

Project number: 6503
Funding source: Teagasc

Date: September 2019
Project dates: Oct 2013-Jun 2019

Enhancing Biodiversity on intensively managed ecosystems



Key external stakeholders:

Policymakers
 Agri-environmental researchers and NGOs
 Farmers

Practical implications for stakeholders:

Opportunities for policymakers to promote biodiversity include: recognising (ineligible) farmland habitats that are currently not protected or recognised under cross-compliance. This study shows that many 'ineligible' habitats are present on Irish farms, particularly more extensive farms (where their cumulative area is substantial), and they could make a considerable contribution to biodiversity protection.

The implementation of Ecological Focus Areas is not expected to have a substantial impact on biodiversity. A high percentage area of habitats were deemed ineligible as EFA under current prescriptions. The limited application of EFA and omission of ineligible habitats from inclusion as EFAs may result in a reduction in quantity and quality of these habitats.

The ecological quality of sampled habitats, both hedgerows and field margins, was found to be low. This could have implications for their capacity to support wider biodiversity and associated ecosystem services (e.g. water quality and carbon storage).

The low quality could be associated with the lack of 'quality objectives' within Cross Compliance. An opportunity to promote biodiversity would be to incorporate quality criteria within Cross Compliance instead of only focusing on the quantity of (a limited number of) habitats. Thus, future objectives could focus on attaining threshold levels of habitat quality. A results-based approach could also be applied in relation to the assessment of habitat quality and payment structure.

Main results:

This study provides an overview of the extent of semi-natural habitat and EFA on intensively managed farms in Ireland, including an assessment of the quality of two of the most frequently occurring habitats i.e. hedgerows and field margins. General conclusions from this study include the following:

1) Almost 10% of the total area of intensive farms within this study comprised habitats beneficial for wildlife, with linear features such as hedgerows, buffer strips and drainage ditches accounting for 43% of the total area of wildlife habitat surveyed.

2) Hedgerows and field margins in the study sample were found to be common on surveyed farms, but many had low ecological quality. Thus, they would be unlikely to reach their full capacity to support wider biodiversity and associated ecosystem services.

3) The limited application of EFA and omission of ineligible habitats from inclusion as EFAs may result in a reduction in quantity and quality of these habitats.

4) The habitats that experts considered as ecologically least important for retention within an agricultural landscape were those prioritised for inclusion in Irish EFA legislation; in contrast, more ecologically important habitats were currently ineligible for either EFA or other CAP measures.

Opportunity / Benefit:

This research suggests a number of opportunities to improve the environmental performance of future policy instruments targeting farmland biodiversity, as follows:

- Undertake assessments of habitat quality
- Expand the list of eligible habitats for inclusion in EFA
- Fully assess the environmental benefits of production-based EFA
- Consider revision of weighting and conversion factors to better reward more biodiversity-rich habitats
- Improved clarity of environmental objectives
- Include habitat quality in design of policy measures
- Consider results-based approaches to improve habitat quality

Collaborating Institutions:

University College Dublin

Teagasc project team: Dr. Daire Ó hUallacháin (PI)
Dr. John Finn
Dr. Julie Larkin (PhD Student)

External collaborators: Dr Helen Sheridan (UCD)

1. Project background:

Changes in land use within the past century have led to a reduction in the abundance, diversity and quality of semi-natural agricultural habitats, resulting in a loss in biodiversity and a reduction in associated ecosystem service provision. The 2013 reform of the Common Agricultural Policy included, for the first time, mandatory agri-environment measures (excluding cross-compliance) under Pillar 1. These new measures came under the heading of 'Greening' and saw the introduction of Ecological Focus Areas (EFA) which are landscape features and practices intended to "safeguard and improve biodiversity on farms" (EC, 2013). This study investigated the extent of existing EFA (and other habitats) present on intensively managed farms (tillage, beef and dairy) in Ireland in addition to assessing the quality of two frequently occurring semi-natural habitats (hedgerows and field margins). Furthermore, farmer and expert perception of the implementation and functioning of agri-environment measures (in particular the EFA measure) was evaluated. Comprehensive farm scale data relating to the extent and quality of habitats is a necessary tool for the evaluation of the ability of agricultural landscapes to support biodiversity and provide ecosystem services.

2. Questions addressed by the project:

The research presented within this project aimed to investigate:

1. the quantity of semi-natural habitats on a sample of intensively managed Irish farming systems
2. the quantity of potentially eligible EFA habitats on intensively managed Irish farming systems
3. the quality of specific habitats within intensively managed Irish farming systems
4. farmer and expert perception of the implementation of agri-environmental legislation

3. The experimental studies:

Four experimental studies were undertaken during the project

1. *The quantity of semi-natural habitats on intensively managed Irish farming systems*

Habitat surveys were completed on 119 intensively managed farms across three farming enterprises (tillage, beef and dairy) in Ireland to estimate the extent of EFA and other farmland habitats. All farms were visited between April 2013 and August 2017. For each farm, a habitat survey conducted in line with best practice guidelines was undertaken.

2. *The quality of specific habitats within intensively managed Irish farming systems*

A total of 92 farms were selected across the three main farming systems; tillage (n=38), beef (n=29) and dairy (n=25) for habitat quality assessments.

Quality of Hedgerows

Between 4 and 6 hedges were randomly selected on each farm. All selected hedgerows were adjacent to cropped (arable and pastoral) land; thus, no garden/ornamental hedges were surveyed. Botanical species diversity data was recorded from two, non-concurrent, randomly located 30m strips within each hedge. Farms were surveyed in the summer months between May 2015 and August 2017. Hedgerow assessment followed the Hedgerow Appraisal System methodology (Foulkes *et al.*, 2013). This system was chosen because it provides a comprehensive evaluation of hedgerow quality.

Quality of field margins

Six hedgerows were randomly selected from each farm and the vegetation of the field margins adjacent to these was assessed using quadrats. For each of the six randomly selected field margins, the length was measured and two 30m strips were determined following the methodology outlined in Foulkes *et al.* (2013). The botanical composition of the field margin vegetation was sampled in two 0.5m x 0.5m quadrats within each of the two 30m strips i.e. placed at the 10m and 20m mark. This gave a total of four quadrats for each of the six selected field margins per farm (a total of 24 quadrats per farm).

3. Farmer and expert perception of the implementation of agri-environmental legislation

Attitudinal surveys were conducted by questionnaire among a sample of farmers across three main enterprises (tillage, beef and dairy) and professionals within agricultural (excluding farmers) and/or ecological/environmental fields. To distinguish between these two groups of professionals we have labelled the former 'farmers' and the latter 'experts'.

The questionnaires recording farmer opinion (farmer questionnaire) were carried out using one of four methods (face to face (n=39); telephone conversation (n=10); postal (n=1); e-mail (n=3)), depending on farmer preferences. A total of 53 farmers were surveyed across the three main farming systems; tillage (n=15), beef (n=14) and dairy (n=24). The farmers who participated in the questionnaire were a subset of those whose lands were surveyed, as described in previous chapters of this thesis.

All questionnaires recording expert opinion (expert questionnaire) were carried out via e-mail. Experts surveyed included agri-environmental researchers, ecologists, conservation officers, agricultural advisors, agricultural inspectors and environmental scientists. This group of experts (n=15) offered a broad range of backgrounds and specialities, thus allowing for an inclusive assessment of expert attitudes.

4. Main results:

This study provides an overview of the extent of semi-natural habitat and EFA on intensively managed farms in Ireland, including an assessment of the quality of two of the most frequently occurring habitats i.e. hedgerows and field margins. General conclusions from this study include the following:

1) Averaged across the sample of farms, almost 10% of the total area of farms surveyed consisted of habitats beneficial for wildlife, with linear features such as hedgerows, buffer strips and drainage ditches accounting for 43% of the total area of wildlife habitat surveyed. Hedgerows were the most abundant and frequently occurring wildlife habitat, present on 100% of farms surveyed and accounting for almost 3% of the total area of every farm. All tillage farms and the majority of pastoral farms sampled met the current 5% EFA requirement. Field margins were the most frequently encountered 'ineligible' habitat.

2) The limited application of EFA and omission of many farmland habitats deemed ineligible as EFA may result in a reduction of quantity and quality of these habitats.

3) Hedgerows and field margins in the study sample were found to have low ecological quality. Thus, they would be expected to be unlikely to reach their full capacity to support wider biodiversity and associated ecosystem services.

4) The habitats that experts considered as ecologically least important for retention within an agricultural landscape were those prioritised for inclusion in Irish EFA legislation; in contrast, more ecologically important habitats were currently ineligible for either EFA or other CAP measures.

5. Opportunity/Benefit:

This research suggests a number of opportunities to improve the environmental performance of future policy instruments targeting farmland biodiversity, as follows:

- **Expand the list of eligible habitats**

This research demonstrated the high variety and percentage area of EFA and habitats beneficial for wildlife (10%) on intensively managed farmland in Ireland. A large proportion of these habitats, which may be as ecologically important as those eligible for EFA, are not protected under any agri-environment legislation (national or international), meaning they are at risk of removal. The inclusion of all semi-natural habitats present on an agricultural holding within a measure such as EFA (and extending the measure to include pastoral farms), removes this risk. Additionally, it may negate the need for the incorporation of less ecologically beneficial features, such as nitrogen-fixing and catch crops.

- **Include habitat quality in design of policy measures**

The ecological and environmental value of a habitat is dependent on both the quantity and quality of that habitat. In turn, this impacts on the range of ecosystem functions that any habitat can provide, such as supporting biodiversity and providing ecosystem services. Nevertheless, agri-environment legislation rarely specifies habitat quality or a habitat's effectiveness at supporting biodiversity or ecosystem services.

- **Consider results-based approaches to improve habitat quality**

The majority of agri-environment schemes and actions under Pillar 2 of the CAP are action-based, whereby payment received is linked to the adherence of specific rules (O'Rourke, E and Finn, J.A. 2020). Another approach to Agri-environment Schemes, termed results-based AESs, can link a payment to a desired environmental outcome, and aims to increase the environmental effectiveness of AEMs (O'Rourke, E and Finn, J.A. 2020).

*O'Rourke, E and Finn, J.A. 2020. Farming for nature: the role of results-based payments. Teagasc and NPWS. www.teagasc.ie/farmingfornature

6. Dissemination: Main publications:

Larkin, J., Sheridan, H., Finn, J., Denniston, H., and Ó hUallacháin, D. (2019) Semi-natural habitats and Ecological Focus Areas on cereal, beef and dairy farms in Ireland. *Land Use Policy* (in press).

Ó hUallacháin, D., Copland, A.S., Buckley, K., McMahon, B.J. (2015) Opportunities within the revised EU Common Agricultural Policy to address the decline of farmland birds: An Irish perspective. *Diversity*, 7, 307-317.

Science for Environment Policy (2017) *Agri-environmental schemes: how to enhance the agriculture-environment relationship*. Thematic Issue 57, Issue produced for the European Commission DG Environment (Ó hUallacháin, Ed)

Ó hUallacháin, D., Sheridan, S., Finn, J.A., Denniston, H., & Larkin, J. (2018) Farmland Biodiversity: the Irish Context. *EuroDairy Workshop*, Moorepark, December 2018.

Larkin, J., Sheridan, S., Finn, J.A., Denniston, H., & Ó hUallacháin, D. (2016) Semi-natural habitats on intensive grassland farms in Ireland. *EGF 2018*, Cork, June 2018

Larkin, J., Sheridan, S., Finn, J.A., Ryan, M., & Ó hUallacháin, D. (2016) Ecological focus areas: enhancing and maintaining biodiversity on tillage farms in Ireland. *1st Ecology and Evolution Ireland Conference*, Institute of Technology, Sligo, November 2016.

Larkin, J., Sheridan, H., Finn, J.A., Ryan, M., & Ó hUallacháin, D. (2016) Ecological focus areas on tillage farms. *National Tillage Conference 2016*, Kilkenny, January, 2016.

Popular publications:

McNamara, L., Ó hUallacháin, D., Keena, C. (2017) Ecological Focus Areas to enhance ecosystem services and integrated pest management. *Irish Farmers Journal*, June 2017.

7. Compiled by: Daire Ó hUallacháin