve score:** Cessation of fertiliser, early cutting, creation of vegetation mosaic structure, removal of predator vantage points.	
Score 2	Good breeding wader site subject to seasonal flooding but badly damaged due to agricultural activities. **Works to improve score:** Cease machinery operations, reestablishment of vegetation and improve overall vegetation structure.	

Score 3	Abandoned breeding wader site no longer suitable for nesting birds due to scrub encroachment, large build up of organic matter, no access to water **Works to improve score:** Reintroduction of grazing, scrub removal, topping.	
Score 4	Breeding wader site with poor vegetation management and scrub control. **Works to improve score:** Improve grazing, increase frequency of topping in initial years and scrub removal.	
Score 5	Good potential breeding wader site but presently unsuitable due to excess rush cover. No predator vantage points **Works to improve score:** Control of rush through cutting, profiling of drains.	

Score 6	Good breeding wader site and part of larger catchment. **Works to improve score:** Increase frequency of topping where possible, create mosaic of vegetation structure. Improved drain management to control water levels.	
Score 7	Open site with no predatory vantage points, rushes cut allowing some tussocks, some areas of water retention but poor species diversity in vegetation **Works to improve score:** Cease fertiliser application and encourage more species diversity. Open profile drains.	

Score 7/8	Open site suitable for nesting birds with mosaic of vegetation heights. Some predatory vantage points Good diversity of plants. Poor access to open water **Works to improve score:** Continue with existing management; consider profiled drains to offer water access.	
Score 9/10	Large open site very suitable for nesting birds with mosaic of vegetation heights. Good diversity of plants. **Works to improve:** Continue with existing management, possible inclusion of scrapes.	
Score 9/10	Large open site very suitable for nesting birds with mosaic of vegetation heights. Good diversity of plants and open access to water. **Works to improve:** Continue with existing management	

An optimally managed breeding wader grassland site will have the following characteristics:

- availability of suitable, undisturbed breeding habitat throughout April, May and June.

-damp site with a high water table and some areas of shallow surface water, no new drains

-minimum cover of Soft Rush up to a maximum of 30% (when cutting, cut as low as possible, and ideally remove cut material, or at least graze after cutting with cattle)

-good vegetation structure with a scattering of rush tussocks and a maximum 30% cover of Soft Rush.

-adequate grazing levels, particularly with cattle, to maintain vegetation structure and achieve specific sward heights just prior to the nesting season.

-absence of invasive species, including scrub.

-no vantage points for predators such as hooded crows.

-a diverse plant and invertebrate community.

-no negative water impacts.

-improved C sequestration potential.

The cost incurred and income foregone by a farmer in creating and maintaining habitat in an agreed favourable condition for breeding waders can be split into management and capital costs.

5.3.1 Component 1: Costings for outcome-based area payment to maintain/achieve favourable condition for breeding waders.

For the farmer there will be two main requirements, ensuring the creation of the optimal vegetation structure through a combination of cutting and grazing and secondly ensuring minimal disturbance in the nesting period during April and July. This will mean reduced stocking rates from a likely 1.5 Livestock units per hectare to 1 Livestock unit per hectare, intensive grazing of livestock outside of bird breeding season to achieve sward heights often at unfavourable times in terms of animal performance and increased time associated with rush control and stock management.

Agri-environment programme costs per hectare for highest environmental output

Loss foregone in gross margin from potential stocking rate[1]	€118
Additional winter feeding costs[2]	€ 17
Additional mowing costs[3]	€ 50
20% incentive payment	€ 37

Total cost per hectare to maintain breeding wader sites in favourable condition €222

[1]Based on the difference between the optimal stocking rate and the potential agricultural stocking rate (1 cow/ha) and a gross margin figure of €235 per cow (Teagasc 2008 gross margin per suckler system. The good level of performance was chosen as this is the gross margin farmers would push for in a purely agricultural output driven model).

[2]This assumes on site feeding of a grazing animal during the winter at 1kg per day for 60 days with concentrate costing €280 per tonne.

[3]Based on average contracting costs and that some wetland grass sites will require 2 cuts (I cut under cross-compliance and 1 more targeted cutting).

€222 (rounded down to €200 to correspond with payment under species rich grassland[3]) is higher than the €200€/ha for the maintenance of Inland Marshes (includes wetlands) shown in a recent study by IEEP for DG Environment on the Costs of implementing Target 2 of the EU Biodiversity Strategy (https://circabc.europa.eu/w/browse/1023ff4f-069f-4e8f-bb55-123f21090719.

The payment structure across the range of possible health assessment scores and farm areas for breeding wader sites (Table 12) highlight that parcel must achieve a score of 4 before any payment is received. The payments are structured in order to incentivise farmers to improve their score and quality of the environmental output from each parcel. Payments would be based on the eligible area claimed by the participating farmer.

Table 12: Output based payments for breeding wader sites highlighting payment rate per hectare for each score.

score	1-3	4	5	6	7	8	9	10
0-40 ha.	0	€50	€80	€110	€140	€170	€190	€200
40-80 ha.	0	€5	€8	€10	€40	€70	€90	€100
100-120+ ha.	0	€0	€0	€0	€20	€30	€40	€50

[3] Farmer should choose either species rich grassland or wader output based on which output the site is most likely to achieve. There is considerable synergy between the two options.

5.3.2 Component 2: Capital payments for associated works to achieve optimum environmental output

Capital works will be required on many sites as an aid to improving the management of areas of the breeding wader sites. This component will include a list of likely capital works but also an option for site specific actions. Payments will be tiered allowing expenditure up to €100 per hectare for the first 40ha, €50 for areas 40-80ha.

Table 13: Total costs for a selection of capital works that would be eligible for funding under component 2 on breeding wader sites

Capital Actions	Amount (total cost)
Restoration Mowing to get on top of 70% + rush infestation in the initial stages	€160 per hectare
Fencing to aid management of specific habitats	€10.00 per metre
Control of weed species (unwanted vegetation - non-native and native species)	€1100 per hectare
Control of Scrub	€1100 per hectare
Water Supply	€200
Site specific actions	75% of actual cost basis
Provision of scrapes	
Water level adjustment features	
Profiled Drain Cleaning	
Predator control	
Removal of predatory vantage points	

6. Monitoring of the programme

Member States are obliged to implement monitoring and evaluation of the environmental, agricultural and socio-economic impacts of their respective agri-environmental programmes. The evaluation process is intended to identify the extent to which policy objectives are being fulfilled, and to identify any changes necessary to bridge the gap between policy aims and outcomes. The Rural development policy for the period 2014-

2020 is more result-oriented than the current and previous programmes, focusing on results, monitoring progress towards agreed objectives (EAFD).

Carlin *et al.* (2010) noted that summary reports on past agri-environment policy evaluations have concluded that there has been insufficient measurement of the precise environmental outcomes from agri-environment programmes. In practice, previous evaluation systems have concentrated on administrative issues such as: statements of the aims of the policy programme, the levels of farmer participation, budgetary considerations, administrative structures, the extent of geographical targeting, obligations of participation and the levels of provision and support from extension services. However, participation in agri-environment programmes *per se* does not guarantee the actual delivery of environmental protection or improvement (Kapos *et al*. 2009); therefore the monitoring of actual performance and environmental outcomes is the only way to evaluate the environmental, agricultural and socio-economic impacts of agri-environmental programmes.

Based on the European Commission Guidelines on the financing, management and monitoring of the common agricultural policy "each measure under the CAP should be subject to monitoring and evaluation in order to improve its quality and demonstrate its achievements." It states that a list of indicators should be determined and the impact of the CAP policy assessed by the Commission in relation to policy objectives.

As Article 29 Agri-environment and climate fits under "restoring, preserving and enhancing ecosystems dependent on agriculture" the target indicator is quoted as the "Physical agricultural land under management contracts supporting biodiversity and/or landscapes".

Output based programmes by their nature give some indication of the success of a programme in achieving the required objectives as they are linked to payments by results. In addition to this an independent body should be engaged to manage the monitoring and evaluation process throughout the lifetime of the programme. The independent body should undertake ongoing evaluation throughout the lifetime of the programme to examine progress, improve the quality of the programme and its implementation and examine proposals for substantive changes to the programme.

7. Advisory Services and Administrative Support

Department of Agriculture Food and Marine (DAFM) have the responsibility for implementing the Rural Development Plan within Ireland to achieve the objectives of the European Union's Rural Development Policy including delivering the agri-environment measure. Associated with this will be general administration costs and the costs of supplying an adequate advisory service as the transfer of knowledge will be a key element for the success of any agri-environment programme.

Article 15 and 16 of the European Agricultural Fund for Rural Development (EAFRD) allows support for the knowledge transfer and information actions. Support under article 15 can cover vocational training and skills acquisition actions, demonstration activities and information actions short-term farm management exchange and farm visit. Article 16 allows for support for farmers in rural areas to benefit from the use of advisory services for the improvement of the economic and environmental performance as well as the climate friendliness and resilience of their farm. For this proposed programme to be effective, two levels of input will be required. First is to train the trainers. This will follow the model used in administrating past agri-environment programmes by recruiting and training a network of consultants in the assessment and management of semi-natural habitats associated with the programme. Once trained to an accredited status, the trained consultants will be responsible for liaising with participating farmers, carrying out Component 1 assessments, identifying and agreeing the Component 2 work, and finally collating and submitting information required by DAFM. As with the present AEOS scheme and previous REPS schemes the cost of this and follow up assessments will be met by the participating farmer. This cost has been factored into the overall costs through the incentive payment under component 1 of this programme. DAFM will then complete checks, calculates payments and finalises the annual farm plans. Quality control procedures will be required to ensure a standard approach across the different counties.

The second part of the advisory service is the establishment of demonstration farms, a similar format to the Teagasc BETTER farms, which will allow a network of demonstration activities educating farmers on the condition of habitats and associated management. This format has already been recognised as a successful approach in the production of agricultural commodities but has not been replicated in the delivery of other agricultural services like the production of semi-natural vegetation, apart from the Burren Farming for Conservation Programme.

The successful implementation of an agri-environment program will mean associated administration costs. Armsworth *et al*. (2012) highlighted that the lower administrative burdens that accompany commonly employed, simple programme designs offer false economies, therefore to achieve successful outcomes will require adequate administration. Whilst the BFCP is considered to have high associated administration costs, the reality is that administration costs at 12% of total costs is below that of the European average for delivery agri-environment costs estimated at 15% (DEFRA 2011). These administration costs are the estimated public sector costs of delivering the programmes, and include design, administration and monitoring work, but not the administrative and transaction costs incurred by the farmer. No comparable figures are presently available for the administration costs associated with REPS or AEOS. The global management consultancy firm McKinsey & Company recently conducted a cost analysis of BFCP against REPS. BFCP delivers greater output at a saving of €8.3 million per annum at current scale.

8. Estimated payments to farmers and total expenditure under an outcome-based agri-environment programme

Presently there are no accurate figures to assess the area of HNV farmland within Ireland. There is however an ongoing collaborative project between Teagasc and IT Sligo funded by DAFM to estimate the national distribution and extent of potential HNV farmland in Ireland. The recently updated version of the JRC/EEA HNV farmland calculations estimates the share of agricultural land (as identified through CORINE Land Cover 2006) that is likely to be HNV for Ireland as 1,154,495 hectares or 20.2% of the Utilizable Agricultural Area. This is likely to be an underestimate, with the actual figure closer to 25% of agricultural area.

If we assume that 1,250,000 ha of UAA is HNV and we target 60% to be under active management in next RDP, we are targeting 750,0000 ha of HNV land i.e. target area for Tier II agri-environment in proposed programme. There are 1,140,000ha of mountain/hill land above 150m In Ireland, and in 1984 400,000 ha of this was considered “improvable” (Lee 1985 cited in O’ Mara 2008). If we assumed this was improved in intervening years we estimate that of the HNV land calculated above, 740,000ha would be semi natural vegetation i.e. heath/Upland component (utilisable excluding bog). This calculation is further substantiated by the fact that when you combine the blanket bog and mountain/hill land of Lee it gives a total for upland type vegetation equivalent to that quoted in Perrin et al (2009) of 28-29% of country. Based on these figures we can assume that of the all HNV

farmland in the country, 65% is heath/upland type with the remaining 35% being semi-natural grasslands and sites supporting species of conservation concern (e.g. breeding waders).

Counties Donegal, Clare, Galway, Kerry, Leitrim, Mayo, Roscommon, Sligo, Wicklow are estimated to have the highest proportions of HNV farmland (farms dominated by semi-natural vegetation with low intensity agricultural farming systems). 50% of the agricultural area of these counties would be equivalent in area to the estimated HNV area (UAA of 9 counties combined = 2,224,478; area of HNV estimated by EEA 2012 = 1,154,495). In last two decades (1994-2011), approximately 54% of agri-environment payments were spent in these nine counties (Total for 9 counties = €1.97 billion, total payments under agri environment for whole country 1994-2011 is over €3.5 billion. Source: DAFM 2012).

Taking into account the above information and making a number of assumptions (outlined below), we have calculated the total payments to farmers under Tier II options (HNV agri-environmental programme) to range from approximately €63 million to €127 million based on uptake rates varying from 30% to 60% of eligible participants (See Table 12 for full details).

Whilst the proposed expenditure on agri-environments programmes in the 2014-2020 RDP has yet to be announced, payments in the 2007-2013 RDP ranged from a peak of €336.75 million in 2009 to €238 million in 2012 (DAFM, 2012; DAFM 2013). Therefore the estimated cost of Tier II in this proposal at €127 million (equating to 53% of 2012 expenditure of agri-environment) is reasonable particularly in relation to the objectives of the European Union's Rural Development Policy, requiring that programmes should be targeted towards restoring, preserving and enhancing ecosystems dependent on agriculture. Additional expenditure can then be directed towards Tier I of this proposal, improving the biodiversity on more intensive agricultural areas of farms.

Table 12: Estimated total paid area, number of participants and total payment per annum under an output-based agri-environmental programme targeted at HNV farmland.

	Area Targeted (ha)			No. of Farms/Participants[4]			Total Payments per annum[5]			Average payment per farm[5]		
	Total Area[1]	Heath/ Upland[2]	Semi-natural veg./ Breeding Waders[3]	All farms	Heath/ Upland type farms	Semi-natural veg. / breeding waders farms	All farms	Heath/ Upland type farms	Semi-natural veg. / breeding waders farms	All farms (60% semi-natural vegetation)	Heath/ Upland HNV type farms	Semi-natural veg. / breeding waders farms
60% Uptake	750000	487500	262500	37500	24375	13125	€127,125,000	€70,687,500	€56,437,500	€3,390	€2,900	€4,300
50% Uptake	625000	406250	218750	31250	20313	10938	€105,937,500	€58,906,250	€47,031,250	€3,390	€2,900	€4,300
30% Uptake	375000	243750	131250	18750	12188	6563	€63,562,500	€35,343,750	€28,218,750	€3,390	€2,900	€4,300

[1] HNV total area assumed to be 1,250,000ha

[2] Heath/Upland component of HNV = 65% of total HNV

[3] Semi-natural grassland and breeding waders areas combined = 35% of total HNV area

[4] Average amount of eligible land for component 1 on farm = 20ha divided by total area targeted. Average farm size of HNV farmland taken as average for farm size from counties Donegal, Clare, Galway, Kerry, Leitrim, Mayo, Roscommon, Sligo, Wicklow from agricultural census 2010 = 33 ha (CSO, 2012), assume 60% is eligible heathland, semi-natural grassland or breeding wader area.

[5] Assuming average farm health assessment score is 7 with farmers utilising 75% of their Capital allowances. Average payment on heath/upland = €145 per ha (covering 60% of farm). Average payment on semi-natural vegetation/breeding wader = €215 per ha (covering 60% of farm).

The estimated area targeted in Tier II is 750,000 ha, with an estimated 37,500 participants with average payment rate under Tier II of approximately €3,390 (Table 12). We assume that Tier I and II are delivered as a single integrated programme. As a results, these participants would be eligible for Tier I options on their intensive agricultural areas. The total agri-environment payments for a range of farm sized from 15-40 ha are outlined in Table 13,

showing combined total payments under Tier I and Tier II ranging from €2,153 for a 15ha heath/upland farm to €10,450 for a 40ha semi-natural grassland dominated farm. In these figures we are assuming an allocation of €100 per hectare for Tier I options. If the government wants to achieve the same participation rates in the 2014-2020 programme as those achieved in 2007-2013 (54,560 and 1.7 million ha), then the total expenditure on agri-environment is estimated at €222 million under the structure proposed in this report. This includes the 37,500 participants with 750,000ha of semi-natural vegetation under Tier II (€127 million) and 500,000ha of intensive agricultural areas on these farms under Tier I (€100 per ha allocation = €50 million). Plus an additional 17,060 farms covering another 450,000ha in Tier I only (€100 per ha allocation = €45 million).

Table13: Estimation of total agri-environmental payments (Tier I and II) on farms with a range of percentage covers of semi-natural vegetation

Farm size (ha)	**% semi-natural vegetation**	**Tier I payments[1]**	**Tier II Payments[2]**		**Total Agri-Environment Payment**	
			Heath/ Upland type farms	Semi-natural veg. / breeding waders farms	Heath/ Upland type farms	Semi-natural veg. / breeding waders farms
15	30	€1,500	€653	€968	€2,153	€2,468
	60	€1,500	€1,305	€1,935	€2,805	€3,435
	75	€1,500	€1,631	€2,419	€3,131	€3,919
30	30	€3,000	€1,305	€1,935	€4,305	€4,935
	60	€3,000	€2,610	€3,870	€5,610	€6,870
	75	€3,000	€3,263	€4,838	€6,263	€7,838
40	30	€4,000	€1,740	€2,580	€5,740	€6,580
	60	€4,000	€3,480	€5,160	€7,480	€9,160
	75	€4,000	€4,350	€6,450	€8,350	€10,450

[1] €100 per ha on various options under Tier 1 agri-environment scheme

[2] Assuming average farm health assessment score is 7 with farmers utilising 75% of their Capital allowances. Average payment on heath/upland = €145 per ha. Average payment on semi-natural vegetation/breeding wader = €215 per ha

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Appendices

Appendix 1: Detail of possible administrative system for implementation of output based agri-environment programme

1. The programme has an application window inviting farmers with greater than 30% semi-natural vegetation on their farm to apply. In the initial application farmers would first determine the likely percentage of semi-natural vegetation on the farm with aid from their agri-environment planner. Initially the process should be targeted towards Natura 2000 sites, and farms with a high proportion of commonage, an approach similar to the procedures presently adopted with AEOS. Once the programme is up and running it can target High Nature Value (HNV) farms and could also target habitats in most urgent need of management as reported under Article 17 of the Habitats Directive.

2. DAFM identify from the application process the likely number of agreements in the first year based on the interest of eligible farmers and finance available.

3. DAFM should establish a suitable number of appropriately trained agri-environment planners to complete the ecological assessments. It is anticipated that many of the existing REPS/AEOS planners would be suitable for such a role. A list of approved advisors/planners would be made available to applicants by DAFM.

4. Farmers should then commission the advisor/planner to draw up a management plan for each farm outlining the scoring system which is the basis of the grazing payments made per eligible unit and a list of site enhancement capital works to be completed as agreed by the farmer. This management agreement issued by DAFM will be a simple map (see farm plan example below) of the farm identifying the assessment scores for each management unit and agreed works to be completed each year subject to an overall financial ceiling based on farm size.

5. The farmer will then sign the plan on a commencement date.

6. Each farm should be reassessed each year to note changes in condition. Payments should then be amended to reflect the new score, thus providing farmers the opportunity to increase payment received through improved environmental quality.

Administration Procedures for Commonage

1. Farmers from a specific Commonage contact DAFM to inform them that they are interested in entering an agri-environment programme for the management of a commonage (name, address, commonage area submitted to DAFM local office on expressions of interest form).
2. DAFM identify all the active farmers of the commonage and provide the list to all active farmers in that specific commonage.
3. List of approved advisors for commonage management made available to applicants by DAFM.
4. At commonage level the farmers engage as a group with or without a facilitator and once 80% of active farmers express interest in joining programme on a specific commonage, they contact an approved advisor to draw up their plans. The plans are individual farm plans covering their entire farm as is the case for all outcome-based plans under this programme. However, the commonage section has agreed assessment scores and commonage work agreed by 80% of the shareholders (a management framework plan must first be agreed by the active shareholders and submitted with the individual plans)
5. The initial management framework plan is developed based on the initial information from the Commonage Framework Plans identifying the different vegetation conditions on the commonage. These can then be amended by the advisor to update any changes but will be subject to agreement by the NPWS in regard to stocking densities and Natura 2000 consent.
6. The management framework plan is drawn up for each commonage outlining the scoring system which is the basis of the grazing payments made per eligible unit and a list of site enhancement capital works to be completed as agreed by the farmers. This management agreement will be a simple map of the commonage identifying the assessment scores for each management unit and agreed works to be carried out by shareholders.
7. The management framework plan for the commonage will then become part shareholders farm plan for their owned land. This can be added once 80% of active farmers agree to commit to a plan. Details and scoring will be the same for each

shareholder but the capital works may vary depending on the amount of work that each shareholder agrees to take on. The amount of capital work per share holder and commonage will be capped per annum, however individual shareholders could increase the capital works with agreement from other shareholders.

8. As with the entire outcome-based programme, each commonage will be reassessed each year to note changes in condition. Payments will then be amended to reflect the amended scores (opportunity for farmers to increase payment through improved management).

Irish RDP Agri-environment Scheme
Farm Plan 2015-2020

Participant's name: EXAMPLE FARM

Component 1	The production of species-rich wet grasslands and heathland.
Component 2	Capital enhancement works

For Illustrative Purposes only

Work plan sheet: 1 of 1

Participant:EXAMPLE	**Address:XXXXX**	**Advisor:** Farm Planner
Herd number:123456	**Phone number:XXXXXXX**	**Advisor tel.:XXXXXX**

WORK PLANNED for 2015 Refer to the Best Practice Guides for management recommendations.

Component 1 (C1): Semi-natural vegetation and other grazed habitats **Total based on C1 assessment €2850**

Field no.	Land class	Management Grazing/Cutting	Lower grazing recommended	Scrub control recommended	Additional information (management recommendations)	Area (ha)	Eligible area (ha)	C1 Score (0-10)	Rate per hectare	Payment (€)
1	H	Grazing	No	Yes	Area in good condition but additional grazing and some scrub removal requited	15	14	8	80	1120
2	H	Grazing	No	No	Area in good condition, some bare soil areas due to supplementary feeding	6	6	8	80	480
3	H	Grazing	Yes	No	Some damage due to higher grazing levels, reduction in grazing should improve habitat	8	8	6	60	480
4	SRW	Grazing	No	Yes	Diverse sward but high levels of Gorse/Whin, scrub removal required	9	7	6	110	770
					Total	**38**	**35**			**2850**

Component 2 (C2): Capital works *Please tick all tasks the farmer agrees to do* Total available C2 budget is up to €3800; Total for proposed C2 works € 2580 ; **Total for agreed 2 works € 2580**

Task	Field no(s)	Length (m)	Area (ha)	Additional information	Rate	Payment (€)	Agree to do?
Scrub Control Flailing/Burning	1		0.20	Removal of whins from Heathland (75% funded)	€825/ha	165	☐
			0.30	Flailing of leggy heather to aid regeneration (50% funded)	€300/ha	45	☐
							☐
Scrub Control	4		1.00	Removal of whins from species rich wet grassland (75% funded)	€825/ha	825	☐
							☐
							☐
Fencing	1,4	200m		Woven wire and two strands of barbed wire to aid grazing control on species rich wet grassland and heathland. (75% funded)	€7.50/m	1500	☐
							☐
							☐
					Total	**€2535**	

Total payment C1, C2, €5385

Participant's Declaration Work planned, as detailed in this Farm Plan, has been fully explained to me by my agri-environment Advisor. I undertake to carry out the agreed work as set down in this Farm Plan and I agree to abide by the Terms and Conditions of the Agri-environment Programme. Signed .....

Appendix 2A 'Health' Assessment for Wet Heath and Blanket Bog Sites

The following assessment sheet is to give an indication of how a habitat could be assessed, the process will require further development and on site evaluation to improve their overall effectiveness.

INSTRUCTIONS & SCORING

Ecological Integrity

Typical: The vegetation should be typical of the blanket bog and wet heath communities i.e. high plant diversity for particular habitat >12 species per sq. m. Overall diverse structure of vegetation due to presence of heathers, grass/sedges, mosses, lichens and low growing plants. Unburnt	**30**
Slightly Modified: The vegetation has been slightly modified but still has high plant species diversity (>12 per sq. m). Grazing levels (past/present) has resulted in low abundance of heathers but diverse structure of vegetation present grass/sedge, mosses, lichens, low growing plants and showing signs of heather regeneration.	**20**
Moderately Modified: The vegetation still retains elements of the typical flora found on blanket bog and wet heath but are much reduced, having been replaced by more grass/sedge dominated vegetation – reduced cover of peat moss and heathers (<10%). Prescribed burning has taken place but moss layer intact	**10**
Significantly Modified: The vegetation has been significantly modified by intensive grazing, recent peat cutting (<5 years ago). It is relatively species-poor in terms of those plants typically found on healthy blanket bog and wet heath. Unpalatable mat grass (Nardus) may be present. Moss layer thin/patchy to absent .	**0**

Grazing levels

Negligible-little or no grazing evident: Sward looks rank and undergrazed (Dominance of purple moor grass and rank/senescent heather). Signs of grazing absent/rarely seen: dung will be absent as will other evidence of grazing livestock such as stock paths and recent hoof prints. Note: undergrazing will not be an issue on blanket bog in terms of environmental quality as these areas require little or no grazing. As a result assessment for under grazing should concentrate on wet heath vegetation.	**-10**
Grazing levels below optimal: i) Vegetation Structure significantly below optimal, often only the more palatable areas grazed and these not particularly well so. Less palatable areas barely grazed, large areas of site dominated by rank heather and Molinia. ii) Vegetation structure generally good but still below optimal in some areas (<25% of site)	**i) = 0** **ii) =15**
Grazing levels optimal: Sward looks to be in good condition with undamaged	**30**

spongy moss layer with abundance of grass and sedge like vegetation on blanket bog areas; a good mix of heaths, heather and typical grasses and sedges on wet heath areas. Lichens present on site e.g. Cladonia-bushy white lichen on vegetation. A diverse range of sward heights present across site.	
Grazing levels poor due to inadequate vegetation cover: i) Grazing slightly above optimal but otherwise good ii) Signs of overgrazing evident but patchy in distribution, signs of overgrazing (heavy grazing of heathers, very short carpet like vegetation) on less than 25% of site	**i) = 15** **ii) = 0**
Very high grazing levels: The site is grazed so tight that the vegetation height is low over the whole site. The site shows signs of poaching throughout with high level of bare soil. Little or no heaths and heather evident on wet heaths. Damage evident to moss layer with little or no sphagnum moss.	**-10**

Encroaching Scrub

- *Scrub levels should only be assessed within the eligible assessment area (i.e. grazeable area).*
- ***Scrub that the farmer would not be permitted to remove e.g. mature scrub or areas of scrub with a woodland flora beneath should not be included when assessing scrub cover.***

Negligible (<1%): Encroaching scrub (e.g. birch) rare, occurring as a few sporadic individuals or one or two discrete patches.	**10**
Encroaching scrub cover 1-5%:	**7**
Encroaching scrub cover 6 – 10%	**5**
Encroaching scrub cover between 11 - 25%	**2**
Encroaching scrub cover between > 25%	**0**

Non native invasive species e.g. Rhododendron

Negligible (<1%): Rhododendron absent occurring as a few sporadic individuals or one or two discrete patches.	**0**
Rhododendron/other non native invasive species 1-5%	**-5**
Rhododendron/other non native invasive species 6 – 10%	**-10**
Rhododendron/other non native invasive species > 10%	**-20**

Plant litter and rank vegetation

- *Litter levels should be **assessed across the main grazeable area**. 'Difficult' areas(i.e. very rough ground or places that are difficult for stock to get into to graze due to rough terrain) should be excluded from the assessment.*

Build up of Litter/dead vegetation absent or negligible <20% cover: restricted to small inaccessible areas, patches of purple moor-grass	**10**
Litter cover low 20– 30%: usually restricted to less palatable areas.	**5**
Litter cover medium 30-50%: usually restricted to less palatable areas.	**2**
Litter cover significant >50: dead-standing frequent and thatch forming some continuous patches.	**0**
Litter dominant >75% cover: forming a more or less continuous layer across most of the assessment area both as a thatch and dead-standing, the latter particularly visible.	**0**

Carbon Storage Potential-Burning, Bare Soil and Erosion

High: Little or no bare soil seen over the greater assessment area other than isolated hoof prints. Some bare soil at 'pinch' points along regularly used routes (e.g. gateways, gaps in walls) is acceptable as long as no signs of erosion are visible. Preferred peat forming species dominate site (Eriophorum/Sphagnum- Cotton grass and peat moss). No burning required or evident on site.	**10**
Between High & Medium	**7**
Medium: Bare soil more frequent along regularly used routes but little or no sign of erosion. May also be a few isolated bare patches caused by animals rubbing and excessive poaching from vehicles very restricted in distribution and not excessive i.e. <5% bare soil in any 10*10 area. Burning only takes place in accordance with prescribed burning programme as laid out in plan. No damage caused to moss layer as a result of prescribed burning.	**5**
Between Medium & Low : e.g. if illegal burning without the permission of the land owners has taken place and there is no damage to moss layer.	**2**
Low: Areas of bare and eroding soil found at intervals along regularly used routes. Significant rutting caused by vehicles/machinery particularly going between access gate and feed points and through excessive poaching. >5% bare and eroding soil. Extensive unprescribed burning on site causing extensive damage to moss layer	**0**

Impact on Natural Water Sources

Low: No obvious damage. Water supply through troughed system or via natural water source but allows no dunging trampling of waterway	**10**
Between Low & Medium	**7**
Medium: Natural water supply but limited access by livestock some poaching but no significant effect. Access to lakes with no water flow and no visible damage.	**5**
Between Medium & High:	**2**
High: livestock complete access to waterway with damage to bed of the watercourse as a result of trampling, dunging. Livestock have to cross waterway to access other parts of the field, erosion at banks, disturbed waterways.	**0**

Feed site damage

- *Litter levels should be **assessed across the main grazeable area**. 'Difficult' areas(i.e. very rough ground or places that are difficult for stock to get into to graze due to rough terrain) should be excluded from the assessment.*

No supplementary feeding present on site or for prescribed feeding as part of targeted grazing requirements of site: *(i.e. attract away from sensitive areas or concentrate on areas requiring increased grazing)*	**0**
Low - little or no damage caused by supplementary feeding: Damage limited to a single feed site. Impact very localised - restricted to within 3m band around the site. Damage should be visible as less than 50% bare earth (May) OR relatively few weeds/agriculturally favoured species (early June on).	**-5**
Medium - damage fairly obvious but restricted in area: Damage limited to a single feed site. Majority of damage confined to a 3m band around the feeder and visible as up to 100% bare soil (May) or weeds (early June on) within the band but very little outside of it.	**-10**
High - obvious damage extending beyond the 3m band: Significant damage extending more than 3m from the feeder. Visible as extensive area of bare soil and 'cut-up' ground (May). A build up of dung may be evident.	**-20**

Related Damage Categories for CFP can be used as an alternative if desired:

CFP Damage Category	Assessment score	Payment Band (% of max)
U	8-10	100
MU	6/7	70
MM	4/5	50
MS	3	30
S	2	0
S*	1	0

Appendix 2B 'Health' Assessment for Dry Heath Sites

The following assessment sheet is to give an indication of how a habitat could be assessed, the process will require further development and on site evaluation to improve their overall effectiveness.

INSTRUCTIONS & SCORING

Ecological Integrity

Typical: The vegetation should be typical of the dry heath communities i.e. high cover of dwarf shrub and heather (>50%). Overall diverse structure with a mix of grasses, sedges and herbs. Extensive layer of mosses and lichens	**30**
Slightly Modified: The vegetation has been slightly modified but still has high cover of dwarf shrub and heather (25-50%). Diverse structure of vegetation present grass/sedge, low growing plants but showing signs of patchy or thin growth of mosses and lichens.	**20**
Moderately Modified: The vegetation still retains elements of the typical flora found on dry heath but are much reduced, having been replaced by more grass/sedge dominated vegetation – reduced cover of heathers and dwarf shrub (10-24%).	**10**
Significantly Modified: The vegetation has been significantly modified by intensive grazing. It is relatively species-poor in terms of those plants typically found on dry heath. Heather and dwarf shrub cover is less than 10%. Agrostis and fescue grass species evident in sward.	**0**

Grazing levels

Negligible-little or no grazing evident: Sward looks rank and undergrazed (Encroaching scrub a problem e.g. Birch/senescent heather and gorse). Signs of grazing absent/rarely seen: dung will be absent as will other evidence of grazing livestock such as stock paths and recent hoof prints.	**-10**
Grazing levels below optimal: i) Vegetation Structure <u>significantly below optimal</u>, often only the more palatable areas grazed and these not particularly well so. Less palatable areas barely grazed, large areas of site dominated by rank heather and gorse and some encroaching scrub evident (e.g. Birch). ii) Vegetation structure generally good but still below optimal in some areas (<25% of site)	**i) = 0** **ii) =15**
Grazing levels optimal: Sward looks to be in good condition with undamaged well developed layer of mosses and lichens. A good mix of heather and dwarf shrub (gorse) with mix of typical grasses, sedges and some herbs. A diverse range of sward heights present across site.	**30**
Grazing levels poor due to inadequate vegetation cover: i) Grazing <u>slightly above optimal</u> but otherwise good dwarf shrub and heather	

25-50% of site ii) Signs of overgrazing evident but patchy in distribution. Signs of overgrazing include heavy grazing of heathers, <25% total cover of dwarf shrub and heather which is replaced by heath grass and bent grass. Signs of overgrazing must occur on less than 25% of site	**i) = 15** **ii) = 0**
Very high grazing levels: The site is grazed so tight that the vegetation height is low over the whole site. The site shows signs of poaching throughout with high level of bare soil. Little or no dwarf shrub and heather evident being replaced by grasses with grasses such as Yorkshire fog and fescues evident. Damage evident to moss layer..	**-10**

Encroaching Scrub

- *Scrub levels should only be assessed within the eligible assessment area (i.e. grazeable area).*
- ***Scrub that the farmer would not be permitted to remove e.g. mature scrub or areas of scrub with a woodland flora beneath should not be included when assessing scrub cover.***

Negligible (<1%): Encroaching scrub (e.g. birch) rare, occurring as a few sporadic individuals or one or two discrete patches.	**10**
Encroaching scrub cover 1-5%:	**7**
Encroaching scrub cover 6 – 10%	**5**
Encroaching scrub cover between 11 - 25%	**2**
Encroaching scrub cover between > 25%	**0**

Bracken & Non native invasive species e.g. Rhododendron

Negligible (<1%): **Rhododendron** absent occurring as a few sporadic individuals or one or two discrete patches. **Bracken** usually restricted to isolated inaccessible areas and fronds relatively short (average < 0.5m) even late in year.	**0**
Rhododendron/other non native invasive species 1-5% Dense stands of **Bracken** should not exceed 5% of assessment area	**-5**
Rhododendron/other non native invasive species 6 – 10% **Bracken** with an open canopy (i.e. not dense) for the most part, the closed canopy not exceeding 10% of the assessment area so the ground flora is barely affected. Average height of the fronds should be <0.5m.	**-10**
Rhododendron/other non native invasive species > 10% **Bracken** forming dense stands with a closed canopy which cover >10% of the area	**-20**

resulting the suppression of the normal ground flora.	

Plant litter and rank vegetation

- *Litter levels should be **assessed across the main grazeable area**. 'Difficult' areas(i.e. very rough ground or places that are difficult for stock to get into to graze due to rough terrain) should be excluded from the assessment.*

Build up of Litter/dead vegetation absent or negligible <20% cover: restricted to small inaccessible areas, patches of purple moor-grass	**10**
Litter cover low 20– 30%: usually restricted to less palatable areas.	**5**
Litter cover medium 30-50%: usually restricted to less palatable areas.	**2**
Litter cover significant >50: dead-standing frequent and thatch forming some continuous patches.	**0**
Litter dominant >75% cover: forming a more or less continuous layer across most of the assessment area both as a thatch and dead-standing, the latter particularly visible.	**0**

Carbon Storage Potential-Burning, Bare Soil and Erosion

High: Little or no bare soil seen over the greater assessment area other than isolated hoof prints. Some bare soil at 'pinch' points along regularly used routes (e.g. gateways, gaps in walls) is acceptable as long as no signs of erosion are visible. No burning required or evident on site.	**10**
Between High & Medium	**7**
Medium: Bare soil more frequent along regularly used routes but little or no sign of erosion. May also be a few isolated bare patches caused by animals rubbing and excessive poaching from vehicles very restricted in distribution and not excessive i.e. <5% bare soil in any 10*10 area. Burning only takes place in accordance with prescribed burning programme as laid out in plan.	**5**
Between Medium & Low : e.g. if illegal burning without the permission of the land owners has taken place but it is localised (<20% of site) and there is minimal damage caused.	**2**
Low: Areas of bare and eroding soil found at intervals along regularly used routes. Significant rutting caused by vehicles/machinery particularly going between access gate and feed points and through excessive poaching. >5% bare and eroding soil. Extensive unprescribed burning on site causing extensive damage.	**0**

Impact on Natural Water Sources

Low: No obvious damage. Water supply through troughed system or via	**10**

natural water source but allows no dunging trampling of waterway	
Between Low & Medium	**7**
Medium: Natural water supply but limited access by livestock some poaching but no significant effect. Access to lakes with no water flow and no visible damage.	**5**
Between Medium & High:	**2**
High: livestock complete access to waterway with damage to bed of the watercourse as a result of trampling, dunging. Livestock have to cross waterway to access other parts of the field, erosion at banks, disturbed waterways.	**0**

Feed site damage

- *Litter levels should be **assessed across the main grazeable area**. 'Difficult' areas(i.e. very rough ground or places that are difficult for stock to get into to graze due to rough terrain) should be excluded from the assessment.*

No supplementary feeding present on site or for prescribed feeding as part of targeted grazing requirements of site: *(i.e. attract away from sensitive areas or concentrate on areas requiring increased grazing)*	**0**
Low - little or no damage caused by supplementary feeding: Damage limited to a single feed site. Impact very localised - restricted to within 3m band around the site. Damage should be visible as less than 50% bare earth (May) OR relatively few weeds/agriculturally favoured species (early June on).	**-5**
Medium - damage fairly obvious but restricted in area: Damage limited to a single feed site. Majority of damage confined to a 3m band around the feeder and visible as up to 100% bare soil (May) or weeds (early June on) within the band but very little outside of it.	**-10**
High - obvious damage extending beyond the 3m band: Significant damage extending more than 3m from the feeder. Visible as extensive area of bare soil and 'cut-up' ground (May). A build up of dung may be evident.	**-20**

Appendix 3A 'Health' Assessment for Semi-natural Wet Grassland Sites

The following assessment sheet is to give an indication of how a habitat could be assessed, the process will require further development and on site evaluation to improve their overall effectiveness.

INSTRUCTIONS & SCORING

Ecological Integrity

Excellent: The vegetation should be typical of the grassland communities found on lowland wet grassland which not have undergone any discernable agricultural improvement in terms of reclamation and the vegetation should not have been modified by overgrazing or additional fertility. At least 5 indicator plants per m^2 in 6 out of 10 random points in the field area.	**30**
Slightly Modified: The vegetation has been slightly modified but is still species-rich and includes many flowering plants typical of species rich lowland wet grassland. Should contain at least 4 indicator plants per m^2 in 6 out of 10 random points in the field area	**15**
Moderately Modified: The vegetation still retains elements of the typical flora found on a species rich lowland wet grassland but are much reduced, having been replaced by more agriculturally-favoured species. Should contain at least 3 indicator plants per m^2 in 6 out of 10 random points in the field area.	**-10**
Significantly Modified: The vegetation has been significantly modified by: reclamation; agricultural improvement including reseeding and/or regular applications of artificial fertiliser or slurry; and/or intensive grazing. It is species-poor in terms of those plants typically found on healthy species rich lowland wet grasslands with the flora being dominated by agriculturally-favoured species and weeds, such as Creeping Buttercup.	**-20**

Where the vegetation is <u>Moderately Modified</u> or <u>Significantly Modified</u> the area is not semi-natural and therefore not part of higher tier.

Vegetation Structure

Poor due to excessive vegetation: Sward looks rank and undergrazed. High levels of vegetation cover smothering out many species. Dung will be absent or rarely seen (may be some from wildlife) as will other evidence of grazing livestock such as stock paths and recent hoof prints.	**5**
Vegetation Structure below optimal: i) Vegetation Structure <u>significantly below optimal</u>, often only the more palatable areas grazed and these not particularly well so. Less palatable areas barely grazed, large areas of site dominated by unwanted vegetation particularly Rush. ii) Vegetation structure generally good but still below optimal.	**i) = 10** **ii) = 15**

Vegetation Structure Good: Sward looks to be in good condition with low levels of rush cover and a mosaic of sward heights. Whilst small areas of poaching may be visible they are relative few and not consistent over the whole site.	**20**
Poor due to inadequate vegetation cover: i) Grazing slightly above optimal but otherwise good, less mosaic structure, a ii) Signs of overgrazing evident but patchy in distribution, affecting composition of sward.	**i) = 15** **ii) = 10**
No Vegetation Structure: The site is grazed at tight that the vegetation height is low over the whole site. The site shows signs of poaching throughout with high level of bare soil.	**5**

Scrub Encroachment

Negligible cover (<1%): Scrub species rare, occurring only as small corners of field or adjacent hedges	**20**
Scrub cover 5% or less: may be as occasional, small patches with scattered individuals or a few restricted patches.	**15**
Scrub cover 6 – 10%:	**10**
Scrub cover between 11 - 25%	**5**
Scrub cover between > 26	**0**

Carbon Storage Potential

High: Little or no bare soil seen over the greater assessment area other than isolated hoof prints. Some bare soil at 'pinch' points along regularly used routes (e.g. gateways, gaps in walls) is acceptable as long as no signs of erosion are visible.	**15**
Between High & Medium	**10**
Medium: Bare soil more frequent along regularly used routes but little or no sign of erosion. May also be a few isolated bare patches caused by animals rubbing and excessive poaching from vehicles very restricted in distribution and not excessive.	**5**
Between Medium & Low :	**0**
Low: Areas of bare and eroding soil found at intervals along regularly used routes. Significant rutting caused by vehicles/machinery particularly going between access gate and feed points and through excessive poaching.	**-5**

Impact on Natural Water Sources

Low: No obvious damage. Water supply through troughed system or via natural water source but allows no dunging trampling of waterway	**15**
Between Low & Medium	**10**
Medium: Natural water supply but limited access by livestock some poaching but no significant effect. Access to lakes with no water flow and no visible damage.	**5**
Between Medium & High:	**0**
High: livestock complete access to waterway with damage to bed of the watercourse as a result of trampling, dunging. Livestock have to cross waterway to access other parts of the field, erosion at banks, disturbed waterways.	**-5**

Additional features

Presence of specific species, e.g. Curlew, Chough, Marsh Fritillary	**+5**
Other	

Possible Indicator Species for semi-natural grasslands (based Northern Irelands Countryside Management Scheme with some amendments).

Flowering Plants

Bedstraw, Heath

Bedstraw, Lady's

Bedstraw, Marsh

Bilberry

Bluebell

Bugle

Cat's-ear

Celandine, lesser

Common Birds' foot trefoil,

Common twayblade

Cranberry

Crane's bill species

Creeping Jenny

Devil's bit scabious

Eyebright

Flax species

Forget-me-not, Marsh

Greater Birds' foot trefoil,

Harebell

Hawkbit species

Knapweed

Lady's mantle

Lady's smock

Lousewort, Common

Lousewort, Marsh

Marsh cinquefoil

Marsh marigold

Marsh pennywort

Meadow thistle

Meadowsweet

Milkwort

Orchid species

Ox-eye daisy

Pignut

Plantain species

Primrose

Ragged robin

Red Clover

Sanicle

Saxifrage

Self heal

St. John's Wort species

Stitchwort, Greater

Stitchwort, Lesser

Thyme species

Tormentil

Vetch, Kidney

Vetch, Tufted

Vetchling, Bitter

Vetchling, Meadow

Violet species

Violet, Marsh

Water avens

Water mint

Wood anemone

Wood sorrel

Yarrow

Yellow flag

Yellow pimpernel

Yellow rattle

Grasses and Sedges

Crested Dog's tail

Quaking grass

Sedges and rushes

Rush, Jointed

Rush, Sharp-flowered

Rush, Hard

Sedge species

Woodrush, Field

Woodrush, Heath

Appendix 3B Health' Assessment for semi-natural dry grasslands (adapted from BFCP)

The following assessment sheet is to give an indication of how a habitat could be assessed, the process will require further development and on site evaluation to improve their overall effectiveness.

INSTRUCTIONS & SCORING

(Including Semi-Natural, Calcareous Grasslands, Limestone Heaths, their Mosaics with Limestone Pavement and semi-natural neutral meadows on deeper, more neutral soils.)

Ecological Integrity

Typical: The vegetation should be typical of the dry grassland communities. Whilst there may be some alterations due to grazing these should be minimal. Pastures should not have undergone any discernable agricultural improvement in terms of reclamation and the vegetation should not have been modified by regular or prolonged summer grazing.	**5**
Slightly Modified: The vegetation has been slightly modified but is still species-rich and includes many flowering plants typical of the dry grassland communities. Fields with little or no grazing should be scored here if they have not undergone any significant reclamation.	**-6**
Moderately Modified: The vegetation still retains strong elements of the typical flora found but these are much reduced, having been replaced by more agriculturally-favoured species that are tolerant of more intensive summer grazing. This category will usually result from more intensive summer grazing but should not be used if the pasture has been reseeded in the last 5 years and/or is regularly fertilised with artificial fertiliser or slurry.	**-17**
Significantly Modified: The vegetation has been significantly modified by: reclamation; agricultural improvement including reseeding and/or regular applications of artificial fertiliser or slurry; and/or intensive grazing. It is relatively species-poor in terms of those plants typically found, the flora being dominated by agriculturally-favoured species and weeds.	**-28**

Where the vegetation is Moderately Modified or Significantly Modified the area is not semi-natural and therefore not part of higher tier.

Grazing level

Negligible - Little or no grazing evident: Sward looks rank and undergrazed often with relatively few flowering plants in evidence. There may be significant amounts of litter, particularly dead-standing which can make the pasture appear paler than it looks in well grazed areas. Dung will be absent or rarely seen (may be some from wildlife) as will other evidence of grazing livestock such as stock paths and recent hoof prints.	**-35**
Grazing level below optimal: i) Grazing levels significantly below optimal, often only the more palatable areas	

grazed and these not particularly well so. Less palatable areas barely grazed. ii) Grazing levels generally good but still below optimal.	**i) = -25** **ii) = 9**
Grazing optimal: Sward looks to be in good condition with an abundance of flowering plants. Litter levels should be low although they may be higher where grazing levels have increased only recently. Signs of grazing livestock such as dung, discernable stock paths and hoof prints will be relatively easy to see but not overly conspicuous (i.e. easy to find but not immediately visible all the time).	**15**
Grazing level above optimal: i) Grazing slightly above optimal but otherwise good. ii) Signs of overgrazing evident but patchy in distribution.	 **i) = 9** **ii) = -5**
Very high grazing level: Appearance of sward will vary according to whether summer grazed or not. Where summer grazed, the proportion of herbs in flower or seed is likely to be extremely low and will probably comprise low growing rosettes such as daisies, or 'weed' species e.g. thistles in the main: the site will probably appear grassy not flowery. In all cases (i.e. with or without summer grazing): 'weeds' are likely to be frequent, litter will be absent or negligible; dung will be conspicuous although it may be concentrated in favoured areas; bare soil and disturbed stones may occur throughout the area although bare patches may be small (< 10cm) and overlooked without careful observation. There are likely to be some more extensive areas of bare soil in commonly used areas e.g. near water, gateways & pinch-points. Impact evident over at least 25% of the site.	**-35**

Plant Litter & Rank Vegetation

Litter absent or negligible (<10% cover). Presence often restricted to small inaccessible areas, patches of purple moor-grass or prickly/thorny areas with small blackthorn bushes or taller burnet rose.	**20**
Litter cover 10 – 25%, often restricted to less palatable areas.	**14**
Litter cover >25-50%, often restricted to less palatable areas.	**8**
Litter cover significant >50-75%. Dead-standing evident but thatch usually more extensive.	**2**
Litter dominant >75% cover forming a more or less continuous layer across most of the assessment area both as a thatch and dead-standing, the latter being particularly visible.	**0**

Carbon Storage Potential

High: Little or no bare soil seen over the greater assessment area other than isolated hoof prints. Some bare soil at 'pinch' points along regularly used routes (e.g. gateways, gaps in walls) is acceptable as long as no signs of erosion are visible.	**10**
Between High & Medium	**7**
Medium: Bare soil more frequent along regularly used routes but little or no sign of erosion. May also be a few isolated bare patches caused by animals rubbing and excessive poaching from vehicles very restricted in distribution and not excessive.	**5**
Between Medium & Low :	**2**
Low: Areas of bare and eroding soil found at intervals along regularly used routes. Significant rutting caused by vehicles/machinery particularly going between access gate and feed points and through excessive poaching.	**0**

Impact on Natural Water Sources

Low: No obvious damage. Relatively smooth appearance, hoof prints sparse or absent. Cover of wetland vegetation (including mosses) should be more or less continuous or have small, patchy open areas. Bare mud/peat should cover <25% of the area. Undisturbed water in ponds/pools should be clear, and in the case of shallow ones, well vegetated. Where there are multiple natural water sources showing a low level of damage the impact should be recorded as 'Between Low & Medium'.	**10**
Between Low & Medium	**5**
Medium: Pock-marked, uneven appearance (deep hollows and high pedestals in wet ground) due to hoof prints over <50% of the area. Bare peat/mud covering < 50% of the area. Vegetation may be patchy and discontinuous. Some dung may be present although it may have been washed away if there is significant water movement. The water in ponds/pools may be slightly discoloured due to suspended sediments but the bottom should be visible in shallow areas. Where there are multiple natural water sources showing a medium level of damage the impact should be recorded as 'Between Medium & High' or 'High' depending on the overall impact.	**0**
Between Medium & High:	**-5**
High: Pock-marked, uneven appearance (deep hollows and high pedestals in wet ground) due to hoof prints covering >50% of the area. Considerable areas of bare soil (>75%). Vegetation much reduced, patchy and discontinuous. Evidence of dunging likely although it may have been washed away.	**-10**

Bare Soil & Erosion

Low: Little or no bare soil seen over the greater assessment area other than isolated hoof prints. Some bare soil at 'pinch' points along regularly used routes (e.g. gateways, gaps in walls) is acceptable as long as no signs of erosion are visible.	**5**
Between Low & Medium	**1**
Medium: Bare soil more frequent along regularly used routes but little or no sign of erosion. May also be a few isolated bare patches caused by animals rubbing on ant hills or digging for minerals. Ruts from vehicles very restricted in distribution and not excessive.	**-3**
Between Medium & High:	**-10**
High: Areas of bare and eroding soil found at intervals along regularly used routes. Significant rutting caused by vehicles/machinery particularly going between access gate and feed points.	**-17**

Scrub Encroachment

Negligible cover (<1%): Scrub species rare, occurring as a few sporadic individuals or one or two discrete patches.	**15**
Scrub cover 5% or less: may be as occasional, small patches with scattered individuals or a few restricted patches.	**9**
Scrub cover 6 – 10%:	**3**
Scrub cover between 11 - 25%	**-7**
Scrub cover between > 26	**-18**

Bracken & Purple Moor-grass

Low: Both species, if present, occurring only sporadically and never forming dense patches (<1% cover). Bracken fronds relatively short even late in year.	**5**
Between Low & Medium	**1**
Medium: Either or both species relatively commonly and easily seen but neither forming dense stands that cover more 2% of the area. Bracken more or less restricted to soil-filled grikes and covering <10% of the site in total with fronds mostly below 0.5m. Purple moor-grass growing as scattered clumps up to 0.5m in diameter.	**-3**
Between Medium & High:	**-10**
High: Either or both species forming dense patches that cover at least 25% of the area. Bracken taller and often forming dense patches with a closed canopy. Purple-moor grass forming dense patches > 5m in diameter.	**-17**

Weeds & Agriculturally-favoured Species

Low: Weed species absent or rare. If present restricted to a few sporadic individuals in wall bands, sheltering spots or around feeders/water troughs, the latter equivalent to 'low' or 'low-medium' in 'Feed Site Damage'.	**5**
Between Low & Medium	**0**
Medium: Weeds most common in wall bands, shelter spots and/or around feed/water troughs but rarely extending more than 5m out from these main zones. Scattered individuals may be distributed throughout the site but their overall cover should be less than 1% of the area.	**-2**
High: Weed species obvious throughout the assessment area as: numerous but well spaced individuals or sporadic but obvious dense patches or in the worst cases, as individuals or patches covering much of the area. Cover > 5%.	**-5**

Feed site Damage

Low: Little or no damage due to supplementary feeding. A localised, small increase in bare earth and disturbance may be visible around feed sites in spring but is likely to become less visible over the summer. The disturbed area should not radiate out more than 3-4m from the feeder and there should be less that 25% bare earth within that area. It should be limited to a single location within the field and "weeds" if present, should not be obvious. If there are multiple feed locations spread across the field the impact should be recorded as 'Between Low & Medium' even though the damage at individual sites is low.	**10**
Between Low & Medium	**6**
Medium: Damage fairly obvious but restricted in area: up to 50% bare soil within a 3-4m radius of the feeder (most visible end of April into May). Or, if later in the year, the bare soil may have become colonised by "weeds" - should not make up more than 25% of the vegetation within the damaged zone. It should be limited to a single location within the field. If there are multiple feed locations spread across the field the impact should be recorded as 'Between medium & high' or 'High' depending on the overall impact.	**2**
Between Medium & High:	**0**
High: Damage obvious: more than 50% bare soil within a 3-4m radius of the feeder (visible end of April into May) and often extending beyond. Usually replaced by a luxuriant growth of annual weeds (e.g. fat hen, redshank, sow-thistle, chickweed) later in the spring. Poaching and the build up of dung will probably be evident.	**-5**

Appendix 4 'Health' Assessment for Breeding Wader Sites

The following assessment sheet is to give an indication of how a habitat could be assessed, the process will require further development and on site evaluation to improve their overall effectiveness.

INSTRUCTIONS & SCORING

Ecological Integrity

Birds

Excellent: The site is a known breeding wader site with a high number of breeding pairs (greater than 3) either through present records or by the presents of birds at assessment (not wintering flocks). Breeding waders include Curlew, Snipe, Redshank and Lapwing.	**30**
Good: The site contains still contains one or two pair of breeding waders site either through present records or by the presents of birds at assessment (not wintering flocks). Breeding waders include Curlew, Snipe, Redshank and Lapwing.	**15**
Potential 1: The site is a potentially suitable for breeding waders with the correct management forming adjacent to or part of a wider lowland wet grassland site.	**10**
Potential 2: The site is a potentially suitable for breeding waders with the correct management forming and is located within an area that breeding waders are known to breed.	**5**

Plants

Typical: The vegetation should be typical of the grassland and heath communities found on lowland wet grassland which not have undergone any discernable agricultural improvement in terms of reclamation and the vegetation should not have been modified by regular or prolonged summer grazing. At least 5 indicator plants per m^2 in 6 out of 10 random points in the field area	**10**
Slightly Modified: The vegetation has been slightly modified but is still species-rich and includes many flowering plants typical of species rich lowland wet grassland. Should contain at least 4 indicator plants per m^2 in 6 out of 10 random points in the field area	**3**
Moderately Modified: The vegetation still retains elements of the typical flora found on a species rich lowland wet grassland but are much reduced, having been replaced by more agriculturally-favoured species. Should contain at least 4 indicator plants per m^2 in 3 out of 10 random points in the field area.	**-3**
Significantly Modified: The vegetation has been significantly modified by: reclamation; agricultural improvement including reseeding and/or regular applications of artificial fertiliser or slurry; and/or intensive grazing. It is relatively species-poor in terms of those plants typically found on healthy	**-5**

species rich lowland wet grasslands with the flora being dominated by agriculturally-favoured species and weeds.	

Grazing level and Vegetation structure

Negligible - Little or no grazing evident: Sward looks rank and undergrazed. High levels of vegetation cover leaving it unsuitable for nesting waders. Dung will be absent or rarely seen (may be some from wildlife) as will other evidence of grazing livestock such as stock paths and recent hoof prints. Levels of Soft rush (*Juncus effusus* and/or *Juncus inflexus* depending on site) are usually high and starting to brown.	**-35**
Grazing level below optimal: i) Grazing levels significantly below optimal, often only the more palatable areas grazed and these not particularly well so. Less palatable areas barely grazed. ii) Grazing levels generally good but still below optimal.	**i) = -25** **ii) = 9**
Grazing optimal: Sward looks to be in good condition with good rush control and a mosaic of sward heights. Whilst small areas of poaching may be visible they are relative few and not consistent over the whole site.	**15**
Grazing level above optimal: i) Grazing slightly above optimal but otherwise good, less mosaic structure ii) Signs of overgrazing evident but patchy in distribution.	**i) = 9** **ii) = -5**
Very high grazing level: The site is grazed at tight that the vegetation height is low over the whole site. The site shows signs of poaching throughout with high level of bare soil. Wader nests are likely to have a high trampling risk	**-35**

Localised damage including, e.g., feed site damage, excessive machinery travel, bare soil

Low: Little or no damage any small increase in bare earth and disturbance may be visible in spring but is likely to become less visible over the summer. The damage should be limited to a single location within the field and "weeds" if present, should not be obvious. If there are multiple damaged areas spread across the field the impact should be recorded as 'Between Low & Medium' even though the damage at individual sites is low.	**15**
Between Low & Medium	**11**
Medium: The site has several areas of damage due to agricultural management, wheel ruts, areas of damage from feeding sites and a high level of poaching from live	**-5**
Between Medium & High:	**-10**

High: The site has been damaged from high level of poaching, resulting in the land being 'cut-up' through cattle tramping.	**-15**

Visual Predatory Problems

None : No obvious predatory problems. Large open site, no adjacent trees for nesting corvids.	**15**
Between Low & Medium	**11**
Medium: Open site but adjacent areas with suitable for nesting corvids and other predators	**7**
Between Medium & High:	**-2**
High: Small site with areas of scrub tall trees likely to harbour predators, including corvids, foxes and mink	**-5**

Scrub Encroachment

Negligible cover (<1%): Scrub species rare, occurring only as small corners of field or adjacent hedges	**15**
Scrub cover 5% or less: may be as occasional, small patches with scattered individuals or a few restricted patches.	**9**
Scrub cover 6 – 10%:	**-3**
Scrub cover between 11 - 25%	**-7**
Scrub cover between > 26	**-18**

Invertebrate habitat and wet features

Ideal: Site has good access to open water by adjacent shoreline, low profiled drains, purpose made scrapes or natural low lying areas which retain water.	**17**
Between Ideal and Satisfactory	**10**
Satisfactory: There are a number of wet features on the site, drains, low lying hollows but overall additional areas could be added or improved	**3**
Between Satisfactory and Poor:	**-10**
Poor: No areas or inaccessible areas of open water in the form of drains, scrapes, low lying areas prone to flooding, high level of drainage. Drains have step sides limiting access by young chicks.	**-17**