

**Irish National Review of Biodiversity Research, that addresses topics
from objective 2 of the EU Communication COM (2006) 216.**

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Introduction

In May 2006, the EU Commission produced an action plan to halt biodiversity loss by 2010, document EU COMM (2006) 216. Unlike its predecessors, the latest plan does not provide any laws protecting species or habitats, but tries to assign responsibilities concerning the implementation of existing legislation. Although the policy framework for the protection of habitats and species is already in place and instruments such as the Common Agricultural Policy (CAP) and Common Fisheries Policy (CFP) have been reformed to take better account of habitats and species, the pace and extent of implementation has been insufficient and much of the EU biodiversity is still severely threatened. To help remedy this situation this action plan identifies four policy areas:

- Biodiversity in the EU
- The EU and global biodiversity
- Biodiversity and climate change
- The biodiversity knowledge base

The annexes to this action plan provide a framework for actions at EU and member state level. The topic of this review is to examine three priority areas that come under Objective 2 of Annex 1. This objective is: "To conserve and restore biodiversity and ecosystem services in the wider EU countryside [outside NATURA 2000 areas]". These three priority areas relate to actions A2.1.3, A2.1.4 and A2.1.8 (not A2.1.7 as stated in the guidelines for this report).

Biodiversity research that contributes directly to the sustainable use of biodiversity in Europe – The Irish view.

The Biodiversity Knowledge Programme for Ireland published by the Irish National Platform for Biodiversity Research in 2006 provides a clear and concise biodiversity research programme for Ireland designed to address the many gaps in biodiversity knowledge, which will be required to underpin all areas of environmentally based legislation both at a National and European level.

This knowledge programme noted that the sustainable management of Ireland's biodiversity would be a key contribution to future social and economic development across all sectors, because many of Ireland's key economic sectors are either directly or indirectly dependent on biological resources (agriculture and forestry occupy over 70% of Ireland's total land mass). This report highlighted a number of areas where research was required to fill knowledge gaps in relation to the economic and social needs for the sustainable use of biodiversity in Ireland, and while the review did not consider Europe as a whole, many of the issues relating to Ireland are applicable to the wider EU countryside.

It is noteworthy that one of the areas highlighted within the knowledge programme was the need for multidisciplinary research projects that would target biodiversity

conservation, policy and societal needs. This recommendation, among others within the report is currently being acted on by funding agencies in Ireland. The BioChange project, a large multidisciplinary, multi institutional research project, addressing the areas of biodiversity conservation, policy and social awareness was the first project to be funded as a direct result of this publication

Many of the research areas indicated by this programme have a direct relationship to the actions of the Technical Annex to EU COMM (2006) 216. In this context, the three priority areas listed below provide an overview of the **research needs** required to address the question “What biodiversity research contributes directly to the sustainable use of biodiversity in Europe- in the context of EU COMM (2006) 216?”

1. Define criteria in order to capture all farm and forest land of high value for biodiversity, identify high-nature-value (HNV) areas, develop measures to address threats.

Within Ireland we believe that research relating to the following areas should be further prioritised.

- While research into the identification of hot spots that have a high biodiversity value in Ireland is being carried out by several projects e.g. BioChange and BioForest along with surveys being carried out by the National Parks and Wildlife Service, further work is required in this area.
- Long-term studies of habitats within intensively managed anthropogenic environments (agriculture, forestry, fisheries) should be established. Currently funding opportunities generally only allow for a three year term of research and valuable study areas are not further investigated after this period.
- Landscape analysis of the impact of the abandonment of traditional patterns of land use and farming systems on biodiversity in economically marginal areas should be further addressed to enhance projects (e.g. Burrenlife) already contributing to this area.

2. Ensure CAP National Strategy Plans and National and Regional Rural Development Plans (RDPs) reflect the requirement to ensure effective implementation of cross-compliance (which provides a baseline for most of the measures of Axis 2 of the Rural Development Regulation) in ways that benefit biodiversity

While a small number of projects contribute to this action, they are largely as a result of studies designed to develop methods to assess the effectiveness of policy instruments implemented to fulfill Ireland’s compliance with issues relating to CAP reform and RDPs. Further dedicated research would greatly enhance the effectiveness of these measures.

- Predictive tools for evaluating the likely impact of CAP, CFP and other measures and policies on biodiversity such as current research examining the effectiveness of the REPs scheme. Further research to assess the effectiveness of the Farm Plan Scheme, especially in commonages outside of designated areas are also required.

- Studies to evaluate the impacts, compatibilities and conflicts between government policies and biodiversity objectives and economic practice, such as ongoing research being carried out by a sub project within the larger BioChange project.
- Further identification of policy blind spots and methods that might be used to resolve policy conflicts.

3. Develop indicators and monitoring schemes.

A number of research projects and monitoring schemes are currently being devised or operated to establish baseline monitoring systems and the development of indicators at various levels of biodiversity assessment. However, further research to target the areas listed below would greatly enhance the capability to mitigate against negative impacts on the sustainable use of biodiversity in Ireland.

- Develop Indicators of biodiversity and ecosystem health.
- Develop early warning systems for the identification and detection of non-native species.
- Implement and continue to develop standardized methodologies for monitoring and evaluating biodiversity trends as CAP reform takes place. An example would be to use the indicators proposed by the European Environment Agency and adopted at the Malahide Stakeholders Conference in May 2004 and subsequently welcomed by the EU Council.

Other reviews independently conducted in Ireland such as Sustainable Development Research in Agriculture: Gaps and Opportunities for Ireland (Matthews, 2003) and Forestry and the National Heritage – a review of the Heritage Council’s forestry policy (Hickie, 2002) reaffirm many of the research priorities outlined in the *Biodiversity Knowledge Programme for Ireland*.

A synopsis of Irish research projects and how they relate to COM (2006) 216 follows. A number of the projects documented relate to one or more of the priority topics listed above and in such cases they were classed within the most relevant policy area. The COM (2006) 216 headline target for the purpose of this review primarily relates to the identification of actions and measures that will halt biodiversity loss by 2010 and show substantial recovery by 2013, therefore projects were selected based on their capacity to assist in the delivery of this target whether they took place prior to 2007 or will be on-going through 2007-2010.

Research summary

*Which research carried out or currently under way in your country has been supporting major topics of the EU Communication?
What are the main results?*

Objective 2: To conserve and restore biodiversity and ecosystem services in the wider EU countryside.

Headline target: In the wider EU countryside (terrestrial, freshwater, brackish water outside NATURA 2000 network) biodiversity loss halted by 2010 and showing substantial recovery by 2013.

High value farmland and forest areas (Action A2.1.3)

ACTION: Define criteria and identify [2006-07] *high-nature-value farmland and forest areas* (including the Natura 2000 network) threatened with loss of biodiversity (with particular attention to extensive farming and forest/woodland systems at risk of intensification or abandonment, or already abandoned), and design and implement measures to maintain and/or restore conservation status [2007 onwards].

Community level action: Evaluate extent to which Common Agricultural Policy (CAP) National Strategy Plans and National RDPs reflect this need - encourage adjustments where necessary.

Member states action: Define criteria in order to capture all farm and forest land of high value for biodiversity, identify HNV areas, develop measures to address threats.

Table 1: Irish research projects that address Action A2.1.3

| Research Project | Project summary/ Aims | Related action area | Results |
|---|--|---|--|
| BioForest (2001-2005) Funding organisation: EPA/COFORD | <ul style="list-style-type: none"> Develop methodologies for biodiversity assessment and identify indicator species in important habitats that might be subject to afforestation. Assess the range of biodiversity in representative forests at different stages of the forest cycle. Review and recommend opportunities for enhancement of biodiversity in plantation forests. Assess the importance of open space to forest biodiversity, and how the management of open space can enhance biodiversity. Assess the effectiveness of the <i>Forest Biodiversity Guidelines</i> and recommend alterations where necessary. | <ul style="list-style-type: none"> Define criteria in order to capture all farm and forest land of high value for biodiversity. Identify HNV areas. | <ul style="list-style-type: none"> Assessments of biodiversity at different stages of the forest cycle, including items related to forest planting, management and assessment in preparation afforestation. A Review of Existing Practice in Ireland and Best Practice Overseas in relation to biodiversity assessment in Preparation for afforestation Recommendations from findings of extensive survey of open spaces within forests (BIOFOREST Project) |

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| | | | Investigation of Experimental Methods to Enhance Biodiversity in Plantation Forests). |
| BurrenLIFE (2004-2009) Funding organisation: EU LIFE (Nature) | <p>Develop a new model for sustainable agriculture in the Burren in order to conserve the habitats of the region designated under the Habitats Directive. To achieve this, an ambitious work programme has been developed and approved by the European Commission for EU LIFE Nature Funding. A range of diverse but complimentary Project Actions has been developed, including:</p> <ul style="list-style-type: none"> • Implementing best-known management practices on 2,000ha of the Burren, including new feeding systems and redeployment of existing livestock and targeted scrub removal. • Increasing understanding of the relationship between land management practices and the natural heritage of the Burren. • Developing new support mechanisms for the sustainable management of the Burren habitats through research and advisory services, marketing initiatives, co-operative structures and the revision of existing agri-environmental schemes. • Enhancing awareness and skills relating to the heritage of the Burren and its management through a range of practical initiatives aimed at empowering local communities. • Disseminating information relating to the agricultural management of areas of high nature and cultural conservation value in Europe through literature and the media. | <ul style="list-style-type: none"> • Develop measures to address threats | <p>Expected results</p> <ul style="list-style-type: none"> • The maintenance or enhancement of the conservation status of the habitats on 2,000ha (minimum) of Burren farmland and of the wetland habitats associated with the Project sites, now termed 'LIFE farms' • The development and support of a new model for 'Conservation Agriculture' in the Burren • Greater awareness and understanding of the heritage of the Burren and how to manage it • Better understanding of issues relating to the management of areas of high nature value like the Burren |
| Identification of HNV farmland areas in western Ireland with specific reference to grasslands. Funding organisation: Teagasc | <ul style="list-style-type: none"> • Select a region representative of low-intensity farming that lies outside core SAC areas- use GIS technology to map the main sites of high and low biodiversity within the region. • Use a ground truthing approach to focus on grassland and grade this for biodiversity • Within a representative sub-sample obtain management information from land-owners and obtain land-owners' | <ul style="list-style-type: none"> • Identify HNV areas. | <ul style="list-style-type: none"> • Identification of HNV farmland areas in western Ireland with specific reference to grasslands. |

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| | <p>opinions on HNV implementation.</p> <ul style="list-style-type: none"> • Improve the decision-making capacity of policymakers in relation to HNV areas. Oct 2005-Oct 2007 | | |
| <p>People and Nature Funding organisation: Galway Rural Development, The Heritage Council and the Galway County Heritage Forum</p> | <p>This project is a partnership between Galway County Council and NUI Galway.</p> <ul style="list-style-type: none"> • Public Awareness and Participation: To foster a greater awareness and understanding of natural heritage by the local community, and encourage local people to become actively involved in the promotion, preservation and enhancement of the local natural heritage. • Biodiversity Audit and Data Inventory: To inventory natural heritage in the region, and compile natural heritage information and data in an accessible and updateable format • Promoting Knowledge: Increase the knowledge of biodiversity in County Galway through supporting and promoting research in the county. • Biodiversity Action Plan: To be developed and implemented in consultation with stakeholders, the BAP will set out our priorities and actions to promote and protect biodiversity in the county in the coming years. | <ul style="list-style-type: none"> • Identify HNV areas. • Develop measures to address threats. | <ul style="list-style-type: none"> • Create public awareness • Inventory of natural heritage • Production of biodiversity action plans |
| <p>BioChange (2005-ongoing) Funding organisation: EPA</p> | <p>BioChange is an integrative, multi-disciplinary research framework to support national and local biodiversity policy in Ireland. Core research within the cluster directly addresses the protection and management of ecological resources in the context of pressures that might lead to environmental change by focusing on habitat fragmentation and loss, impacts on non-native species, climate change, pollution and resource management. BioChange will provide an Irish framework to address the most significant biodiversity policy in Europe - halting the decline of biodiversity by 2010.</p> <p>The aims of the project include:</p> <ul style="list-style-type: none"> • Develop fundamental biodiversity research and build capacity in taxonomic skills, as well as developing biodiversity indicators and biomonitoring tools. • Investigate the effects of habitat loss and fragmentation on wetland, pond, woodland and grassland habitats, examine the role of habitat mosaics in maintaining biodiversity in fragmented landscapes, and provide tools for predicting the effects of changes in habitat quantity and configuration on | <ul style="list-style-type: none"> • Develop measures to address threats | <p>This project has just come to the end of its first year and no results are available at this early stage.</p> |

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| | <p>the biodiversity of semi-natural habitats.</p> <ul style="list-style-type: none"> • Examine biological invasion by non-native species in the study region and assess impacts on biodiversity, interactions between non-native species and climate change, and make predictions on future environmental change facilitated by non-native species. • Review the range of likely pollutants of Irish aquatic habitats and potentially applicable biomonitors, bioindicators and indicators of biodiversity or conservation status. Select those most likely to be effective, undertake research to test their effectiveness for selected habitats and taxonomic groups and establish a strategic agenda to assess their effectiveness for others. <p>Other areas of this project will target the production of inventories and output of taxonomic data and the understanding of socio-economic processes, including public participation that shape biodiversity policies.</p> | | |
| <p>National Survey of Native Irish Woodlands (2003-ongoing) Funding organisation: National Parks & Wildlife Service</p> | <ul style="list-style-type: none"> • Create a database of Irish native woodlands in Microsoft Access ® and ArcView ® GIS. • Provide an appraisal of the applicability of current woodland classification systems. • Facilitate a systematic evaluation of the conservation value and the regeneration status of Irish woodlands. | <ul style="list-style-type: none"> • Identify HNV areas. • Define criteria in order to capture all farm and forest land of high value for biodiversity. | <ul style="list-style-type: none"> • Identification of HNV woodland areas. • Assessment of biodiversity associated with specific woodlands. <p>Further results will be available on project completion.</p> |
| <p>WaterAC (2002-2005) Funding organisation: COFORD</p> | <p>To provide objective scientific information to help determine and contribute to management practices that could prevent or ameliorate impacts of some forest operations on acidification of aquatic systems. This is being addressed through studies at a regional scale, catchment scale, and riparian or river reach scale. Specific targets are:</p> <ul style="list-style-type: none"> • To further test the utility of the Sodium Dominance Index (SDI) as a measure of the acid sensitivity of running water systems and as a tool for evaluating the impact of forestry on acidity of streams. • To determine biological indicators within the SDI. <p>To review the literature on the efficacy of buffer strips as a means of reducing impacts of acidification on stream chemistry and biological communities.</p> | <ul style="list-style-type: none"> • Develop measures to address threats. | <ul style="list-style-type: none"> • Identification of indicators. • Recommendations on management practices to prevent impacts of specific forest operations. |

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| <p>The role of field margins in the formed landscape: form, function and biodiversity. (2002-2004) Funding organisation: Teagasc (Walsh Fellowship)</p> | <p>To investigate field margins for biodiversity</p> | <ul style="list-style-type: none"> • Results will indirectly allow the identification of HNV areas | <ul style="list-style-type: none"> • Assessment of the biodiversity of field margins. • Conclusions as to the role of field margin biodiversity on landscape form and function. |
| <p>Influence of riparian diversity on the biodiversity and functioning of stream ecosystems. (2002-2003) Funding organisation: ERI</p> | <p>The aim of this study was to relate riparian landscape and vegetation patterns to plant species richness. This is the first study in Ireland showing the internal heterogeneity of the riparian landscapes along low order streams. This is also the first attempt to investigate the relationships between landscape indices and plant species richness/vegetation composition in riparian zones.</p> | <ul style="list-style-type: none"> • Results will indirectly allow the identification of HNV areas | <ul style="list-style-type: none"> • Assessment of the biodiversity of stream ecosystems. • Correlations between stream biodiversity and landscape indices. |
| <p>Sustainable settlement in Ireland. (2002-ongoing.) Funding organisation: EPA</p> | <p>To develop methodologies for the estimation of sustainable settlement size and to provide a detailed and inclusive analysis of the relationship between Irish settlements and sustainable development</p> | | <p>Project on-going, no results currently available</p> |
| <p>Biodiversity of agricultural field drains. (2004-ongoing) Funding organisation: IRCSET</p> | <p>To study the biodiversity associated with filed drains in agricultural systems.</p> | <ul style="list-style-type: none"> • Results will indirectly allow the identification of HNV areas | <p>Project on-going, no results currently available</p> |

Influence of national plans of CAP implementation on biodiversity, including aspects of cross-compliance (Action A2.1.4)

ACTION: Ensure effective implementation of *cross-compliance* (which provides a baseline for most of the measures of Axis 2 of the Rural Development Regulation) in ways that benefit biodiversity [2007-2013].

Community level action: Evaluate extent to which CAP National Strategy Plans and National RDPs reflect this need - encourage adjustments where necessary.

Member states action: Ensure CAP National Strategy Plans and National and Regional RDPs reflect this need.

Table 2: Irish research projects that address Action A2.1.4

| Research Project | Project summary/ Aims | Related action area | Results |
|--|--|--|--|
| Traditional cereal varieties conservation (ongoing) | The Irish Genetic Resources Conservation Trust together with the Irish Seedsaver Association and the Trinity College Botanic Gardens are currently engaged in the in-situ and ex-situ conservation of traditional Irish cereal varieties | Aids in the mitigation of some of the negative impacts of agriculture | |
| Farmlands birds project (2003-2005) Funding organisation: Department of Agriculture and Food through the Research Stimulus Fund of the National Development Plan and the Heritage Council | This project, conducted by BirdWatch Ireland and University College Cork (UCC), aimed to assess the impact of the Rural Environment Protection Scheme (REPS) on breeding and wintering bird population on farmland. The information collected will be used to improve agri-environment measures in the future, to enhance their potential benefits for biodiversity. | Cross-compliance with REPS | <ul style="list-style-type: none"> • Assessment of the impact of the REPs scheme on bird biodiversity • Recommendations for the enhancement of bird diversity through agri-environment measures. |
| Quantifying the environmental responses of agricultural production systems. Funding organisation: Teagasc | This programme is identifying potential problem areas, possible corrective actions to improve environmental performance and potential costs of implementing necessary changes. The programme also includes a new research project on the biodiversity of farmed landscapes and a new project on the measurement and modelling of greenhouse gas fluxes. | <ul style="list-style-type: none"> • Cross compliance with axis 2 | <ul style="list-style-type: none"> • No Published results |
| Integrated modelling of nutrient efficiency and biodiversity. 2004 Funding organisation: Teagasc | | <ul style="list-style-type: none"> • Cross compliance with axis 2 | No Published results |

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| <p>Factors influencing phosphorus loss from grassland soil to water (1995-1998). Funding organisation: Teagasc</p> | <p>This project examined phosphorus (P) loss from soil to water under field conditions. In addition two International Workshops on P loss to water, held in Ireland in 1995 and 1998, are also covered under this project.</p> | <ul style="list-style-type: none"> • Cross compliance with axis 2 | <ul style="list-style-type: none"> • A positive relationship between soil test P levels and P loss to water was established.. • There is need for further work to establish the relative contribution of the different variables involved in P loss from soil to water for different soils and farming conditions. • This research should help provide answers to the most sustainable methods to minimise losses of P to water and ensure that agricultural production is compatible with good water quality. |
| <p>Commonage Framework Plans</p> | <p>Research carried out for the production of management plans for commonage has led to the identification of some HNV areas, many of which are outside of NATURA 2000</p> | <ul style="list-style-type: none"> • Results will help to identify HNV areas • Cross compliance with axis 2 | <ul style="list-style-type: none"> • Management plans for 440,000 hectares of commonage |

Develop indicators and monitoring schemes (Action A2.1.8)

Action: Implement the Common Monitoring and Evaluation Framework and Strategic Environmental Assessment (SEA) Directive requirements where applicable, for rural development programmes, including the definition of indicators in a way the impact of measures on biodiversity is assessed.

Community level action Evaluate the extent to which MS have used the mandatory indicators and the appropriateness and adequacy of their additional programme specific indicators.

Member state action: Use mandatory indicators, and draw up additional programme-specific indicators as needed.

Table 3: Irish research projects that address Action A2.1.8

| Research Project | Aims and objectives | Related action areas | Results |
|--|---|--|---|
| Identification of Environmental Variables for Use in Monitoring for the Evaluation of the Rural Environment Protection Scheme (REPS) (Teagasc) | <p>The aim of this study was to identify and select quantitative environmental attributes for a monitoring programme that may be integrated into an environmental evaluation of Ireland’s agri–environmental scheme. This was achieved primarily by reviewing a range of agri–environmental indicators and suggesting indicators that would be appropriate for monitoring the Rural Environment Protection Scheme (REPS).</p> <p>The study conducted a desk review to collate information on current best practice in monitoring for environmental quality. A Project Group (comprising representatives from the Environmental Protection Agency (EPA), Department of Agriculture and Food (DAF), Teagasc, and the project supervisors) advised on the ongoing development of the project. There was a consultation process with national experts, and with a selection of stakeholder organizations with an interest in monitoring the environmental impact of the REPS.</p> | <ul style="list-style-type: none"> • Developing indicators • Also linked to environmental cross-compliance with REPS | <ul style="list-style-type: none"> • Identification of indicators to measure the efficacy of the REPs scheme in relation to conservation of the rural environment. |
| Ag-Biota (2000-2005) EPA | <p>This project was conducted by UCD, Teagasc and University College Limerick. Its scope included monitoring, functional significance and management tools for the maintenance and economic utilisation of biodiversity in the intensively managed earth landscape. The main aims were</p> <ul style="list-style-type: none"> • To establish a national network of monitoring sites and initiate the development of scientifically-valid tools for the assessment of floral and faunal diversity in agricultural systems, and to devise appropriate protocols for the longer-term monitoring of biodiversity in Irish agriculture. • To identify of the key management factors that define or limit biodiversity within contrasting farming systems, by | <ul style="list-style-type: none"> • Monitoring • Indicators | Full project results are due shortly. |

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| | <p>assessing the impact of alternative husbandry practices that are under existing experimental comparison at Teagasc Research Centres.</p> <ul style="list-style-type: none"> To investigate the influence of husbandry practice on crop pest and disease incidence, and the ecological function of potentially beneficial populations within production systems, in order to develop management strategies for a more effective agronomic utilisation of biodiversity within the agro-ecosystem. <p>To investigate the practical consequences of reduced biodiversity within the agro-ecosystem and test fundamental ecological theories about biological diversity, community structure, ecological function and species redundancy.</p> | | |
| EPA Soil and Subsoil Mapping Project | The primary objective of this project was the continued development and delivery of soil and subsoil/parent material maps for the remainder (i.e. areas not previously mapped through the Irish Forest Soils project - FIPS-IFS) of the country as proposed by the Groundwater Working Group (under the auspices of the WFD Co-ordination Group). This objective is being met by extending the research and mapping efforts as specified and delivered under the FIPS-Irish Forest Soils project to the remaining areas of the country which were not previously mapped by that project. | <ul style="list-style-type: none"> Indicators | <ul style="list-style-type: none"> Produce indicators of the likely distribution of particular habitats throughout Ireland. Descriptions and maps of the soils in the survey area. The production of a land cover map. |
| Countyside Bird Survey (1998-ongoing) Funding organisation: National Parks and Wildlife Service. | To monitor population trends for widespread bird species in Ireland | <ul style="list-style-type: none"> Monitoring | Inventory of species and habitat preferences. |
| BIOSCAPES. (2001-2004) | Use of GIS to select indicators of biodiversity in a lowland agricultural landscape undergoing coniferous afforestation | <ul style="list-style-type: none"> Indicators | <ul style="list-style-type: none"> |

Conclusions

The majority of biodiversity research in Ireland, that addresses topics from objective 2 of the EU Communication COM (2006) 216 has occurred incidentally as part of larger studies rather than being specifically targeted at these topics. This is not surprising as many of these research projects were designed, funded and in many cases completed, prior to the publication of this communication. However, it is encouraging that Irish researchers have in many cases pre-empted the communication and identified the same priority actions as worthy of research. The *Biodiversity Knowledge Programme for Ireland* has also addressed the three priority topics of this review, along with many other research recommendations that are also actions of the annex to the communication. It is encouraging to note that these recommendations are being taken on board by Irish funding agencies.

A number of gaps still exist in relation to addressing the three priority areas of the communication. Specifically, research is required to directly target the identification of High Nature Value farmland outside of the NATURA 2000 network and to develop measures to address threats to these areas. Research to develop indicators and monitoring schemes for these areas is also required. Further research to enhance and better develop the REPs and the Farm Plans Scheme as a real contribution to biodiversity loss is also required.

Objective 2 (Action A2.1.3)

Member states action: Define criteria in order to capture all farm and forest land of high value for biodiversity, identify HNV areas, develop measures to address threats.

The majority of biodiversity research projects that relate to high nature value areas have chosen study sites within the NATURA 2000 network. However, many of the results of these projects (e.g. the identification of indicators, measures to address threats and development of monitoring schemes) could in many cases, be applied to areas outside of NATURA 2000.

Little research has been directly conducted at defining criteria to capture all farm areas of high value for biodiversity or identifying high nature value areas. The exception being research related to forestry and woodlands (e.g. the BioForest project and the National Survey of Native Woodlands). The majority of research projects that do address these issues have to a large extent resulted from studies assessing other areas of biodiversity.

Objective 2 (Action A2.1.4)

Member states action: Ensure CAP National Strategy Plans and National and Regional RDPs reflect this need.

The Rural Environment Protection Scheme (REPs), is a scheme designed to reward farmers for carrying out farming activities in an environmentally friendly manner and to bring about environmental improvement on existing farms.

The objectives of the scheme are to:

- Establish farming practices and production methods that reflect the increasing concern for conservation, landscape protection and wider environmental problems.
- Protect wildlife habitats and endangered species of flora and fauna.
- Produce quality food in an extensive and environmentally friendly manner.

While the scheme itself does not represent research, a number of research studies have taken place or are ongoing to assess the real effect the REPs scheme has contributed to or may be developed to better enhance biodiversity on Irish Farms

Objective 2 (Action A2.1.8)

Member states action: Use mandatory indicators, and draw up additional programme-specific indicators as needed.

A number of projects focus on the development of indicators as part of wider basic biodiversity studies (e.g. Ag-BIOTA, BioForest and BioChange). Others directly target the development of indicators for specific areas (e.g. particular habitats and species). Monitoring programmes, largely driven by EU legislation within NATURA 2000 areas are ongoing. However there is a paucity of monitoring schemes designed or being implemented outside of the NATURA 2000 network and it is unlikely that this situation will change in the foreseeable future.

General

As stated in the Biodiversity knowledge programme for Ireland “The effective implantation of environmental policy depends not only on an understanding of the underlying ecological science, but also on a wider appreciation of, and justification of, the educational, economic and social benefits of environmental conservation measures.... Environmental policies success only if they receive public acceptance and support. Key to this success is the effective dissemination of relevant information to a variety of audiences.” With this in mind, gaps in the following areas of research need to be addressed to ensure actions A2.1.3, A2.1.4 and A2.1.8 among other actions of the annex can be effectively implemented:

Generic research

- Sociological studies of public attitudes and perceptions should be carried out in the areas of Agriculture, food production systems, Food costs and resource management practices (pollution prevention) including sectoral analysis.
- Qualitative studies aimed at understanding how people think about nature, what changes they see taking place during their lifetime, and how they experience those changes in their daily lives should be undertaken.

Sectoral analysis

- Predictive tools for evaluation the likely impact of the CAP and other measures and policies on biodiversity.
- Socio-economic interdisciplinary study of stakeholder's attitudes, motives, awareness values and behaviors in different farm typologies.
- Cultural and historical studies of biodiversity.

Communication and education

- In order to improve awareness of biodiversity of major biodiversity issues we need to undertake research that will identify and develop methods of communication of biodiversity awareness at public and stakeholder level.
- Assess the impact of biodiversity measures on society.
- Develop and improve the teaching of biodiversity at primary, post primary and third level.
- Investigate what resources the state requires to manage and communicate effectively about obligations relating to lands designated for conservation

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