Identifying Pressures
The growing demand for a wide range of public goods and services from land in the context of growing populations and a finite resource base is placing significant pressures on farmers and farmland in Ireland and worldwide. Farmers in Ireland with intermediate quality farmland are similarly confronted by multiple, often conflicting demands, because it can support extensive livestock farming; often has high potential for forestry; contains landscapes valued for their biodiversity, recreation and cultural values; and has potential for renewable energy generation and water provision. Policy objectives for different land use types and the services required from the range of agricultural land use intensities in Ireland need to be much clearer. Scotland’s recent development of a land use strategy can provide many lessons for Ireland and highlights the challenges in trying to maximise benefits while minimising the trade-offs in the delivery of multiple services (Slee et al. 2014). The complex policy demands coupled with the heterogeneity of the land base further highlights the need for translation of clear national policy into local initiatives.

Informing Policy
High Nature Value farmland (HNVf) occurs predominantly (though not exclusively) in the west of the country and in upland areas in the rest of the country and has high spatial coincidence with high status water and the head water streams of larger downstream rivers. The management of High Nature Value farmland for biodiversity has the potential to have co-benefits for water quality and quantity (the regulation of flooding and maintaining base flow). Improved co-ordination and spatial targeting of initiatives to High Nature Value farmland could play a major role in meeting both the requirements of the Water Framework Directive and the Birds and Habitats Directives, while delivering other ecosystem services.

Developing Solutions
Different approaches are required to meet Water Framework Directive targets on High Nature Value farmland compared to intensive farmland. In High Nature Value farmland areas there needs to be a focus on promotion of farming activities that meet water and biodiversity objectives rather than focus on mitigation actions that may be required for activities associated with intensive agricultural practices. A framework needs to be developed which maps out a pathway for the development of integrated approaches for the management of our land, water and living resources to ensure sustainable use. There is a real need to expand the range of locally-led integrated catchment/landscape management initiatives which aim to simultaneously provide multiple ecosystem services. These initiatives must take a participatory approach which will encourage an innovative network of stakeholders working in partnership to develop locally-adapted and results-orientated solutions. Success factors for local initiatives such as the Burren Programme highlight the need to secure a broad range of stakeholder involvement and the key role of dedicated community “champions” to take the initiative and drive innovation. A flexible and adaptive management approach which is well researched and knowledge based is needed. This recognises the value of sound science and traditional knowledge. Local initiatives need to be supported by state agencies and government departments with an integrated knowledge transfer/advisory service.
The work of the EPA can be divided into three main areas:

Regulation: We implement effective regulation and environmental compliance systems to deliver good environmental outcomes and target those who don’t comply.

Knowledge: We provide high quality, targeted and timely environmental data, information and assessment to inform decision making at all levels.

Advocacy: We work with others to advocate for a clean, productive and well protected environment and for sustainable environmental behaviour.

Our Responsibilities

Licensing
We regulate the following activities so that they do not endanger human health or harm the environment:
• waste facilities (e.g. landfills, incinerators, waste transfer stations);
• large scale industrial activities (e.g. pharmaceutical, cement manufacturing, power plants);
• intensive agriculture (e.g. pigs, poultry);
• the contained use and controlled release of Genetically Modified Organisms (GMOs);
• sources of ionising radiation (e.g. x-ray and radiotherapy equipment, industrial sources);
• large petrol storage facilities;
• waste water discharges;
• dumping at sea activities.

National Environmental Enforcement
• Conducting an annual programme of audits and inspections of EPA licensed facilities.
• Overseeing local authorities’ environmental protection responsibilities.
• Supervising the supply of drinking water by public water suppliers.
• Working with local authorities and other agencies to tackle environmental crime by co-ordinating a national enforcement network, targeting offenders and overseeing remediation.
• Enforcing Regulations such as Waste Electrical and Electronic Equipment (WEEE), Restriction of Hazardous Substances (RoHS) and substances that deplete the ozone layer.
• Prosecuting those who flout environmental law and damage the environment.

Water Management
• Monitoring and reporting on the quality of rivers, lakes, transitional and coastal waters of Ireland and groundwaters; measuring water levels and river flows.
• National coordination and oversight of the Water Framework Directive.
• Monitoring and reporting on Bathing Water Quality.

Monitoring, Analysing and Reporting on the Environment
• Monitoring air quality and implementing the EU Clean Air for Europe (CAFE) Directive.
• Independent reporting to inform decision making by national and local government (e.g. periodic reporting on the State of Ireland’s Environment and Indicator Reports).

Regulating Ireland’s Greenhouse Gas Emissions
• Preparing Ireland’s greenhouse gas inventories and projections.
• Implementing the Emissions Trading Directive, for over 100 of the largest producers of carbon dioxide in Ireland.

Environmental Research and Development
• Funding environmental research to identify pressures, inform policy and provide solutions in the areas of climate, water and sustainability.

Strategic Environmental Assessment
• Assessing the impact of proposed plans and programmes on the Irish environment (e.g. major development plans).

Radiological Protection
• Monitoring radiation levels, assessing exposure of people in Ireland to ionising radiation.
• Assisting in developing national plans for emergencies arising from nuclear accidents.
• Monitoring developments abroad relating to nuclear installations and radiological safety.
• Providing, or overseeing the provision of, specialist radiation protection services.

Guidance, Accessible Information and Education
• Providing advice and guidance to industry and the public on environmental and radiological protection topics.
• Providing timely and easily accessible environmental information to encourage public participation in environmental decision-making (e.g. My Local Environment, Radon Maps).
• Advising Government on matters relating to radiological safety and emergency response.
• Developing a National Hazardous Waste Management Plan to prevent and manage hazardous waste.

Awareness Raising and Behavioural Change
• Generating greater environmental awareness and influencing positive behavioural change by supporting businesses, communities and householders to become more resource efficient.
• Promoting radon testing in homes and workplaces and encouraging remediation where necessary.

Management and structure of the EPA
The EPA is managed by a full time Board, consisting of a Director General and five Directors. The work is carried out across five Offices:
• Office of Environmental Sustainability
• Office of Environmental Enforcement
• Office of Evidence and Assessment
• Office of Radiation Protection and Environmental Monitoring
• Office of Communications and Corporate Services
The EPA is assisted by an Advisory Committee of twelve members who meet regularly to discuss issues of concern and provide advice to the Board.
Co-benefits for Water and Biodiversity from the Sustainable Management of High Nature Value Farmland

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Prepared for the Environmental Protection Agency

by

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The EPA Research Programme addresses the need for research in Ireland to inform policymakers and other stakeholders on a range of questions in relation to environmental protection. These reports are intended as contributions to the necessary debate on the protection of the environment.
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Executive Summary

Agriculture systems in Europe range from very intensive production on fertile land with high inputs to very extensive High Nature Value (HNV) farmland on marginal land with low inputs. HNV farmland comprises those areas of Europe where agriculture is a major (usually the dominant) land use and where that agriculture supports, or is associated with, either a high level of species and habitat diversity, or the presence of species of European conservation concern, or both. A range of EU policies are targeted at HNV farmland and all EU Member States are required to identify, monitor and support the ecological and economic viability of HNV farmlands. Despite their important role in the delivery of ecosystem services, many of these areas are under threat from abandonment, intensification and land use change.

A broad range of landscape types in Ireland are represented in HNV farmland including extensively farmed uplands, areas of calcareous grassland and limestone pavement, machair/coastal grasslands, the drumlin belt from Clew Bay to Cavan with large areas of wet grasslands, the islands, river floodplains and the Wexford slobs. A national map of HNV farmland likelihood for Ireland at electoral division (ED) scale highlights the varied nature of the agricultural land base. The spatial coincidence of HNV farmland and rivers of good ecological status, and areas with high and very high HNV farmland likelihood, were compared with the distribution of river water bodies of good ecological status (2010–2012). Of the assessed river lengths, 63% of the river water bodies at good status and 79% of the river water bodies at high status occurred in areas with high HNV farmland potential.

Maintenance of high-status water bodies in these areas requires an integrated and targeted approach to the management of HNV farmland to meet the requirements of the Water Framework Directive. The management of HNV farmland for biodiversity has the potential to have co-benefits for water quality and quantity, such as the regulation of flooding and maintaining base flow. Improved co-ordination and spatial targeting of initiatives for HNV farmland could play a major role in meeting the requirements of the Water Framework Directive and the Birds and Habitats Directives.

The spatial heterogeneity in land capacity and the range of intensities of farming in Ireland highlights that approaches need to be locally adapted within a broader framework. There is a real need to expand the range of locally led integrated catchment/landscape management initiatives, which aim to simultaneously provide multiple ecosystem services. Initiatives must take a participatory and partnership approach that will encourage an innovative network of stakeholders working in partnership to develop locally adapted and results-orientated solutions. Furthermore, policy objectives for different land use types and the services required from the range of agricultural land use intensities in Ireland need to be clear. The complex policy demands, coupled with the heterogeneity of the land base, highlight the need for translation of clearer national policy into local initiatives.
1 Introduction

This report looks at the potential synergies between biodiversity and water quality delivery on High Nature Value (HNV) farmland. We describe HNV farmland in an Irish context and discuss the potential co-benefits of HNV farmland for biodiversity and water quality. The objectives of the study were to:

- explain the HNV farming concept;
- describe the distribution of HNV farmland in Ireland and explain the characteristics of HNV farmland in an Irish context;
- show the spatial distribution of HNV farmland in relation to high-status water bodies;
- discuss the support measures available for HNV farming and the potential for design of measures to provide both enhanced biodiversity and water quality in HNV areas.
Explaining the HNV Farmland Concept

2.1 What is HNV Farmland?

Farmland covers almost 50% of the land area in Europe (Eurostat, 2015a), with agriculture systems ranging from very intensive production on fertile land with high inputs to very extensive HNV farmland on marginal land with low inputs.¹ HNV farmland is important for the conservation of species and habitats that depend on low-intensity agricultural systems and for the maintenance of high biodiversity levels outside areas with nature conservation designations (Cooper et al. 2007). Many of these farms are in Areas of Natural Constraint (ANCs). These are often mountainous areas, or areas where natural constraints limit opportunities for intensification, and so land is prone to abandonment (Eurostat, 2013).

In Europe three broad types of HNV farmland have been described (Andersen et al., 2004).

Definition of HNV farmland

HNV farmland comprises those areas of Europe where agriculture is a major (usually the dominant) land use and where that agriculture supports, or is associated with, either a high level of species and habitat diversity, or the presence of species of European conservation concern, or both (Andersen et al., 2004).

- **Type 1 HNV farmland** is farmland dominated by semi-natural vegetation.
- **Type 2 HNV farmland** is farmland dominated by low-intensity agriculture and a mosaic of semi-natural and cultivated land and small-scale features.
- **Type 3 HNV farmland** is farmland supporting rare species or a high proportion of European or world populations of species of conservation concern.

At the farm level, whole, partial and remnant HNV farmland have been described by Keenleyside et al. (2014). In whole farm HNV, the entire farm is a low-intensity system; partial HNV systems occur where there is low-intensity management of some land, alongside intensive practices on other land parcels; and remnant HNV farmland (which is no longer HNV farmland) describes farmland where there are features of high nature value, but its land management is irrelevant to the main farm business, which is based on intensive agricultural production with some abandonment or management for cross-compliance, nature conservation or agri-environment payments from the EU.

2.2 EU Policy Context

All EU Member States are required to identify, monitor and support the ecological and economic viability of HNV farmlands (EEA, 2004). HNV farmland produces many important environmental public goods, such as clean air, clean water, a stable climate, agricultural biodiversity and aesthetic landscapes (Cooper et al., 2009; Lefebvre et al., 2012). As a result of their important role in the delivery of ecosystem services, the identification, monitoring and support of HNV farmland has been a policy requirement for EU countries since 2003 (Beaufoy et al., 2010) as many of these areas are under threat from abandonment, afforestation and intensification (Keenleyside and Tucker, 2010; Terres et al., 2015). HNV farmland extent and quality was one of the original set of agri-environment indicators developed by the European Commission in the late 1990s and remains a key indicator in the Common Monitoring and Evaluation Framework (CMEF) guidelines for the Common Agricultural Policy (CAP) (DG Agriculture, 2006; Eurostat, 2015b). The European Agricultural Fund for Rural Development (EAFRD) established HNV farmland as a key priority of axis 2 for Rural Development Programmes from 2007 to 2013 (CEC, 2006; EC, 2013). The current rural development

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regulations of the CAP (2014–2020) further solidify the important role of HNV farmland, where they include the restoration and preservation of biodiversity in HNV farmland within one of the six EU priorities for rural development [Council Regulation (EC) No 1305/2013].

HNV farmland straddles both agricultural and biodiversity policies in Europe. The EU Biodiversity Strategy aims to halt the loss of biodiversity and ecosystem services by 2020, and target 3 of the strategy specifically aims to show measurable improvement in the provision of ecosystem services and conservation of species and habitats depending on, or affected by, agriculture and forestry (EC, 2011a,b). In the 2015 Commission assessment of progress in implementing the EU Biodiversity Strategy, HNV farmland and organic farming were highlighted as examples of EU farming systems that contribute to maximising the agricultural area covered by biodiversity measures while providing socio-economic benefits (EC, 2015a). The assessment highlighted that the overall trends continue to be a cause for serious concern, but that there are many local improvements as a direct result of good agricultural practices and biodiversity measures under the CAP; the report cited in particular agri-environment measures and measures for Natura 2000 sites. It stated that these examples carry an important message on the achievability of the 2020 biodiversity target, but they need to be spread wider to achieve measurable results at the EU level (EC, 2015b). In order to achieve the goals of the biodiversity strategy, the assessment highlighted the role of the integration of biodiversity targets into Member State CAP Rural Development Programmes and also noted the benefits of biodiversity for improving water management (EC, 2015a).

2.3 HNV Farmland in Ireland

A broad range of landscape types in Ireland are represented in HNV farmland. One such important landscape class is upland areas, dominated by semi-natural vegetation such as blanket bog, wet heath and acid grassland (commonage is a major component of farming systems in these regions). It is important to note that “upland-type” semi-natural vegetation (dry and wet heaths, blanket bog, grasslands dominated by *Molinia, Nardus* and *Festuca/Agrostis*, acid grasslands) extends to sea level in western Ireland due to the wet climate. Other key HNV farmland landscape types include areas of calcareous grassland and limestone pavement, machair/coastal grasslands, the drumlin belt from Clew Bay to Cavan with large areas of wet grasslands, the islands, river floodplains and the Wexford slob.s

Since the early 2000s, there have been a number of initiatives on HNV farmland in Ireland (Figure 2.1). These started with the 7th European Forum on Nature Conservation and Pastoralism (EFNCP) conference in Ennistymon, County Clare, entitled “Recognising European pastoral farming systems and understanding their ecology: a necessity for appropriate conservation and rural development policy”. Following this, work commissioned by the Heritage Council highlighted the need for HNV farmland in Ireland to be defined,
delimited and targeted for support (Jones et al., 2003). This coincided with the instigation of the BurrenLIFE project, a 5-year EU LIFE Nature project focusing on a HNV farmland landscape in County Clare (Dunford et al., 2010). A PhD project examining the nature value of farmland in areas outside designated areas in east Galway (Sullivan, 2010) and two PhD projects examining the nature value of farmland in the north-west of Ireland (Boyle, 2015; Hayes, 2015) were carried out. The Heritage Council provided funding to the EFNCP to undertake work on HNV farmland; a number of reports have arisen from this work (McGurn, 2010, 2011; McGurn and Moran, 2010). Currently, the Institute of Technology, Sligo, is one of 13 EU participants in a recently funded Horizon 2020 network project, called HNV Learning, Innovation and Knowledge (Link), which began in April 2016. The HNV Link project aims to develop a network dedicated to supporting HNV farmland, focusing on innovations that simultaneously improve “socio-economic viability” and “environmental efficiency” (see www.hnvlink.eu). The IDEAL-HNV project, which began in 2013, was the first Irish national-scale project set out to identify the distribution and extent of HNV farmland throughout the country. Alongside these projects, HNV farmland was incorporated as a specific target in Ireland’s Rural Development Programme (RDP) 2006–2013, under axis 2. Support was mainly targeted at agri-environment action-based measures for commonages and Natura 2000 areas.

Furthermore the need to develop criteria to identify HNV farmland and measures to address threats was highlighted under target 5 of Ireland’s Biodiversity Action Plan for 2011–2016 (DAHG, 2010), which aimed to optimise the use of opportunities under agriculture, rural development and forest policy to benefit biodiversity.

Official reporting to the EU on the total area of HNV farmland in Ireland still uses the EEA/JRC figure of 1.1 million ha (Paracchini et al., 2008), generally thought to represent farmland areas dominated by Natura 2000 and commonage areas, which impacts on the policy supports for these areas as identified above. The IDEAL-HNV project produced a national map of HNV farmland likelihood for Ireland (Matin et al., 2016). Using five variables available at a national scale, a map of HNV farmland likelihood was created at a tetrad (2 × 2 km) scale, and was then scaled up to electoral division scale. The variables used were:

1. CORINE\(^3\) land cover data split into five classes and scaled 1–5 as a representation of farmed semi-natural vegetation; resultant classes were arable and permanent crops, shrub, pasture, unfarmed and farmed semi-natural land (water, forest, rock, and built areas excluded in analysis);
2. average stocking density;
3. hedgerow density;
4. river and stream density;
5. soil diversity.

Variables 1 and 2 were given greater weight, as they are considered more influential in the identification of HNV farmland than the remaining variables. This decision was based on existing research (Sullivan, 2010; Boyle, 2015) and expert opinion. The map represents only HNV farmland potential and must be interpreted within the limitations of the data used to produce it (see Figure 2.2). The colour assigned to the grid indicates the likelihood of finding HNV farms in this area. However, regardless of the colour assigned to an area, there may be a range of farms, from intensively to extensively managed, within the region.

Research into the types of HNV farmland in Ireland identified six distinct types (Sullivan et al., forthcoming). This research also considered the links between the Irish types of HNV farmland and the existing HNV farmland typologies described in Europe (see Figure 2.3). The six types described were:

1. *Whole HNV farmland with no commonage.* The majority of farms in this subtype occurred in the Burren, although coastal farms with high proportions of sand dunes or machair would also be included in this category. Most of these farms had high proportions of dry, semi-natural grasslands and low stocking densities. Semi-natural habitat cover was very high (~75%), stocking density was low (~0.6 LU/UAA, livestock units per hectare of utilisable agricultural area) and field boundary density was often low (~100 m/ha).

2. *Small whole HNV farmland.* These farms had very high cover of semi-natural habitats (both

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\(^3\) Co-ORdinated INformation on the Environment (CORINE) is a standardised data series compiled by the EU.
Figure 2.2. HNV farmland likelihood on an electoral division (ED) scale. From Matin et al. (2016). Green shades indicate high likelihood of having HNV farmland, yellow indicates intermediate likelihood of having HNV farmland and blue shades indicate low likelihood of having HNV farmland.

Figure 2.3. The types of HNV farmland in Ireland (based on research carried out for the IDEAL-HNV project).
Benefits from the Sustainable Management of HNV Farmland

grasslands and peatlands). Many of these farms also included shares in commonage. These farms were all small and included all the island farms. Semi-natural habitat cover was very high (~80%), stocking density was low (~0.50 LU/UAA) and field boundary density was very high (~300 m/ha).

3. **Large whole HNV farmland.** These farms were all quite large (> 100 ha) and had very high semi-natural habitat cover. Peatlands were very common on these farms and many of them had shares in commonage. The stocking density was very low on these farms, as was the field boundary density (which is not unusual for farms with high peatland cover). Semi-natural habitat cover was very high (~90%), stocking density was very low (~0.30 LU/UAA) and field boundary density was low (~90 m/ha).

4. **Whole HNV commonage farmland with agriculturally improved grassland.** This category was similar to the other whole HNV subtypes described here, but these farms had lower proportions of semi-natural habitats. The majority of these farms also had shares in commonage. Unlike many of the other types described here, they had higher cover of improved agricultural grassland and slightly higher stocking densities. Semi-natural habitat cover was high (~70%), stocking density was low (~0.70 LU/UAA) and field boundary density was medium (~185 m/ha).

5. **Partial HNV farmland.** Partial HNV farmland has a high cover of semi-natural habitats (such as wet grassland or peatland) but, unlike whole HNV farmland, can also have a significant cover of improved agricultural grassland. Farmland in this category also often has semi-improved grassland (fields that have been fertilised or drained in the past but are now rush dominated and prone to poaching). This type of farmland occurs where there is a mixture of grassland intensities in a landscape such as in County Leitrim, east Mayo and east Galway. Semi-natural habitat cover was medium (~55%), stocking density was low (~0.70 LU/UAA) and field boundary density was high (~210 m/ha).

6. **Aggregate HNV farmland.** This type of farmland was found in the Shannon Callows. Each individual farm had a lower proportion of semi-natural habitat cover than whole or partial HNV farmland, but these smaller proportions made up part of the whole floodplain, which is nationally very important for wet grassland, hay meadows and wading bird breeding. Semi-natural habitat cover was low to medium, stocking density was medium and field boundary density was medium.

This research was not a comprehensive inventory of all types of HNV farmland in Ireland but aimed to cover the main types that occur. Type 2 HNV farmland (section 2.1) in particular was not evident from the IDEAL-HNV fieldwork but may occur where extensive organic systems are in place and is not included in the six types described above. Type 3 HNV farmland would also be overlooked by fieldwork, as it relates to populations of species that are nationally or internationally important but would preferentially select more intensively farmed land. Areas used by overwintering geese and swans are a good example of type 3 HNV farmland in Ireland; this HNV farmland is quite easily identified using National Parks and Wildlife Service species distribution data.

Ireland as a whole appears to have a good mix of semi-natural vegetation and more intensive food production areas, resulting in a good national balance between provisioning and regulatory ecosystem services. This was highlighted in a 2015 EU study on the links between ecosystem service supply and semi-natural vegetation in agricultural land in Europe (García-Feced et al., 2015). However, this masks regional differences within Ireland as evident in the HNV map (Figure 2.2) and overlooks serious threats to HNV farmland and resultant knock-on consequences for ecosystem service supply. Threats to HNV farmland include:

- land abandonment;
- land use change such as afforestation (note that semi-natural woodland and woody vegetation are an important component of HNV farmland landscapes but change of land use from semi-natural vegetation to monoculture coniferous plantations has consequences for biodiversity);
- farm intensification and polarisation (both intensification and abandonment in different areas of one farm).
In essence, the picture of sustainable resource management and ecosystem service supply is very different when viewed on different scales, from country to region to farm level. In particular, the risk of land abandonment in the Border, Midlands and West regions of Ireland is classified as one of the highest in the EU due to low farm incomes, remoteness, low population densities and ageing farmer populations (Terres et al., 2015). Much of this stems from the inadequate support for HNV farmland, and, in particular, the fact that regulatory ecosystem services are not rewarded by the market, putting HNV farmland at a further disadvantage to conventional intensive farm and forestry land use.

Ireland’s RDP 2014–2020 identifies that the HNV concept is still not fully established in Ireland (DAFM, 2015). HNV farmland was included under priority 4 of the new RDP programming structure, which aims to restore, preserve and enhance ecosystems related to agriculture and forestry, with a particular focus on the following areas: (a) biodiversity, including Natura 2000 sites and areas facing natural constraints, HNV farmland and the state of European landscapes; (b) water management; and (c) soil management (EC, 2013). Measures included in the €4 billion RDP 2014–2020 are outlined in Figure 2.4. While none of these are solely targeted at restoring, preserving or enhancing HNV farmland, the measures relating to agri-environment and climate and ANCs would be of particular relevance. Ireland’s locally led agri-environment schemes (LLAES) proposal in the current RDP (2014–2020) has significant potential to bring innovative solutions to bear to ensure sustainable land management. It was specifically targeted at meeting the requirements of the EU Birds (2009/147/EC), Habitats (92/43/EEC) and Water Framework (2000/60/EC) Directives, and has a total budget over the programme period of €70 million; many of the priority areas identified for the implementation of this proposal would be considered HNV farmland areas.

The LLAES measures included in the RDP were designed to complement the national Green Low-Carbon Agri-environment Scheme (GLAS).

![Figure 2.4. List of measures included in Ireland’s RDP 2014–2020. GLAS, Green, Low-Carbon, Agri-Environment Scheme; TAMS, Targeted Agricultural Modernisation Schemes.](image-url)
GLAS is a traditional action-based approach that pays farmers to undertake particular actions that are linked to cross-cutting objectives of climate change, water quality and biodiversity. The LLAES aim to address specific environmental and biodiversity challenges not addressed at the national level through GLAS. It is envisaged that this will include both schemes addressing centrally identified priorities and an open competitive call. All priorities will be linked to implementation of the EU Birds, Habitats and Water Framework Directives. The centrally identified priorities include the continuation and expansion of the Burren programme; priority freshwater pearl mussel catchments; and hen harrier areas. LLAES aim to encourage locally derived solutions and will require submission of proposals by local groups. The only theme currently identified for the competitive call in the RDP is the conservation/restoration of upland peatlands. At the moment it looks like, as a minimum, there will be LLAES developed for the Burren, freshwater pearl mussel catchments, hen harrier areas and upland peatlands.

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4 The previous programme is known as the BurrenLIFE project (2005–2010).
3 Water Quality and HNV Farmland

3.1 Water Quality and Agriculture

Agriculture has a significant impact on water quality (Harding et al., 1999; Moss, 2008; OECD, 2012); the intensity of agriculture in turn has a major influence on this impact. Catchments that are close to pristine conditions, i.e. dominated by natural or semi-natural vegetation, put less pressure on water quality than areas that are more intensively farmed (Harding et al., 1999; Moss, 2008). However, it must be noted that the relationship between intensity of land use and impact are not straightforward (Doody et al., 2012). Several decades of research into the relationship between agriculture, water quality and quantity within catchments has influenced policy. This has led to greater understanding of the driving forces–pressures–state–impact–response (DPSIR) pathways; and the establishment of the catchment/watershed, as the unit of management and evaluation of local, regional, national and international water policies (Jordan et al., 2012). The focus of water monitoring and management is often on the larger downstream channels of rivers, but the health of these larger downstream channels is dependent on maintaining good or high ecological status in headwater streams (McGarrigle, 2014). First- and second-order streams cover 77% of the river channel network in Ireland and, of those monitored, 30% failed to meet good ecological status, highlighting the need for an integrated catchment management approach (McGarrigle, 2014). The need for a more integrated approach is further emphasised by the persistent pressure from diffuse agricultural pollution and the limited success in addressing the decline in ecological status of rivers across Europe (OECD, 2012). Balancing the management of landscapes dominated by agriculture to achieve profitable agriculture while ensuring the sustainability of water resources and enhancing biodiversity is a major challenge and raises multiple “resource dilemmas” (Jordan et al., 2012). The heterogeneity of land capacities for production, susceptibility to pollution and ecological sensitivity requires a targeted, risk-based and integrated approach to protect sensitive areas while maintaining/enhancing food production (McGonigle et al., 2012), which is of particular importance in an Irish context given the varied nature of the agricultural land base, as emphasised by the map of HNV farmland likelihood produced by the IDEAL-HNV project (see Figure 2.2). Water quality and food production goals need to be cognisant of, and set in the wider context of, the general need for a more integrated approach to natural resource management in agricultural landscapes (Bathgate et al., 2009).

3.2 Watercourses and Farmland

Watercourses (i.e. rivers, streams and drainage ditches) are an important component of Irish farmland. There are very few farms in Ireland that do not have some linear water feature as a component of their field boundaries (with the exception of some farms over karst limestone areas). Drainage ditches are common in intensively farmed reclaimed land areas. While drainage ditches and streams are common in areas with poorly draining soils, they can also be present in conjunction with other field boundary types, such as hedgerows or earth banks (Table 3.1). In the south- and mid-east of Ireland (Counties Cork, Waterford, Kilkenny, Carlow, Wexford, Wicklow and Meath) 48% of 294 km of field boundaries recorded on 50 farms were defined as watercourses (Sheridan et al., 2011). In east Galway drainage ditches, streams and rivers made up at least 18% of 286 km of field boundaries surveyed on 32 farms (Sullivan et al., 2013). And in north-western Ireland (Mayo, Sligo and Leitrim) drainage ditches, streams and rivers comprised 15% of 461 km of field boundaries on 60 farms (Boyle, 2015).

Drainage ditches and streams were very common components of field boundaries on the farms surveyed for the IDEAL-HNV project. Drainage ditches and streams, together with features that contained some portion that was water, made up 18% of 882 km of field boundaries surveyed on 102 farms in Counties Leitrim, Cork, Clare, Galway, Westmeath, Offaly, Mayo, Wicklow, Donegal and Waterford (Table 3.1). Management of this extensive network of watercourses on Irish farmland is key to management of water resources in Irish farmland.
3.3 Water Resources and HNV Farmland

Most HNV farmland is dominated by semi-natural vegetation, and the intensity of agriculture in these areas is low. HNV farmland predominantly occurs in the west of the country and in upland areas in the east (Figure 2.2). On a national level, water quality also varies across the country. For example, the nitrates levels at 180 river sites in 2008 showed average levels in the south-east to be generally much higher than those in the west (EPA, 2009). In order to compare the coincidence of HNV farmland areas with the distribution of good-status water bodies in Ireland using the ArcGIS geographic information system, the EDs with high and very high HNV farmland likelihood were extracted from the HNV farmland likelihood map (Figure 2.2) and merged to give one polygon. This polygon was overlaid on the river water bodies ecological status layer from the EPA geoportal (EPA, 2009; data available at http://gis.epa.ie). The intersecting area was extracted and the proportion of good-status water bodies within HNV farmland areas was calculated based on the total good-status water bodies in Ireland. Over half (53%) of the good-status water bodies in Ireland (EPA 2007–2009 data; available at http://gis.epa.ie) occurred in areas with high HNV farmland potential. Given that the HNV farmland potential area is 40% of the land mass of Ireland (Figure 3.1a), it is likely that HNV farming practices are not impacting water quality to the same extent as conventional farming, although further research would be necessary to verify this. This assertion is supported when the river bodies whose ecological status has been assessed by the Environmental Protection Agency (EPA) are considered. The most recent data (2010–2012) show that, of the assessed river lengths, 63% of the good-status river water bodies and 79% of the high-status river water bodies occurred in areas with high HNV farmland potential (Table 3.2).

Maintenance of high-status water bodies in these areas requires an integrated and targeted approach to the management of HNV farmland to meet the requirements of the Water Framework Directive. The decline in high-status water bodies in Ireland is a key concern highlighted by the EPA (White et al., 2014).
Many of these are located in upper parts of larger catchments and made up of lower order streams and, as highlighted above, the catchments are dominated by HNV farmland. Relatively low-intensity activities are important for their maintenance and major threats include drainage, fertilisation, one-off housing, forestry and wind farm developments, and animal access to water (White et al., 2014). The sensitive nature of these catchments and the need for management of HNV farmland to be cognisant of water resource issues are highlighted by the fact that very low-level changes can impact negatively on sensitive high-status waters. Given that additional measures may be required to reduce the impacts of farming and forestry in these sensitive catchments (White et al., 2014) there is a clear need to differentiate between the potential impacts of different types of farming and their spatial distribution within the catchment. In particular, support of extensive farming practices will be key in sensitive areas identified as potential risks for nutrient export to sensitive water bodies. White et al., (2014) noted that, nationally, 689 river water bodies (15%), 320 lake water bodies (39%), 15 transitional

Figure 3.1. Spatial coincidence between HNV farmland and ecological status of river water bodies. (a) High potential HNV farmland areas (scaled up to ED scale and merged); (b) river water body ecological status 2010–2012; and (c) high potential HNV farmland areas only with river water body ecological status.
(estuarine) water bodies (8%) and 29 coastal water bodies (27%) were classified as high status by the EPA based on Water Framework Directive data from 2007–2009. It was further noted that high-status catchments have little or no capacity for further intensification and need farm-specific management to maintain high-status sites (White et al., 2014).

The relationship between water quality and agricultural practices in HNV farmland areas is further emphasised in the work carried out on the Lough Melvin catchment. This area is dominated by HNV farmland and highlights that particular issues can still arise in catchments dominated by HNV farmland related to sedimentation and phosphorous loads. Multiple EU and national water protection strategies have failed to prevent the decline in water quality in the Lough Melvin catchment where agriculture is extensive but is estimated to contribute 62% of the phosphorous load to the lake (Doody et al., 2012). The work highlighted that an appropriate catchment-specific approach to the Water Framework Directive is essential. Specifically, individual fields within a HNV landscape can still be quite intensively managed resulting in build-up of soil phosphorus on improved agricultural grassland areas of catchment. HNV areas need as much expertise in “precision” nutrient management as intensively farmed areas. The Lough Melvin study showed that there is high connectivity to water bodies in HNV farmland areas. High stream density, poorly drained gley soils and a high density of artificial field drains introduced following grant aid in the 1970s means that there is medium to high risk to water quality at Lough Melvin (Doody et al., 2012). This high connectivity is similar to the other HNV farmland areas (see section 3.1). There is a clear need for integrated strategies that are adapted to the range of farmland types in Ireland, from HNV farms through to medium- and low-nature value (intensive) farms.

Research from the BurrenLIFE project in a very different catchment, dominated by karst limestone, highlighted the risks to water quality in HNV farmland areas despite the general low intensity of the agricultural practices. A risk of nutrient export model was developed as part of the BurrenLIFE project. This evaluated the “pressure strength” posed by agricultural activity and tested a framework for classifying risk of nutrient export at the field level. Comparison of different farming systems in terms of their risk of nutrient transfer enabled the assessment of the potential of proposed changes to existing farming systems under BurrenLIFE to lower the risk of nutrient export to water. Results highlighted the potential of the BurrenLIFE farming project as a conservation model to reduce the risk of nutrient transfer to water. The BurrenLIFE programme is currently being rolled out as part of the LLAES under Ireland’s RDP 2014–2020. Its specific objectives are to ensure the sustainable agricultural management of HNV farmland; to contribute to the positive management of landscape and cultural heritage; and to contribute to improvements in water quality and water usage efficiency in the Burren region (see www.burrenprogramme.com). This work highlights that solutions can be found and implemented where an integrated approach to natural resource management is locally adapted and results orientated.

Table 3.2. River bodies whose ecological status has been assessed, the length of the river body associated with the assigned status and the proportion of that river length in areas with high HNV farmland potential

<table>
<thead>
<tr>
<th>River body status</th>
<th>Total length in Ireland (km)</th>
<th>Length in HNV farmland areas (km)</th>
<th>Proportion of total length in Ireland in HNV farmland areas (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bad</td>
<td>185.55</td>
<td>108.22</td>
<td>58.33</td>
</tr>
<tr>
<td>Poor</td>
<td>7399.52</td>
<td>3990.81</td>
<td>53.93</td>
</tr>
<tr>
<td>Moderate</td>
<td>13,213.16</td>
<td>6220.16</td>
<td>47.08</td>
</tr>
<tr>
<td>Good</td>
<td>26,622.34</td>
<td>16,742.30</td>
<td>62.89</td>
</tr>
<tr>
<td>High</td>
<td>9288.32</td>
<td>7321.74</td>
<td>78.83</td>
</tr>
<tr>
<td>Total</td>
<td>56,708.89</td>
<td>34,383.25</td>
<td>60.63</td>
</tr>
</tbody>
</table>

Trade-offs and synergies between agroecosystem services are a fundamental issue for the management of natural resources. Farming systems differ widely in terms of the use of resources, degree of intensification, species and orientation of production, local/regional socio-economic and market context, cultural roles, etc., and differentiation between livestock farming systems is required in an analysis of sustainability (Bernués et al., 2011). Depending on the environmental setting, the supply of multiple ecosystem services can arise from deliberate management of homogeneous landscapes/catchments or from inherent spatial heterogeneity in the landscape, but in either case the management of ecosystem services and biodiversity should be implemented as bundles rather than as individual targets (Crouzat et al., 2015). Linking biodiversity- and water-related ecosystem services (water quality and quantity) is challenging, as pressures on river ecosystem services will grow as land use intensifies, water demands increase and climate change accelerates over the coming decades (Durance et al., 2016). Strong “co-production” partnerships with a broad range of stakeholders need to be developed and nurtured to effectively deliver a range of ecosystem services (Durance et al., 2016). Co-ordinated approaches and appropriate management at multiple scales is required to provide multiple benefits, both for biodiversity- and wider water-related ecosystem services (Rhymer et al., 2010), and needs to be implemented through an integrated catchment/landscape management approach. It is also essential to recognise the inherent trade-offs and synergies between different ecosystem services (Power, 2010) from the outset.

4.1 Potential for Biodiversity and Water Services Delivery from HNV Farmland

The co-benefits associated with biodiversity and water quality have been noted across a number of studies, with a range of targets from riparian margins to lowland farmland birds to invertebrates (Bradbury and Kirby, 2006; Bradbury et al., 2010; Cole et al., 2012; Christen and Dalgaard, 2013; Delattre et al., 2013). In order to halt biodiversity decline, existing biodiversity areas needed to be supplemented with additional areas. Areas currently managed for water provision have potential to accrue additional benefits to biodiversity and vice versa (Chan et al., 2006). In terms of water regulation, catchment-scale flood risk management is currently popular among policymakers (Kenyon et al., 2008; Rouillard et al., 2015) and has the potential to simultaneously improve water quality, increase biodiversity and reduce flood risk. The Water Framework Directive river basin management plans, CAP cross-compliance and new agri-environment and climate strategies have been suggested as means of promoting co-benefits in flood risk management (Rouillard et al., 2015). Studies on catchments dominated by peatlands provide examples of what is possible in this regard. Damaged peatlands can negatively affect delivery of water-related ecosystem services, and there is evidence for rapid ecological responses in aquatic ecosystems to peatland restoration, related to reduced suspended solid loads and further deterioration in water quality (Martin-Ortega et al., 2014). Studies in the Exmoor area of the UK have shown the long-term benefit of peatland restoration for a range of ecosystem services, such as a reduction in carbon losses and improvement of water provision. These benefits can be offset against the costs of restoration in the long-term (Grand-Clement et al., 2013). Restoration of Exmoor peatlands resulted in one-third less water leaving the moorland during heavy rainfall over a 3-year period (see http://www.upstreamthinking.org/index.cfm?articleid=10828). This is particularly relevant in the context of Ireland, given the increased rainfall and flood events seen in recent years. Other test catchments in the UK – Eden, Wensum and Avon catchments – also hope that the mitigation features put in place will have multiple benefits for pollution retention, flooding, carbon sequestration, habitat creation and biodiversity (Owen et al., 2012). The Eden catchment is an upland catchment (www.edendtc.org.uk) with a range of farming intensities; some areas within the catchment would be considered
HNV farmland. Key diffuse pollution pressures identified here include fine sediment and phosphorus. The Exmoor partnership (between South West Water, the Devon Wildlife Trust, the Cornwall Wildlife Trust, the West Country Rivers Trust and the Exmoor National Park Authority) has led to the development of the upstream thinking initiative, which combines local farmers’ and partners’ knowledge to improve water quality at source. The initiative is targeted at moorland and semi-natural vegetation (i.e. HNV farmland) and has shown proven benefits for water quality and regulation (see http://www.upstreamthinking.org/index.cfm?articleid=8692). Researchers on the Working Wetlands project in central Devon (see http://www.exmoormires.org.uk/index.cfm?articleid=8691) have also shown how areas maintained for biodiversity (Culm grasslands – unimproved wet grasslands dominated by Molinia caerulea and rush pasture) have benefits for water regulation. It was highlighted that 11 times more water leaves intensively managed grasslands than Culm grasslands during storms. Many HNV landscapes in Ireland are dominated by wet grasslands and peatlands and could have the potential to deliver the same degree of ecosystem services in terms of water regulation and water quality.

The delivery of improved water quality and other water-related ecosystem services, while maximising the synergistic effects with biodiversity, requires the development of programmes that are locally targeted and results orientated. In the Irish context the new LLAES measure designed to complement national agri-environment measures such as GLAS and GLAS+ (DAFM, 2015) may be the vehicle to pilot such measures, particularly on upland peatlands dominated by HNV farmland. It is envisaged that LLAES will encourage the development of bespoke projects to meet specific environmental challenges at a local level. However, it must be noted that agri-environmental measures differ in their capacity to simultaneously provide multiple ecosystem services and can be hampered by individual administrations predominately focused on a single environmental objective (Galler et al., 2015). Developing integrated multifunctional measures may also be hampered by a lack of knowledge of management effects on different ecosystem services, and a spatially targeted allocation of agri-environmental measures is necessary (Galler et al., 2015) to maximise the resources in areas where provision of multiple ecosystem services is possible. Galler et al. (2015) also note that although the EU directives emphasise potential synergies with other environmental objectives (for example, the EU Water Framework Directive refers to Natura 2000 and the Habitats Directive), implementation concepts and measures are not well co-ordinated between the individual regional administrations and synergies and trade-offs between environmental objectives are insufficiently considered. Measures for climate change mitigation and safeguarding biodiversity are generally considered multifunctional and can simultaneously contribute to both water quality conservation and erosion prevention (Galler et al., 2015). It is also noted by Galler et al. that, where large areas of the agricultural land were not included in biodiversity measures, the synergies with other ecosystem services, such as climate change and water services, were reduced. This highlighted the potential of large contiguous areas of HNV to deliver multiple benefits in terms of ecosystem services. These climate change and biodiversity measures are considered the most costly because of the required changes in land use and extensive restrictions on use (Galler et al., 2015), which is the case in intensive farming areas. However, the implementation cost may not be as high in HNV farmland areas as extensive farming practices are already in place. Measures with improved spatial targeting directed at water quality and regulating flooding, in combination with maintenance and enhancement of existing HNV farming systems (and associated biodiversity features) could deliver multiple benefits. The combination of wider ecosystem services into river basin management plans in an integrated catchment management approach could be a mechanism to move from a single- to a multi-objective decision-making approach in the design and prioritisation of management actions (Terrado et al., 2016).

There is a real need for integrated strategies that are adapted to the range of farming systems that exist (extensive whole HNV through to intensively farmed land) to realise co-benefits for water and biodiversity while maintaining essential production services such as food and fibre provision. As highlighted in section 2.3, we must recognise that in many areas there may be a range of farm types along the HNV–intensive farmland spectrum and, even within HNV farms, there will be a range of intensities between fields, which highlights the need for targeting of measures at various spatial scales from field to catchment or landscape.
5 Conclusions and Recommendations

Predominantly, HNV farmland occurs in the west and upland areas of the country and has high spatial coincidence with high-status water and the headwater streams of larger downstream rivers. The management of HNV farmland for biodiversity has the potential to have co-benefits for water quality and quantity, such as the regulation of flooding and maintaining base flow. Improved co-ordination and spatial targeting of initiatives for HNV farmland could play a major role in meeting the requirements of the Water Framework Directive and the Birds and Habitats Directives. Different approaches are required to meet Water Framework Directive targets on HNV farmland compared with intensive farmland. In HNV farmland areas there needs to be a focus on the promotion of farming activities that meet water and biodiversity objectives, rather than a focus on mitigation actions that may be required for activities associated with intensive agricultural practices. A framework needs to be developed that maps out a pathway for the development of integrated approaches for the management of our land, water and living resources to ensure sustainable use.

The spatial heterogeneity in land capacity and the range of intensities of farming in Ireland from low-intensity HNV farmland to intensive farming systems highlights that approaches need to be locally adapted within a broader framework. There is a real need to expand the range of locally led integrated catchment/landscape management initiatives, which aim to simultaneously provide multiple ecosystem services. These initiatives must take a participatory and partnership approach that will encourage an innovative network of stakeholders working in partnership to develop locally adapted and results-orientated solutions. Success factors for local initiatives, such as the Burren Programme, highlight the need to secure a broad range of stakeholder involvement and the key role of dedicated community "champions" to take the initiative and drive innovation. Initiatives need to be targeted to specific areas, locally adapted and focused on results. A flexible and adaptive management approach that is well researched and knowledge based is needed; this recognises the value of sound science and traditional knowledge. Local initiatives need to be supported by state agencies and government departments with an integrated knowledge transfer or advisory service.

We need to be cognisant of the wider policy setting and, in particular, the growing demand for a wide range of private and public goods and services in the context of growing populations and a finite resource base. Scotland's recent development of a land use strategy can provide many lessons for Ireland and highlights the challenges in trying to maximise benefits while minimising the trade-offs in the delivery of multiple services (Slee et al., 2014). In Scotland, as in Ireland, many of the areas dominated by HNV farmland are designated for nature and landscape conservation and the most productive farmland has a clear focus on food production. However, as can be seen in Figure 2.2, we have a very diverse range of land types in Ireland, as in Scotland, and many areas do not neatly fit into either of the two extremes. The so-called squeezed middle (Slee et al., 2014) in Scotland (corresponding to the light green and yellow areas in Figure 2.2 in Ireland) are the areas with many competing land use pressures leading to land use conflict. These land use conflicts are experienced across the spectrum in Ireland, but at least at the two extremes the policy objectives can be clearer. Scotland's land use strategy recognises that the best agricultural land should be prioritised mainly for agricultural production, and that at the other extreme the land with limited options for productive agricultural use is valued more for public goods and ecosystem services, such as landscape amenity and biodiversity and as a carbon store. Many of the additional demands for land-based ecosystem services fall on the intermediate-quality farmland zone (Slee et al., 2014). The farmers in these areas in Ireland are similarly confronted by multiple, often conflicting demands, as the farmland can support extensive livestock farming; often has high potential for forestry; contains landscapes valued for their biodiversity, recreation and cultural values; and has potential for renewable energy generation and water provision. Policy objectives for different land use types
and the services required from the range of agricultural land use intensities in Ireland need to be much clearer. The complex policy demands, coupled with the heterogeneity of the land base, further highlight the need for translation of clear national policy into local initiatives.
References


DAFM (Department of Agriculture, Food and the Marine), 2015. Ireland – Rural Development Programme (National) version 1.4. DAFM, Dublin.


EC (European Commission), 2011a. Communication from the Commission to the European Parliament, the Council, the Economic and Social Committee and the Committee of the Regions “Our life insurance, our natural capital: an EU biodiversity strategy to 2020”. COM(2011) 244 final, Brussels.


# Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANC</td>
<td>Areas of Natural Constraint</td>
</tr>
<tr>
<td>CAP</td>
<td>Common Agricultural Policy</td>
</tr>
<tr>
<td>CMEF</td>
<td>Common Monitoring and Evaluation Framework</td>
</tr>
<tr>
<td>DPSIR</td>
<td>Driving forces–pressures–state–impact–response (pathways)</td>
</tr>
<tr>
<td>EAFRD</td>
<td>European Agricultural Fund for Rural Development</td>
</tr>
<tr>
<td>ED</td>
<td>Electoral division</td>
</tr>
<tr>
<td>EFNCP</td>
<td>European Forum on Nature Conservation and Pastoralism</td>
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<tr>
<td>EPA</td>
<td>Environmental Protection Agency</td>
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<tr>
<td>GLAS</td>
<td>Green Low-Carbon Agri-environment Scheme</td>
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<tr>
<td>HNV</td>
<td>High Nature Value</td>
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<tr>
<td>Link</td>
<td>Learning, Innovation and Knowledge</td>
</tr>
<tr>
<td>LLAES</td>
<td>Locally led agri-environment schemes</td>
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<tr>
<td>RDP</td>
<td>Rural Development Programme</td>
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</table>
Is féidir obair na Gníomhaireachta a roint ina trá phríomhреiméise:

Rialú: Déanaimid córais éifeachta a rialaithe agus comhlionta comhshaoil a chur i bhfeidhm chun thoradh maithe comhshaoil a sholáthar agus chun díreach orthu staid nach gcleóim leis na córais sin.

Eolas: Soláthraimid sonraí, fásnéis agus meastaimh comhshaoil atá ar ardcaighdeán, spróidhdiriuith agus tráthúil Chun bonn eolais a chur faoin gcinntear air a gach teach.

Tacaíocht: Bimid as saothrú i gcomhar le grúpaí eile chun tacú le comhshaoil atá glan, táirgíuí agus cosantat go maith, agus le hioimpar a chur fíidh ar le comhshaoil inbhuanaithe.

Ár bhFreagrachtáin

Ceadúnú Déanaimid na gníomhaiochtaí seo a leanas a rialú ionsach nach ndéanann siad dochar ar sláinte ón phobail ná don chomhshaoil:

- saoairí drámaíola (m.sh. láithreáin lioinata talún, loiseoireí, stáisiúin aisteirí drámaíola);
- gníomhaiochtas tionscalaíoch ar scála móir (m.sh. déantaíochta cógáistíochta, déantaíochta stroighne, stáisiúin chumhlaicheadh);
- an dianalmhacht (m.sh. maaca, éanlaith);
- úsáid shrianta agus scoailleadh rialaithe Orgáinach Géinmhodhnaithe (OGM);
- foinsí radóin (m.sh. trealamh x-gha agus radatóirír, foinsí tionsclaíoch);
- áiseanna móra stórála peitrile; forbartha, an uisce agus na sinbhuanaitheachta.

Forfheidhmiú Náisiúnta i leith Cúrsaí Comhshaoil

- Clár náisiúnta inúchtaí agus cigreachtaí a dhéanamh gach bliain air shaoirí agus bhfuil ceadaimh ón nGníomhaireacht acu.
- Maoirseacht a dhéanamh a fhreagrachtáin comhshaoil na n-údarás áitiúil.
- Caighdeán oilse a bhíonn an eolaíocht agus an bhall toilteach a dhéanamh a bhfuil ceadaimh ón nGníomhaireacht acu.
- Mhórphleananna forbartha a thabhairt a thionchar agus a fhás a chur i bhfeidhm.

Bainistíocht agus Tuairisciú a dhéanamh ar gComhshaoil

- Monatóireacht, Anaílis agus Tuairiscíú ar gComhshaoil
  - Monatóireacht a dhéanamh ar chúl a chuid a aithniú agus a eoláidh mar chomhphléimh uilchearachd mar mhuintir na hÉireann. Táimid tionscanta do dhaoine agus don chomhshaoil a chosaint ó éifeachteachta diobhaisca a raibh liom na táirgí a dhéanamh an gComhshaoil.

Rialú Astóichoata na nGás Ceaptha Teasa in Éirinn

- Fardail agus réamh-mheachascháin na hÉireann a fhorbairt a chur i bhfeidhm.
- An Traidisiúnta Astóichoata a chur i bhfeidhm i gcomhair breis agus 100 de na táirgíorí dé-ocsaíde gabháin in Éirinn.

Taighde agus Forbairt Comhshaoil

- Taighde comhshaoil a chustoich sin brúna a shaítheacht, bhfuil eolais a chur i bhfeidhm as iarracht a bheith níos éifeachtúil ar acmhainní.

Coiste Comhairle a chur ar fáil don Rialtas maidir le hábhair a dhéanamh ar ábhair imní agus le comhairle a chur ar fáil cáil. Tá an ghníomhaireacht a dhéanamh ar chuid de na rialacháin atá i bhfeidhm, ach tá na rialacháin atá inbhuanaithe a bhíonn ina ndóigh le clochtaí an phobail ná don chomhshaoil.
Identifying Pressures

The growing demand for a wide range of public goods and services from land in the context of growing populations and a finite resource base is placing significant pressures on farmers and farmland in Ireland and worldwide. Farmers in Ireland with intermediate quality farmland are similarly confronted by multiple, often conflicting demands, because it can support extensive livestock farming; often has high potential for forestry; contains landscapes valued for their biodiversity, recreation and cultural values; and has potential for renewable energy generation and water provision. Policy objectives for different land use types and the services required from the range of agricultural land use intensities in Ireland need to be much clearer. Scotland’s recent development of a land use strategy can provide many lessons for Ireland and highlights the challenges in trying to maximise benefits while minimising the trade-offs in the delivery of multiple services (Slee et al. 2014). The complex policy demands coupled with the heterogeneity of the land base further highlights the need for translation of clear national policy into local initiatives.

Informing Policy

High Nature Value farmland (HNVf) occurs predominantly (though not exclusively) in the west of the country and in upland areas in the rest of the country and has high spatial coincidence with high status water and the head water streams of larger downstream rivers. The management of High Nature Value farmland for biodiversity has the potential to have co-benefits for water quality and quantity (the regulation of flooding and maintaining base flow). Improved co-ordination and spatial targeting of initiatives to High Nature Value farmland could play a major role in meeting both the requirements of the Water Framework Directive and the Birds and Habitats Directives, while delivering other ecosystem services.

Developing Solutions

Different approaches are required to meet Water Framework Directive targets on High Nature Value farmland compared to intensive farmland. In High Nature Value farmland areas there needs to be a focus on promotion of farming activities that meet water and biodiversity objectives rather than focus on mitigation actions that may be required for activities associated with intensive agricultural practices. A framework needs to be developed which maps out a pathway for the development of integrated approaches for the management of our land, water and living resources to ensure sustainable use. There is a real need to expand the range of locally-led integrated catchment/landscape management initiatives which aim to simultaneously provide multiple ecosystem services. These initiatives must take a participatory approach which will encourage an innovative network of stakeholders working in partnership to develop locally-adapted and results-orientated solutions. Success factors for local initiatives such as the Burren Programme highlight the need to secure a broad range of stakeholder involvement and the key role of dedicated community “champions” to take the initiative and drive innovation. A flexible and adaptive management approach which is well researched and knowledge based is needed. This recognises the value of sound science and traditional knowledge. Local initiatives need to be supported by state agencies and government departments with an integrated knowledge transfer/advisory service.