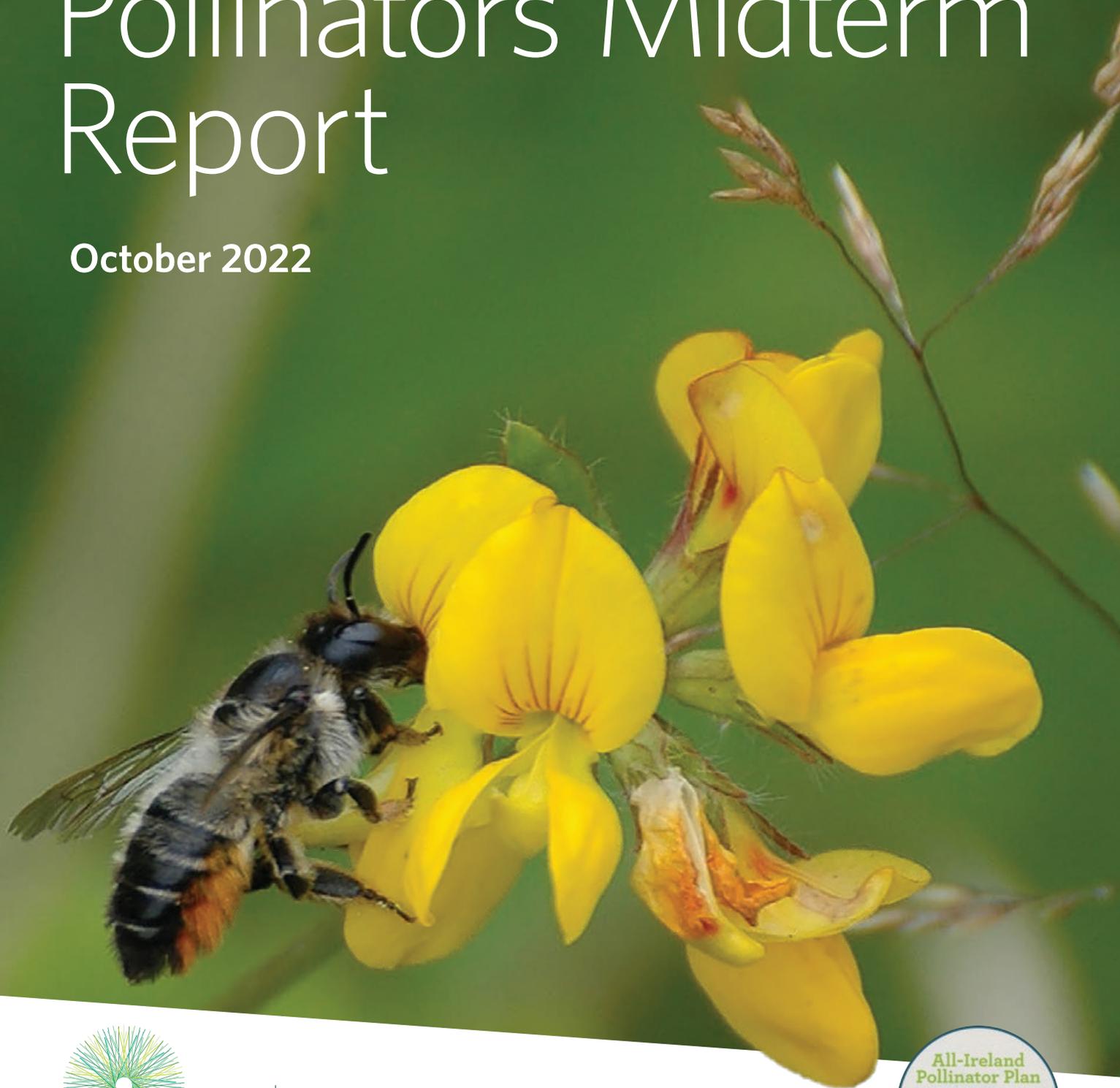


Protecting Farmland Pollinators Midterm Report

October 2022



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Key achievements to date

We would like to take this opportunity to reflect on the accomplishments of the project to date (July 2019 - August 2022) and to thank all those who have participated in and contributed to the project.

- ✓ Farmers have used the whole-farm pollinator scorecard to score their own farms for two consecutive years.
- ✓ Farmers have received two results-based payments depending on how pollinator-friendly their farm is.
- ✓ Overall, the Pollinator Points have increased across the 40 farms and within each farm type (beef, dairy, mixed and tillage).
 - The median score increased to 33,572 pollinator points in 2021 from 25,696 pollinator points in 2020.
 - Twenty-five farmers have increased their pollinator score.
 - Four farmers more than tripled their pollinator points.
 - Eight farmers reduced their pesticide inputs.
- ✓ The first evidence-based Action Sheet using the data from the Protecting Farmland Pollinators EIP project was produced - How to create solitary bee nest sites on your farm.
- ✓ Three promotional videos were produced.
- ✓ Twenty-six monthly Newsletters and three blogs were published to keep farmers and the wider community up to date on the progress of the project.
- ✓ Six online farmer training sessions and six farm walks were held.
- ✓ The project to date demonstrates that farmers have a huge interest in learning about biodiversity and want to know how to maintain, protect and enhance biodiversity on their farms while having a productive farming system. Working with farmers has allowed us to provide some answers to this very important question.



Background

The Protecting Farmland Pollinators Project is about identifying small actions that farmers can take that will allow biodiversity to coexist within a productive farming system. We want to help encourage all farmers to provide small wildlife habitats for pollinators, in terms of food, safety, and shelter, on their farms.

Pollinators are important for growing insect-pollinated crops, fruits, and vegetables; for the health of our environment; for their cultural significance and for the economy. Farmers recognise this importance, but farmland has experienced wide-scale loss of wild pollinators over the last 50 years. In Ireland, one third of our 101 wild bee species are threatened with extinction.

By working closely with a group of 40 farmers, management practices that benefit bees on Irish farmland were identified, and a whole farm pollinator scoring system was developed. The whole farm pollinator score is based on providing food, safety, and shelter for pollinators on the farm. This score helps farmers to understand how pollinator-friendly their farm is, and identify what simple, low-cost actions they can take to work towards improving their score.

This five-year project is working with a group of 40

farmers, across farm types (beef, dairy, mixed, and tillage) and intensities (high, medium, and low) in Co. Kildare and neighbouring counties.

It is built on evidence-based actions and a results-based payment model. Within the project, farmers receive an annual payment based on their overall farm pollinator score, which is calculated based on the quantity and quality of p (sorry please remove the capital p where it is not the start of a sentence). Pollinator-friendly habitat on the farm - the higher the pollinator score of the farm, the more the farmer will be paid annually.

In taking action to protect pollinators, we start a chain reaction that has positive benefits for the general health of our environment, our mental health, and the wellbeing of future generations. We hope to enable all farmers to understand how pollinator-friendly (or not) their farm is, and what simple, low-cost actions they can take to work towards improving their whole farm for pollinators and other biodiversity in a measurable way that does not impact on productivity.

The Protecting Farmland Pollinators EIP project began in July 2019 and will run until the end of 2023.

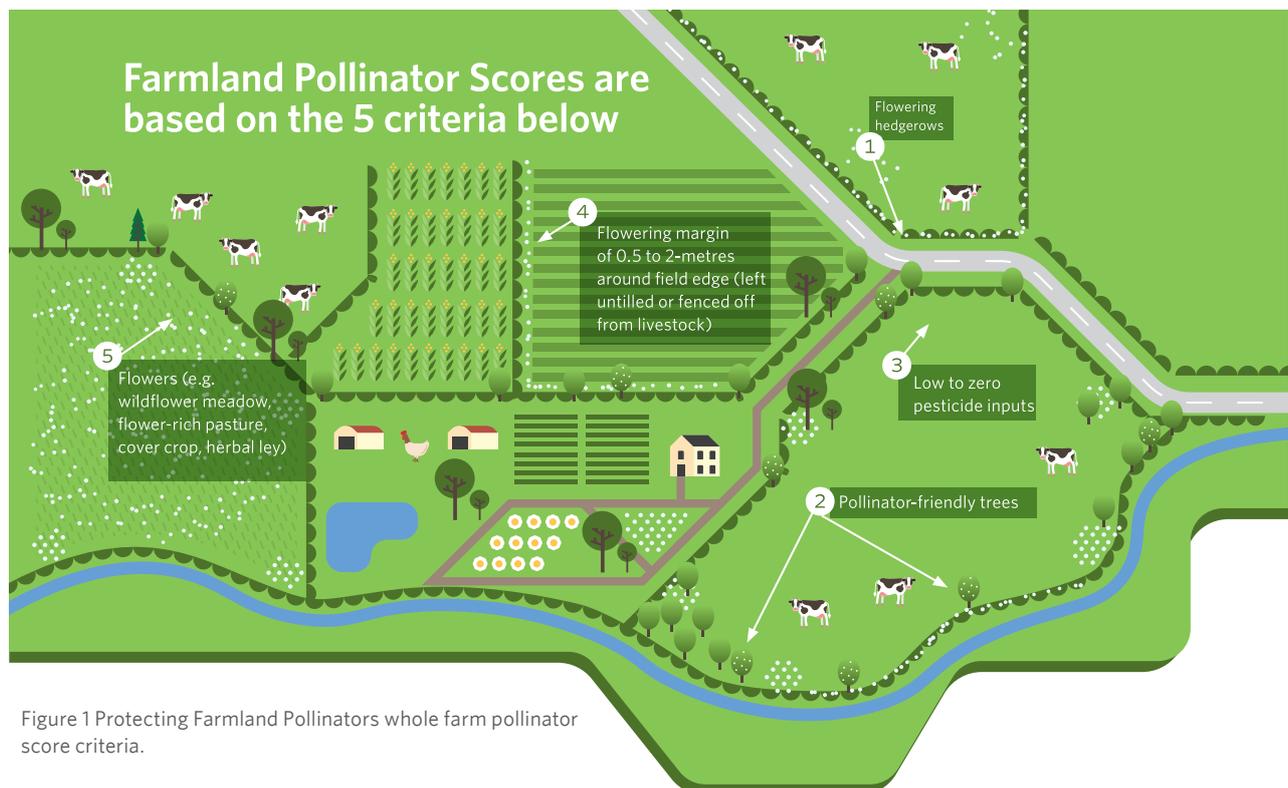


Figure 1 Protecting Farmland Pollinators whole farm pollinator score criteria.

Who is working on the Project?

The Protecting Farmland Pollinators Project is co-ordinated by the National Biodiversity Data Centre. The Data Centre is the National Centre for the collection, collation, management, analysis, and dissemination of data on Ireland's Biodiversity. The project Manager (Dr Saorla Kavanagh) manages the day-to-day running of the project. Dr Úna Fitzpatrick is the project Co-Ordinator and Chair of the Operational Group. Both Úna and Saorla are employed by the National Biodiversity Data Centre. Paulina Furmaniak and Cathy Walsh are the Financial Managers for the project and are employed by Compass Informatics. The forty participant farmers contribute ideas and offer feedback whenever required.

Dr Michelle Larkin provided Maternity cover from June - September 2021.

Owen Beckett provided Maternity cover in October and November 2021 and assisted with specimen identification.

Dr Neus Rodriguez-Gasol, Niamh Phelan and Shannon O'Brien worked on the Ecological Survey Team for 6-months between March and August 2020.

The National Biodiversity Data Centre is an Initiative of the Heritage Council and is operated under a service level agreement by Compass Informatics. The data centre is funded by the Department of Culture, Heritage and the Gaeltacht, and the Heritage Council.



The Operational Group consists of:

- The National Biodiversity Data Centre
- Five Champion Farmers (Andrew Bergin, John McHugh, Kim and Mireille McCall and Trevor Harris)
- Bord Bia
- Glanbia
- HEINEKEN Ireland
- Macra na Feirme
- Teagasc
- Trinity College Dublin



The group is locally led by the five Champion Farmers across types (beef, dairy, mixed and tillage). It has been put together to ensure scientific expertise in pollinator requirements, project design and data analyses (National Biodiversity Data Centre, Trinity College Dublin); farmer engagement and knowledge transfer (Teagasc, Macra na Feirme, Champion Farmers); and to advise on future practical recommendations with respect to agri-environment (Teagasc) and biodiversity/sustainability schemes from a commercial perspective (Bord Bia, Glanbia and HEINEKEN Ireland). The Operational Group is further supported by the 16-member steering group of the All-Ireland Pollinator Plan, which includes representatives from both The Department of Agriculture, Food and the Marine and the Department of Agriculture, Environment and Rural Affairs.

Protecting Farmland Pollinators is a European Innovation Partnership (EIP) project funded by the Department of Agriculture, Food, and the Marine (DAFM) under the Rural Development Programme 2014-2020. Aspects of the Project are subject to change in response to participant feedback and project monitoring.

Is tionscadal EIP (Comhpháirtíocht Nuálaíochta Eorpach) é an Protecting Farmland Pollinators atá á riaradh ag National Biodiversity Data Centre. Tá an Tionscadal maoinithe ag Maoiniú Ionstraim Téarnaimh an AE faoin gClár um Fhorbairt Tuaithe 2014-2022.



Figure 2 Participant farmers at a farm walk on the McCalls Farm Co. Kildare.

What does the project aim to do?

This programme has four key objectives:

1. To test the effectiveness of a range of pollinator measures across different farm types in Ireland and to identify those that have most impact and that are most cost-effective.
2. To test the impact of these pollinator measures on broader biodiversity.
3. Based on the pollinator measures, to develop a simple whole farm pollinator scoring system that uses a habitat matrix approach to quantify how pollinator-friendly the entire farm is.
4. To develop a simple results-based payment method that encourages and assists farmers in attempts to improve their whole farm pollinator score.

Using the information on the effectiveness of each pollinator measure, an innovative whole farm scoring system that uses a habitat-matrix approach to quantify how pollinator-friendly the entire farm is as a land parcel, is in development. The approach used within the scoring system will have wide-scale application across other EU member states.

“To develop a simple results-based payment method that encourages and assists farmers in attempts to improve their whole farm pollinator score.”



How does it work?

How does the results-based system work?

A results-based payment structure is used to score the 40 farms. Payment scales are linked to the whole farm Pollinator Score which depends on the farmer's management practices. Farmers receive an annual payment based on their overall whole farm pollinator score which is calculated based on the amount and quality of habitat maintained and/or created.

Within the overall score, each action is weighted relative to the others and then further refined by the quality of the resource using a range. For example, a high-quality hay meadow (i.e., higher plant diversity) will score more than a low-quality meadow (i.e., lower plant diversity).

Before the farmer can score his or her farm, they must create solitary bee nesting habitat for mining and cavity nesting solitary bees. Of the 102 bee species in Ireland, 80 are solitary bees. Solitary bees prefer to live alone (hence their name) instead of in the big colonies associated with honey and bumblebees. Solitary bees are harmless and not

aggressive and are excellent pollinators. They nest in two main ways; mining bees burrow into the ground, while cavity nesting bees use existing holes in hollow stems, wood, or stone walls.

There are ten beef, ten dairy, ten mixed and ten tillage farms participating in the project. Within each farm type there are farms that are intensively managed with very little space for biodiversity, and farms that are already managed in a way that benefits biodiversity. Some farms have higher inputs than others, and three of the farms are certified organic. The farm household income also varies within each farm type. In year one, a baseline pollinator score was calculated for each farm by the Project Manager. The results-based payment did not apply until year two (2020) of the project. In year two and year three the farmer completed his or her own scorecard. The farmer simply filled in the approximate amount section on the scorecard for each of the actions he or she has taken in that farming year. An example of a scorecard can be seen in the Table 1, page 11. Every year at least 10% of the farms are audited by the Project Manager. Farms are selected at random. However, if there was a drastic change in pollinator points on a specific farm, it is automatically selected for auditing.

How to score your farm

There are three steps to creating a whole farm pollinator score.



Before you score

To be eligible for a Pollinator Score your farm must have nesting habitats for cavity nesting and mining solitary bees. It was decided not to include this within the score itself but to have it as an initial mandatory requirement for three reasons:

1. It can be created at little or no cost.
2. It is a known limiting factor and is therefore very important. Farms that are flower rich will not have wild pollinators unless they also have safe areas where pollinators can nest.
3. It is very hard to score this against the other, more complex actions.

Based on best expert judgement, the farmer must satisfy the following requirements for wild bee nesting habitat per 35 hectares, with this scaled up on a total farm area basis.

Must have nesting habitat:	Per 35Ha (average farm size)
Bare soil for mining solitary bees (Fig. 3a)	8 separate locations at least*
Bee boxes or equivalent for cavity-nesting solitary bees (Fig. 3b)	3



Figure 3 Examples of (a) bare soil for mining solitary bees and (b) bee boxes or equivalent for cavity-nesting solitary bees.

In many cases, solitary bee nesting habitat will already be on the farm unnoticed (e.g., bare soil or natural cavities). Bare soil for solitary bee nesting can be created with a spade while bee boxes or equivalent can be created by drilling holes into fence posts or pieces of wood (the structural wood within pallets is ideal) and positioning these appropriately.

*For larger farms it is possible to use area equivalents for the bare soil habitats. However, a minimum of eight locations per farm is required. It is preferred if the bare soil sites are spaced across the whole farm. Each bare soil site must be a minimum of 30x30 cm in area. The vegetation around these sites can grow back quickly and will need to be maintained on a regular basis, at least twice a year.

These sites can be created along hedgerows, driveways, and other field boundaries. Bees don't like the damp, so sites should be situated on relatively dry banks. The evidence from the EIP suggests that hedgerows are the location most likely to be used. Scraping back the top layer of vegetation will not disturb the bees. The first evidence-based Action Sheet using the data from the Protecting Farmland Pollinators EIP project was developed. This action sheet outlines how best to create solitary bee nest sites on your farm. It was based on ecological assessment of nesting sites created within the project - farmers created over 300 nest sites for mining solitary bees and 130 sites for cavity nesting solitary bees. For more information visit: https://biodiversityireland.ie/app/uploads/2022/05/ActionSheet_Solitary-Bees-WEB-2.pdf.



Figure 4 Active mining bee nests on farmland.



Figure 5 The range of bee boxes that were placed on the farms. The holes have been covered by leaves or soil in the occupied nests.

Identifying pollinator-friendly habitats on the farm

Once sufficient nesting habitat is created, farmers need to identify the pollinator-friendly habitats on the farm, in other words, identify what actions they are taking for pollinators. Farmers are required to fill in the approximate amount section for each of the 19 actions on the scorecard (Table 1). The Project Manager then calculates the score based on the amount submitted by the farmer. Actions are weighted, so that those actions that are more beneficial to pollinators score more. Scores are also further adjusted for quality using a range.

The scoring system and associated weighting is under constant development and will slightly change as the project progresses. The aim is to ultimately create a scoring system that is fully evidence-based. If the farmer does not have an amount to fill in i.e., if they are not managing a specific action, they can leave the amount blank or enter a null value. The preferred units of measurement for each action are stated. The scorecard can be split into four sections (see Tables 2-5): Hedgerows and field boundaries (Actions 1-4), Trees (Action 5&6), Fields and flowers (Actions 7-12) and Pesticides (Actions 13-19). Managing hedgerows for pollinators is one of the most beneficial actions for pollinators on farmland.

The number of points awarded for each action is subject to change and will depend on the quality of habitat. For actions 1-4, the quality of the habitat is dependent on the number of flowering plant species within the hedge or boundary. For actions 6-11 the quality is dependent on the number of flowering plant species **allowed to flower** within the habitat.



Figure 6 Pollinator-friendly flowering hedge (McCalls Farm) and flowering margin (Phelan's Farm).



Table 1 Whole Farm Pollinator Scorecard – left blank for farmers entry.

	No.	Action	Units of Measurement	Approximate Amount
Food and Shelter	1	Flowering hedgerow max. cut once every 3-5 years with a 1.5-2m margin or understory fenced from grazing or untilled	metres	
	2	Flowering hedgerow cut once every 2-5 years with at least 0.5m margin fenced from grazing or untilled	metres	
	3	Flowering hedgerow cut once every two years (no margin)	metres	
	4	Other pollinator-friendly field boundary	metres	
	5	Pollinator-friendly flowering trees at least 10 years established (up to max. 500)	number of trees	
	6	Pollinator-friendly flowering trees planted in the last 10 years, must be established for 1 year or more (up to max. 500)	number of trees	
	7	Native hay/wildlife meadow (maximum cut or grazed once a year)	ha	
	8	Herbal ley allowed to flower / sown wildflower area	ha	
	9	Clover pasture / mixed species sward allowed to flower	ha	
	10	Bird cover / Poly-crop	ha	
	11	Non-farmed areas (e.g., around farmyard, lanes, roads) unmanaged to allow grass and wildflowers to grow naturally	m ²	
Safety	12	Flowering pollinator-friendly catch, companion or cover crop allowed to flower	ha	
	13	Eliminated herbicides, fungicides, and insecticides from whole farm	Yes or No	
	14	Eliminated herbicides, fungicides, and insecticides from whole farm excluding livestock	Yes or No	
	15	Eliminated insecticides and fungicides from tillage crops	ha	
	16	Eliminated insecticides from tillage crops	ha	
	17	Eliminated herbicides from whole farm	Yes or No	
	18	Herbicides – spot spray only noxious and invasive plants (Chickweed, Ragwort, Giant Hogweed, and other invasive plants)	Yes or No	
	19	Herbicides - only used on crops and not used to "tidy-up" the farm	Yes or No	

Actions for hedgerows and field boundaries

Hedgerows tick all the boxes for pollinators, they can provide food, safety, and shelter. Each of the hedgerow actions and the boundary action are measured in metres.

Table 2 Pollinator-friendly actions for hedgerows and field boundaries.

No.	Action	Units of Measurement	Approximate Amount
1	Flowering hedgerow max. cut once every 3-5 years with a 1.5-2m margin or understory fenced from grazing part of the year or untilled	metres	
2	Flowering hedgerow cut once every 2-5 years with at least 0.5m margin fenced from grazing part of the year or untilled	metres	
3	Flowering hedgerow cut once every two years (no margin)	metres	
4	Other pollinator-friendly field boundary	metres	



Figure 7 Hedgerows cut on a minimum 3-year rotation with the margins clearly visible.

Action 1: Flowering hedgerow max. cut once every 3-5 years, with a 1.5-2m margin or understory, fenced from grazing part of the year or untilled:

For every metre of flowering hedgerow with a 1.5-to-2-metre margin, 10 points are awarded. If for example a farmer has 200 metres on the farm, they are awarded 2000 points. Depending on the diversity of flowering plants within the hedge the monetary reward for 200 metres of this action can range from €100 to €500. The margin needs to be protected from livestock grazing (i.e., fenced) during the flowering season (between March and October at least).



Figure 8 Hedgerow cut on a three-year rotation with 2-metre margin.

Action 2: Flowering hedgerow cut once every 2-5 years with at least 0.5m margin fenced from grazing part of the year or untilled:

For every metre of flowering hedgerow with a 0.5-metre margin, four points are awarded. If for example a farmer has 200 metres on the farm, they are awarded 800 points. Depending on the diversity of flowering plants within the hedge the monetary reward for 200 metres of this action can range from €40 to €200. The hedge margin needs to be protected from livestock grazing (i.e., fenced) during the flowering season (between March and October at least).



Figure 9 Hedgerow cut on a two-year rotation with margin.

Action 3: Flowering hedgerow cut once every two years (no margin):

For every metre of flowering hedgerow with no margin, two points are awarded. If for example a farmer has 200 metres on the farm, they are awarded 400 points. Depending on the diversity of plants within the hedge the monetary reward for 200 metres of this action can range from €20 to €100. These unfenced hedgerows are a very valuable resource for pollinators as livestock tend to scrape back the vegetation below these hedges and create nesting habitats for our solitary bees.

Action 4: Other pollinator-friendly boundary:

This action includes several pollinator-friendly farm boundary features including buffer strips, untilled strips, road margins, road frontage, drains, and overgrown and unmanaged hedgerows. The margins must contain flowers but cannot be sprayed with herbicides. If a hedgerow has been left unmanaged or uncut it will be included in this action. If a farmer has 200 metres of this action on the farm, they are awarded 200 points. Depending on the diversity of plants within the feature the monetary reward for 200 metres can range from €10 to €50.

Actions for trees

Pollinator-friendly flowering trees provide food and shelter for pollinators. This action is measured by simply counting the number of trees on the farm. A maximum score of 500 trees is permitted for each of the tree actions. Only trees that are considered pollinator-friendly (e.g., Bird Cherry, Blackthorn, Crab apple, Elder, Fruit, Hawthorn, Hazel, Horse chestnut, Lime, Rowan, Willow, Whitethorn, Wild Cherry) can be included in the count. The following trees should not be included: conifers / evergreen, ash, beech, and oak. Pollinator-friendly trees on farmland can be located within a hedge, garden or can be standalone trees in a field. Twenty-five points are awarded for every mature pollinator-friendly tree and five points are awarded for every young pollinator-friendly tree on the farm. Depending on the age of the trees the monetary reward for 100 trees can range from €25-€125.

Table 3 Pollinator-friendly action for trees.

No.	Action	Units of Measurement	Approximate Amount
5	Pollinator-friendly flowering trees at least 10 years established (up to max. 500)	number of trees	
6	Pollinator-friendly flowering trees planted in the last 10 years, must be established for 1 year or more (up to max. 500)	number of trees	

Action 5: Pollinator-friendly flowering trees at least 10 years established (up to a maximum of 500 trees):

Twenty-five points are awarded for every pollinator-friendly tree on the farm that has been established for a minimum of 10 years, and must depending on the age of the trees the monetary reward for 100 trees is €125. A maximum of 500 trees can be included in this action.

Action 6: Pollinator-friendly flowering trees planted in the last 10 years, must be established for 1 year or more (up to maximum of 500 trees):

Five points are awarded for every young pollinator friendly tree on the farm. The tree must be established for at least one year. The monetary reward for 100 trees is €25. A maximum of 500 trees can be included in this action.



Figure 10 Pollinator-friendly trees on farmland McNamee Farm , Greene Farm and O'Sullivan- Creighton Farm, Co. Kildare.

Actions for fields and flowers

Flowers provide food for pollinators. Pollinators need access to food throughout their life. Different pollinators have preferences for different flowers. Having a diversity of flowers on the farm is very important. The higher the diversity of flowers on the farm the higher the likelihood that there will be something in flower throughout the flowering season. It is widely known that our native plant species provide better food sources for our native pollinators. For actions 7-12 below points are awarded per hectare or per m². The monetary reward associated with each of the actions depends on the number of different flowering plant species (diversity). The higher the diversity, the higher the reward.

Table 4 Pollinator-friendly actions for fields and flowers.

No.	Action	Units of Measurement	Approximate Amount
7	Native hay/wildlife meadow (cut or grazed once/twice a year)	ha	
8	Herbal ley allowed to flower / sown flower area	ha	
9	Clover pasture / mixed species sward allowed to flower	ha	
10	Wild bird cover / Poly-crop	ha	
11	Non-farmed areas (e.g., around farmyard, lanes, road margins) unmanaged to allow grass and wildflowers to grow naturally	m ²	
12	Flowering pollinator-friendly catch, companion or cover crop allowed to flower for 2 weeks	ha	

Action 7: Native hay/wildlife meadow (cut or grazed once a year) will provide food for all pollinators and can also provide nesting habitats for bumblebees (Figure 11):

This is a particularly high scoring feature on the scorecard. For every hectare of species rich hay meadow on your farm you will be awarded 6000 points. The monetary reward for this action ranges from €300 to €1500 depending on the number of flowering plant species.



Figure 11 Native hay meadow Kelly's Farm and McCall's Farm.

Action 8: Herbal ley allowed to flower / sown flower area will provide food for some pollinators and can also provide nesting habitats for bumblebees (Figure 12):

Herbal leys also known as multi species herbal leys are a mix of grass, legume, and herb seeds. They bring a range of benefits to livestock health, soil fertility and provide food for pollinators. Herbal leys can also offer protection against drought. Herbal leys usually contain a mixture of native and non-native plant species.



Figure 12 Herbal ley Clondarrig Farm.

Sown flower area is a sown mix of seeds that are not native Irish plant species. These plants do provide food resources for pollinators, but the points are not as high for this action compared to having a native hay/wildlife meadow. We do not recommend sowing non-native wildflower mixes on the farm. Sown flower areas is not an action recommended by the All-Ireland Pollinator Plan and is being tested in a research context here.

For every hectare 800 points are awarded. The monetary reward for this action ranges from €40 to €200 depending on the number of flowers and flowering plant species.

Action 9: Clover pasture / mixed species sward allowed to flower:

Clover pasture can be made up of red or white clover and can only be included on the scorecard if the plants produce flowers (Figure 13).

Mixed species swards (also known as low input grasslands/ permanent pasture) are common in Ireland and can be beneficial to livestock health and soil fertility (Figure 14). They contain native plant species only. Every hectare of action 8 equates to 400 pollinator points. The monetary reward for this action ranges from €20 to €100 per hectare depending on the number of flowers and flowering plant species.

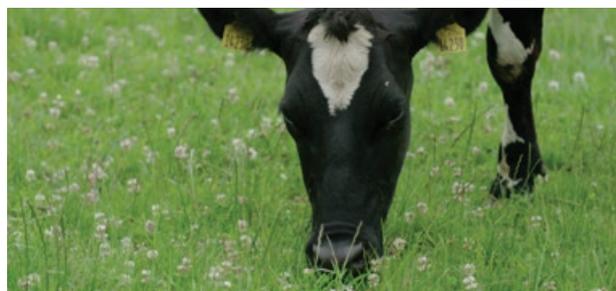


Figure 13 Flower rich clover pasture Castlefarm and O'Loughlin's Farm Co. Kildare.



Figure 14 Mixed species swards allowed to flower.

Action 10: Wild bird Cover / Poly-crop:

Both bird cover and poly crop are a mixture of grain and flower seeds (usually non-native). Apart from providing a food source for pollinators and birds it can also provide winter cover on the land which reduces soil erosion and leaching. For every hectare of action 8 on 400 points are awarded and the monetary reward for this action ranges from €20 to €100.

Action 11: Non-farmed areas unmanaged to allow grass and wildflowers to grow naturally:

Non-farmed areas (e.g., around gates, field margins, lanes, roads) unmanaged to allow grass and wildflowers to grow naturally. Once an un-farmed area is not sprayed with herbicides and produces flowers, it is included in the scorecard no matter how small the area.

For every m² of unmanaged non-farmed area the farmer receives 0.1 of a point. The monetary reward for 100 m² of non-farmed areas ranges from €0.50 to €2.50. Once a non-farmed area is not sprayed with herbicides and produces flowers, it is included in the scorecard no matter how small the area.



Figure 15 Examples of Pollinator-friendly non-farmed land managed for pollinators.

Action 12: Flowering pollinator-friendly catch, companion, or cover crop:

For every hectare of land where a pollinator-friendly catch, companion or cover crop has been sown 200 points are awarded. The monetary reward for action 11 ranges from €10 - €50 per hectare. Once a cover crop is sown mid-August, weather permitting, it will provide two weeks of flowers in September. To receive points for this action there must be flowers for pollinators for at least 2 weeks.



Figure 16 Companion and cover crop Flynn's farm and Cover crop Greene's Farm.

Pesticide options

By reducing or stopping the use of pesticides on the farm you can provide a safe environment for pollinators. Pesticides come in the form of fungicides, herbicides and insecticides. All three groups have been shown to have negative effects on bees and other living organisms (lethal and sub-lethal). By reducing or stopping the use of herbicides on the farm you will increase the number of flowers available for pollinators. There are seven actions under pesticides where farmers can receive points for helping pollinators

Table 5 Pollinator-friendly actions for hedgerows and field boundaries.

No.	Action	Units of Measurement	Approximate Amount
13	Eliminated herbicides, fungicides, and insecticides from whole farm	Yes or No	
14	Eliminated herbicides, fungicides, and insecticides from whole farm excluding livestock	Yes or No	
15	Eliminated insecticides and fungicides from tillage crops	ha	
16	Eliminated insecticides from tillage crops	ha	
17	Eliminated herbicides from whole farm	Yes or No	
18	Herbicides - spot spray only noxious and invasive plants (Chickweed, Ragwort, Giant Hogweed, and other invasive species)	Yes or No	
19	Herbicides - only used on crops and not used to "tidy-up" the farm	Yes or No	

How is habitat quality assessed?

The range is from 1 to 5 with 5 being the best or most beneficial for pollinators. The tree actions (5 and 6) and safety actions (13-19) have a standard range of one (it does not change). The calculation of the range for the hedgerow actions (1-4) is based on the number of flowering plant species (number of plants in flower). The woody plants and the plants at the base of the hedge margin area (ground flora) are included. The following equation is used to calculate the range for actions 1-4:

Actions 1-4

$$N = \frac{(\text{number of species of ground flora} + \text{number of woody species})}{2}$$

- If N = <2 (2 species) the range = 1
- If N = 2-4 (3-9 species) the range = 2
- If N = 5-6 (10-12 species) the range = 3
- If N = 7 (14 species) the range = 4
- If N = >8 (16 species) the range = 5

To get a score of 5 for a hedge you need at least 16 species of flowering plants in flower in that hedge.

Woody species = 8
Ground Flora = 8
N = 8

$$N = \frac{8+8}{2}$$

Actions 7-12

For all other actions (7-12), the range is based on the number of flowering plant species (number of plants in flower).

- 1 = <2 species in flower
- 2 = 3-4 species in flower
- 3 = 5-7 species in flower
- 4 = 8-12 species in flower
- 5 = >12 species in flower

To get a score of 5 for a hay meadow you need at least 12 plant species in flower within the meadow.

Example Farm

An example of how the pollinator score changed for a beef farm (Farm 27) over three years is shown below. The pollinator scorecard and associated farm map for each of the farming years one to three can be seen (Figure 17-20). An example on what the potential farm pollinator score could be for the farming year 2022/2003 (year four) can be visualised in Figure 21.

The farmer increased their pollinators points from 13,788 (€689) in year one to 17,388 points (€869) in year two, to 27,593 points (€1,380) in year three. Within two farming years, this farmer more than doubled their score. This was achieved by changing how they managed their hedgerows and by increasing the amount of clover swards on the farm.



No.	Action	Units of Measurement	Approximate Amount	Proposed Weighting	Final Score	Monetary Reward
8	Clover pasture / mixed species sward allowed to flower	ha	1.95	400	2340.00	€117.00
10	Non-farmed areas (e.g., around farmyard, lanes, road margins) unmanaged to allow grass and wildflowers to grow naturally	m ²	21778	0.10	8711.20	€435.56
18	Herbicides - only used on crops and not used to "tidy-up" the farm	Yes or No	27.3	5	136.50	€6.83
TOTAL					13787.70	€689.39

Figure 17 Whole farm pollinator score for Farm 27 for the farming year 2019/2020 (year one). Maps are drawn in Google Earth.



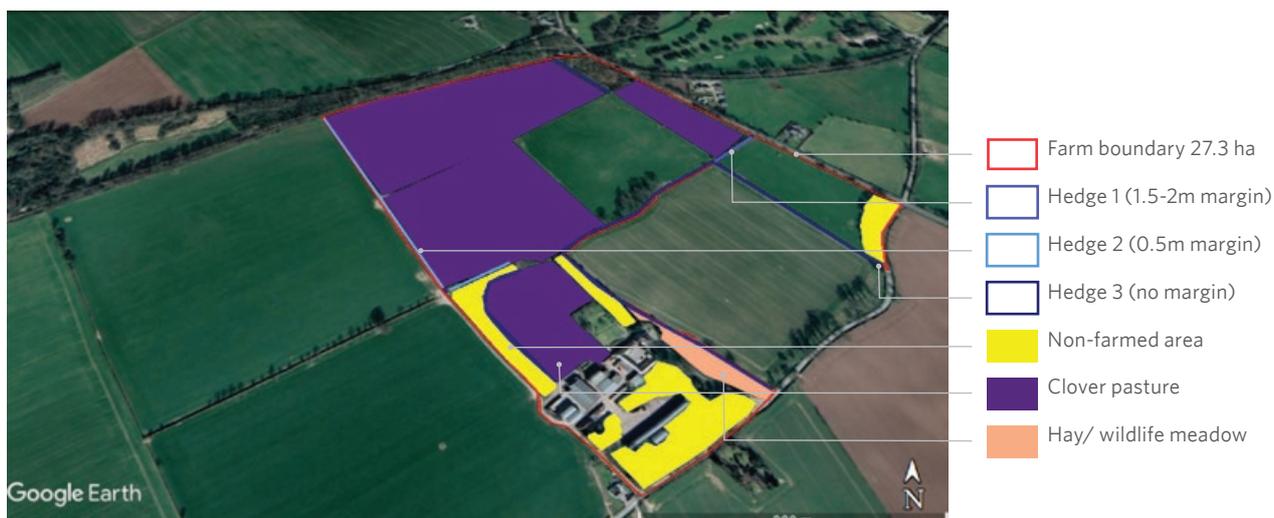
No.	Action	Units of Measurement	Approximate Amount	Proposed Weighting	Final Score	Monetary Reward
3	Flowering hedgerow cut once every two years (no margin)	metres	1800	2.00	3600.00	€180.00
5	Pollinator-friendly flowering trees (up to max 500)	number of trees	104	5	2600.00	€130.00
8	Clover pasture / mixed species sward allowed to flower	ha	1.95	400	2340.00	€117.00
10	Non-farmed areas (e.g., around farmyard, lanes, road margins) unmanaged to allow grass and wildflowers to grow naturally	m ²	21778	0.10	8711.20	€435.56
18	Herbicides - only used on crops and not used to "tidy-up" the farm	Yes or No	27.3	5	136.50	€6.83
SCORE					17387.70	€869.39

Figure 18 Whole farm pollinator score for Farm 27 for the farming year 2020/2021 (year two). Maps are drawn in Google Earth.



No.	Action	Units of Measurement	Approximate Amount	Proposed Weighting	Final Score	Monetary Reward
3	Flowering hedgerow cut once every two years (no margin)	metres	1800	2.00	3600.00	€180.00
4	Other pollinator-friendly field boundary	metres	0	1.00	0.00	€0.00
5	Pollinator-friendly flowering trees at least 10 years established (up to max. 500)	number of trees	104	25.00	2600.00	€130.00
9	Clover pasture / mixed species sward allowed to flower	ha	15	400	12000.00	€600.00
11	Non-farmed areas (e.g., around farmyard, lanes, road margins) unmanaged to allow grass and wildflowers to grow naturally	m ²	21778	0.10	8711.20	€435.56
17	Eliminated herbicides from whole farm	Yes or No	27.3	25	682.50	€34.13
SCORE					27593.70	€1,379.69

Figure 19 Whole farm pollinator score for Farm 27 for the farming year 2021/2022 (year three). Maps are drawn in Google Earth.

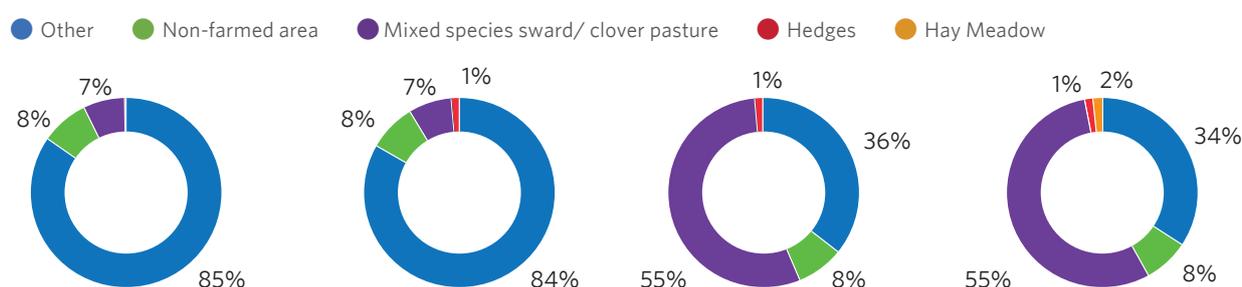


No.	Action	Units of Measurement	Approximate Amount	Proposed Weighting	Final Score	Monetary Reward
1	Flowering hedgerow max. cut once every 3-5 years with a 1.5-2m margin or understory fenced from grazing part of the year or untilled	metres	86	10	2580.00	€129.00
2	Flowering hedgerow cut once every 2-5 years with at least 0.5m margin fenced from grazing part of the year or untilled	metres	482	4.0	5784.00	€289.20
3	Flowering hedgerow cut once every two years (no margin)	metres	1232	2.00	4928.00	€246.40
5	Pollinator-friendly flowering trees at least 10 years established (up to max. 500)	number of trees	104	25.00	2600.00	€130.00
7	Native hay/wildlife meadow (maximum cut or grazed once/twice a year)	ha	0.42	6000	7560.00	€378.00
9	Clover pasture / mixed species sward allowed to flower	ha	14.58	400	11664.00	€583.20
11	Non-farmed areas (e.g., around farmyard, lanes, road margins) unmanaged to allow grass and wildflowers to grow naturally	m ²	21778	0.10	8711.20	€435.56
17	Eliminated herbicides from whole farm	Yes or No	27.3	25	682.50	€34.13
SCORE					44509.70	€2,225.49

Figure 20 Potential whole farm pollinator score for Farm 27 for the farming year 2022/2023 (year 4). Maps are drawn in Google Earth.

Taking action to help pollinators on the farm will not affect the farm basic payment

The assorted colours in the donut graphs (Figure 21) represent the percentage of pollinator-friendly land within a beef farm over a four-year period. The table shows the area of land eligible for the basic payment scheme (ha), the number of different pollinator-friendly habitats on the farm, the total area of pollinator-friendly land (ha) and the monetary reward for the farmer (€) over a four-year period for a beef farm (Farm 27). Years one to three are based on actual data and year four is theoretical. Over the four-year period the area of pollinator-friendly land increases and the area of land eligible for the basic payment scheme does not change. The total area of pollinator-friendly land does not change between year three and year four, however the farmers monetary reward increases. This difference in monetary reward is due to the quality of the pollinator-friendly habitat and is reflected in the weighting of the scorecard actions. If in year four, the farmer allows native meadow to grow this would mean a monetary gain as this is more valuable to pollinators than a mixed species sward.



	Year 1	Year 2	Year 3	Year 4
Productive land area (BPS eligible) (ha)	25.12	25.12	25.12	25.12
Number of pollinator-friendly habitats	3	4	4	5
Total area pollinator-friendly land (ha)	4.14	4.32	7.6	7.6
Monetary reward for famers	€689	€869	€1475	€2672

Figure 21 The donuts show the percentage of pollinator-friendly land on a beef farm over a four-year period. The 'Other' category is non-pollinator friendly land. The table shows the area of land eligible for the basic payment scheme (ha), the number of different pollinator-friendly habitats on the farm, the total area of pollinator-friendly land (ha) and the monetary reward for the farmer (€) over a four-year period for a beef farm (Farm 27).

Taking actions for pollinators on the farm can have multiple knock-on benefits for the farm

For example, managing hedgerows for pollinators will allow the hedge to grow and provide shade for animals when required. Hedges can also help with flood mitigation and pest control. Increasing hedgerow margins by moving fence lines out can make it easier to maintain power to fences. Clover pasture, herbal leys, and mixed species sward can mitigate against the negative effects of drought. They can also have additional benefits for the soil.

Changes to the scorecard since the project began

The initial draft scorecard has retained its structure and key actions but has continued to evolve slightly since the project began. This occurs in collaboration with the farmers following their feedback, and as data collected within the project is analysed. It has also evolved in line with other evidence-based studies on pollinator conservation. For example, the most recent change was requested by farmers to reward them for newly planted trees. The current version of the scorecard is discussed in this document. It is the intention that a fully evidence-based scorecard, agreed by farmers, is one of the key outcomes of the project.

Results to date

Farm Scores

The whole farm pollinator scores for the 2020-2021 farming year (year two of the results-based payments), ranged from 4,156 pollinator points to 363,508 pollinator points (Median = 33,572). The distribution of farm scores across the four farm types (beef, dairy, mixed, and tillage) and across the two years scored can be seen in Figures 22 and 23.

There was a statistically significant increase in the whole farm pollinator score in the farming year 2020/2021 compared to the farming year 2019/2020 ($z = -4.2$, $p < 0.0005$, with a large effect size ($r = 0.47$)). The median score increased from 25,696 in 2019/2020 to 33572 in 2020/2021 with Dairy and Tillage farms showing the largest increase (Figure 22 and 23). Farmers are taking action to help pollinators on their farms. Twenty-five farms increased

their pollinator scores between year one of the results-based payment and year two. Four farms more than tripled their score.

The scoring system continues to show the expected range for the pilot group of 40 farms that were chosen to reflect differing farm types and intensities. The results-based payment for each of the 40 farms was calculated and farmers received their second payment in December 2021.

Figure 23 shows the whole farm pollinator score for each of the forty farms for each farm type (beef, dairy, mixed and tillage) and showing for each of the years scored (year one and year two). Each bar represents an individual farm score. The highest score overall came from a beef farm (248,946 pollinator points), the second highest came from a mixed farm (192,190 pollinator points) and the third highest from a tillage farm (108,176 pollinator points).

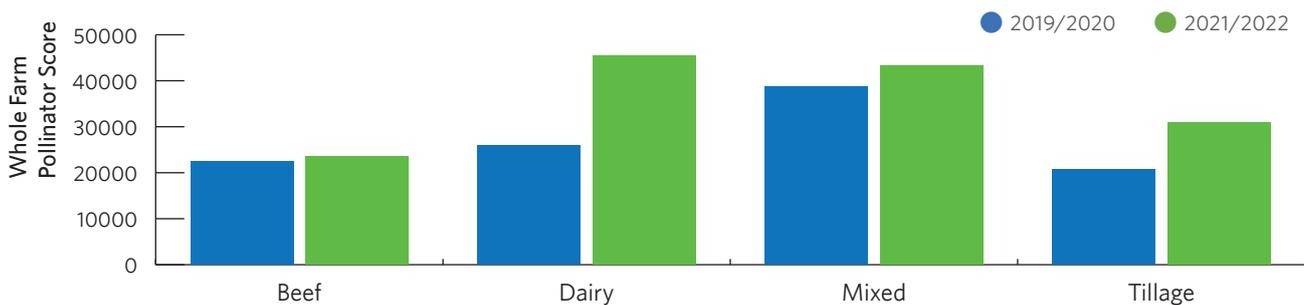


Figure 22 Median whole farm pollinator score (pollinator points) across the four farm types (beef, dairy, mixed and tillage) for the farming years 2019/2020 (blue) and 2020/2021 (green). Each bar represents the median farm score for each farm type.

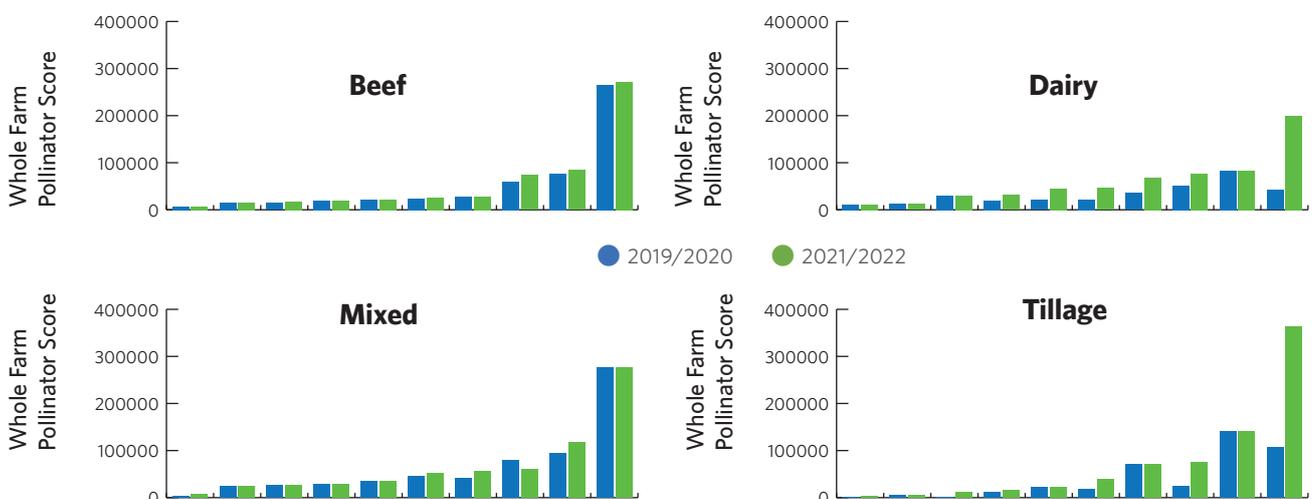


Figure 23 Whole farm pollinator score for each farm type (beef n=10, dairy n=10, mixed n=10, and tillage n=10 for the farming years 2019/2020 (blue) and 2020/2021 (green). Each bar represents an individual farm score.

The box plot in Figure 24 shows the distribution of pollinator points across the four farm types, beef (black), dairy (red), mixed (green), and tillage (blue). The maximum, minimum, median and mean pollinator score for the four farm types are shown for year one and year two. Mixed farms have the highest average pollinator points overall and tillage farms had the lowest. The box plot shows how spread out the pollinator points are within each farm type (with beef having the largest spread in year one and tillage having the largest spread in year two).

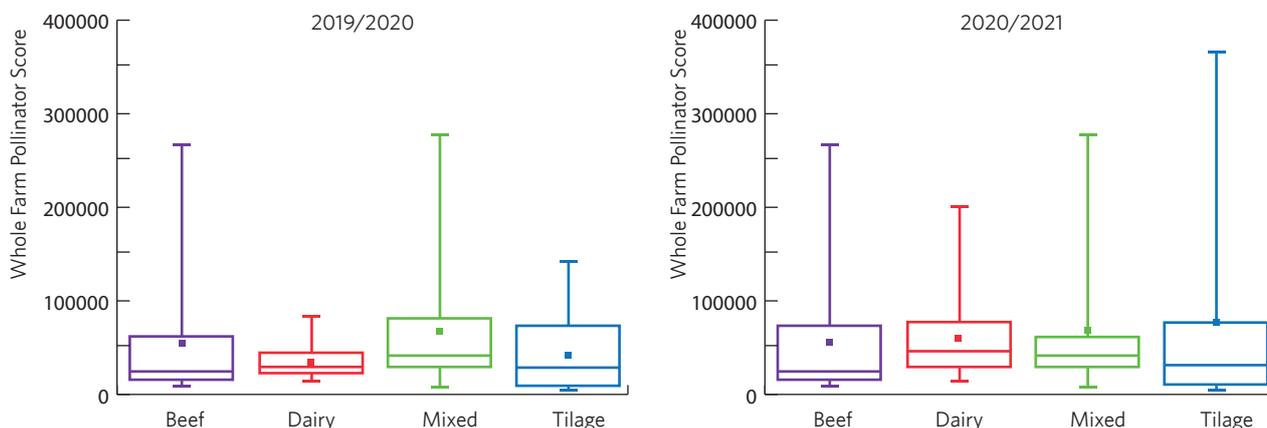


Figure 24 Box plot showing the distribution of farm scores within each farm type, beef (black), dairy (red), mixed (green) and tillage (blue) for year one (2019/2020) and year two (2021/2022). The maximum (top line outside the box), minimum (bottom line outside of the box), median (line inside the box) and mean (small square inside the box) pollinator score for the four farm types are represented.

Top three actions on farmland

The number of pollinator-friendly trees is the most frequently used action on the 40 participating farms for both year one and year two. The number of trees on an individual farm range from 12 to 500 plus. The second most popular action on the scorecard changed between year one and year two. In year one it was flowering mixed species sward / clover pasture, 32 of the 40 farms; and in year two it was non-farmed area, 36 of the 40 farms (Table 6). Some of the five additional farmers that recorded the non-farmed area action in year two decided to, 'allow a space for nature on the farm' and some of the farmers did not have the time to keep the area "tidy". Flowering hedgerow is now the third most popular action on the scorecard with 31 of the 40 participant farmers managing some of their hedges for pollinators.

Table 6 The top nine food and shelter actions across the 40 farms. The actions are in order of frequency of use according to the data from year one. The total number of trees and area of each action are shown for year one and year two. * The number of trees is an underestimation as the cut off for number of trees in 500.

Action	Number of participant farms Y1	Number of participant farms Y2	Quantity Y1	Quantity Y2
Trees	40	40	9078 trees*	9078 trees*
Clover pasture/mixed species sward	32	34	640.18 ha	666.24 ha
Non-farmed area	31	36	30.33 ha	31.78
Other pollinator-friendly field boundary	25	23	40699.70 m	35970.7 m
Flowering hedgerow	24	31	37740.40 m	69742.5 m
Herbal ley /sown wildflower area	12	14	28.04 ha	37.56 ha
Native hay/wildlife meadow	9	13	18.9178 ha	26.14 ha
Bird cover / Poly-crop	6	6	19.17 ha	24.24 ha

On farm biodiversity surveys in 2020

Large amounts of data on the biodiversity present on each of the 40 farms were successfully collected by a team of experienced ecological surveyors between May-September 2020. These data were collected to meet the objectives of the project and to ensure the proposed pollinator scorecard is evidence-based. The data analysis is ongoing and to date the data has been used to answer the following question: *Where nesting habitat created, is it used and what drives this if this is the case?* The answer can be found in the published results-based Action Sheet.

Once the data has been fully analysed four additional questions will be answered:

- ✓ *Do farms that score higher have a greater abundance and/or diversity of pollinators (bees and hoverflies)?*
- ✓ *Do farms that score higher have a greater abundance and/or diversity of biodiversity?*
- ✓ *Which of the pollinator measures are most effective in Ireland?*
- ✓ *How does pollinator diversity and abundance vary by farm type and what actions are most effective in each farm type?*

It is important to show that those farms that have a higher pollinator score do have more pollinators and more biodiversity. This will create a clear evidence-based for the approach. Surveys were carried out in 2020 to test this. Forty farms were surveyed twice between May and July and a further 20 were surveyed in August. The 40 farms make up a total area of 2,774.70 ha. Surveys were conducted to assess each of the features on the scorecard and to get a sense of pollinator, invertebrate, and floral diversity for each of the farms.

- ✓ Plant and pollinator transects were carried out on 80 hedgerows and 54 farm features.
- ✓ Over 16,200 metres of hedgerow were assessed for plants, pollinators, and structure.
- ✓ Four hundred and seventy-four pan traps were set to gather data on farm pollinator abundance and diversity.
- ✓ 50 Malaise traps were set to record the invertebrate diversity on each of the farms.
- ✓ Solitary bee nest sites were checked for occupancy on each of the 40 farms
- ✓ Hedgerow structural data were also recorded.

Key findings to date

The complete data set has not been fully analysed to date. Here we present just a selection of some of the key findings.

Plants found on the farms

The hedgerow flowering plant diversity (number of different plant species) ranged from 11 to 32 per farm, with 19 being the average number of plant species per farm. One hundred and five different flowering plant species were recorded across the 80 hedgerows within the 40 farms. During the survey in season one (6th May - 6th June 2020), 52 of these were in flower.

Data on the different farm features (barley, bird cover, clover pasture, cover crop, herbal ley, mixed species sward, native hay meadow, pasture, and sown non-native meadow) are currently being collated. Here we provide a summary on the plants recorded in the cover crop.

Cover crops can provide useful resources for pollinators late in the season. To produce two weeks of flowers in September, cover crops need to be sown mid-July. Five cover crop fields on four farms in Kildare were surveyed in September 2020. Seventeen species of flowering plants were recorded within the quadrats across the five cover crop fields, of which ten were in flower (*Brassica napus*, *Brassica rapa*, *Brassica rapa oleifera*, *Epilobium palustre*, *Fagopyrum esculentum*, *Linum usitatissimum*, *Phacelia tanacetifolia*, *Senecio vulgaris*, *Sinapis alba* and *Veronica persica*). An additional nine species of species in flower were recorded within the field but were absent from the quadrats (*Anagallis arvensis*, *Raphanus sativus* var. *longipinnatus* and *Viola arvensis*, *Vicia villosa*, *Sonchus asper*, *Sonchus oleraceus*, *Myosotis*, *Lapsana communis*, and *Capsella bursa-pastoris*).



Pollinators found on the farms

A data set consisting of 8,669 records of pollinators was collected from the transect walks, pan traps and malaise traps. A total of 8,003 of these specimens were identified to genus level and 7,191 specimens were identified to species level. Thirty-seven species of bee and 57 species of hoverfly were recorded.

The top five most frequently recorded bumblebee, solitary bee, and hoverfly species are shown in Tables 7-9. The number of farms that each species was recorded on is also reported.

Table 7 The most frequently recorded species of bumblebee. The Latin name, common name, number of records and number of farms on which the species was recorded is reported.

Pollinator Species	Common name	Number of individuals recorded	Number of farms
<i>Bombus lucorum agg.</i>	Bombus lucorum complex	622	39
<i>Bombus pascuorum</i>	Common carder bee	419	38
<i>Bombus lapidarius</i>	Red-railed bumblebee	270	28
<i>Bombus pratorum</i>	Early bumblebee	81	27
<i>Bombus hortorum</i>	Garden bumblebee	65	18

Table 8 The most frequently recorded species of solitary bee. The Latin name, common name, number of records and number of farms on which the species was recorded is reported.

Pollinator Species	Common name	Number of individuals recorded	Number of farms
<i>Halictus rubicundus</i>	Orange-legged furrow bee	69	16
<i>Nomada marshamella</i>	Marsham's nomad bee	35	15
<i>Andrena scotica</i>	Chocolate mining bee	34	13
<i>Andrena haemorrhoa</i>	Early mining bee	19	9
<i>Andrena bicolor</i>	Gwynne's mining bee	17	12

Table 9 The most frequently recorded species of hoverfly. The Latin name, common name, number of records and number of farms on which the species was recorded is reported.

Pollinator Species	Common name	Number of individuals recorded	Number of farms
<i>Episyrphus balteatus</i>	Marmalade hoverfly	1692	39
<i>Platycheirus albimanus</i>	Grey spotted boxer	406	39
<i>Melanostoma mellinum</i>	Short meanostoma	392	35
<i>Helophilus pendulus</i>	European hoverfly	314	33
<i>Platycheirus peltatus</i>	Meadow boxer	248	19

Bombus muscorum (the large carder bee) was recorded on four of the participant farms, three farms in Co. Kildare and one farm in Co. Laois. This species is listed as Vulnerable on the European Bee Red List and is under severe decline in Ireland.

Data on the pollinators recorded on the farm hedgerows and on the different farm features (barley, bird cover, clover pasture, cover crop, herbal ley, mixed species sward, native hay meadow, pasture, and sown non-native meadow) are currently being collated. These data will be analysed to understand which features are most important to different pollinator species.

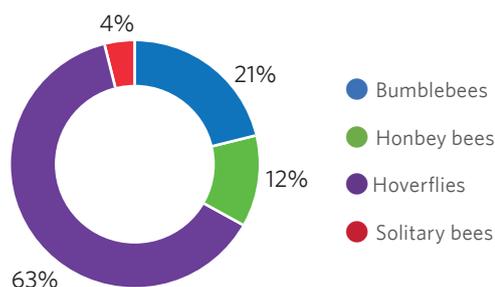


Figure 25 The percentage of pollinator groups found on the 40 farms (Bumblebees 21%, Honey bees 12%, Hoverflies 63% and Solitary Bees 4%).



Figure 26 An example of some of the pollinators found on the farms.

Solitary bee nest sites

The 300 bare soil sites and 130 bee boxes which were created by the 40 participant farmers have been maintained. An estimated 35% are occupied by solitary bees.

Eighty-one bare soil sites from 40 farms were monitored (convenience sample: sites that were easy to access and not far from the farm survey locations) to assess if the site was occupied by solitary mining bees. The area, aspect, general context (location and whether the nest was manmade), number of nests, and shade for each site was recorded. Each site was monitored for ten minutes. Within the first 4 months, the exposed areas of bare soil were already successfully colonised by mining bees, and one-third of nest sites were occupied (27 out of 81 sites). Across nineteen farms, a total of nine different bees were observed. Three *Andrena* bees (Buff Mining Bee, Chocolate Mining Bee, and Gwynne's Mining Bee), six sweat bees (Gooden's Nomad bee, Marsham's Nomad Bee, *Halictus tumulorum*, *Halictus rubicundus*, and a species of *Lassioglossum* and *Sphecodes*).

Nest sites were occupied on all farm types (5 beef, 5 dairy, 4 mixed and 5 tillage). The most common bee to nest was *Halictus rubicundus* (found on 9 farms) and Marsham's Nomad Bee came in a close second (8 farms). All results reported here include data on active occupied nest sites only.

Twenty-nine nest boxes from 18 farms were monitored to assess if the nest box was occupied by solitary cavity bees. The aspect, general context (location), number of nests and the size of each nest box was recorded. Each nest box was monitored for ten minutes. Eleven bee boxes from eight farms were occupied. *Megachile* sp was the only species observed flying into a nest box. Other bees had not emerged from their nests at the time of surveying. *Megachile centuricularis*, *M. versicolor* and *Hylaeus confusus* were observed flying close to nest boxes.

Communication and engagement

Farmer Training and Presentations

We had seven online farmer training events:

- How to fill in the scorecard revision (25 in attendance)
- Top ten plants on farmland and how to identify them (12 in attendance).
- Top five pollinators on farmland and how to identify them (18 in attendance).
- Solitary bee nesting habitats (18 in attendance).
- Citizen Science at the National Biodiversity Data Centre (9 in attendance).
- Filling in the Farm Pollinator Scorecard as accurately as possible (20 in attendance).
- Creating and maintaining Pollinator-friendly habitats on the farm hedgerows and hay meadows (18 in attendance).

Six farm walks were organised by the participant farmers. These farm walks were organised for protect participants but were attended by other farmers and farming organisations as well as participant farmers. The aim of the farm walks was to showcase the range of pollinator-friendly actions that were being implemented on each farm. These farm walks were also used to further discuss the updated pollinator scorecard.

Saorla Kavanagh gave several presentations online and in person:

- *Shaping the Future for Pollinators - Innovations in Farmed Landscapes*, UK.
- *Origin Green 'Pathways to Biodiversity' - a Company Viewpoint Webinar*.
- *Biodiversity Training*, Bord Bia Staff Sustainability Training Days (and Ruth Wilson).
- *Preserving and restoring ecosystems and biodiversity*, Interreg Europe event (PROGRESS).
- Guest lecture to fourth year undergraduate students in the Institute of Technology Carlow.
- Fifth Irish Pollinator Research Network Meeting, January 2022.

Úna FitzPatrick presented on the project at an Interreg Europe event (PROGRESS). She also gave a Bord Bia webinar and discussed the project during a wider Pollinator Plan talk for the Teagasc Signpost webinar series.

Action Sheets

Action Sheets offer advice on what works best on Farmland based on the EIP Data. All Action Sheets combined will form the basis for the 2023 Guidance Document for Farmers.

The first Action Sheet using the data from the Protecting Farmland Pollinators EIP project was developed. This action sheet outlines how best to create solitary bee nest sites on your farm.

https://biodiversityireland.ie/app/uploads/2022/05/ActionSheet_Solitary-Bees-WEB-2.pdf

Articles and Blog posts

Saorla Kavanagh:

- *Creating a network of flower-rich meadows across farmland:* https://biodiversityireland.ie/meadow_network/.
- *Farmers working together to help biodiversity:* <https://biodiversityireland.ie/farmers-working-together-to-help-biodiversity/>.
- Published an article in the Organic Trusts Clover Magazine, May 2022.
- Contributed to an article for the Dairy Councils Summer Newsletter: Dairy farmers working to create a buzz on farms, May 2022.
- Published two articles in Biodiversity Ireland (Autumn 2021 and Spring 2022 issues).
- Contributed to the Biodiversity Booklet published by the Irish Examiner in May 2022.

Tom Tierney

- Protecting Farmland Pollinators – A Farmer’s Perspective: <https://biodiversityireland.ie/protecting-farmlands-pollinators-a-farmers-perspective/>.



Figure 27 Tom Tierney’s farm

Media

The project produced three promotional videos in May 2022.

- Introduction to the Protecting Farmland Pollinators EIP <https://www.youtube.com/watch?v=cORImcbOQ3E>
- Farmer Interviews https://www.youtube.com/watch?v=K_LY4LyDrVk
- Short farmer clips <https://www.youtube.com/watch?v=khI9Z3gBss8&t=2s>

The project contributed to the National Rural Networks EIP-AGRI Participating Farmer Video Blog Series: Episode 7: Protecting Farmland Pollinators Project <https://www.youtube.com/watch?v=-cQj4euvEvY>.

The All-Ireland Pollinator Plans Farmland Officer, Ruth Wilson, participated in a podcast with Teagasc in July 2022 promoting the project <https://www.teagasc.ie/environmentedge/>.

The project was also promoted by Dr Michelle Larkin through the Glanbia Living Proof Online event: Sustainable Farming in a Changing Environment, October 2021 <https://www.youtube.com/watch?v=X9c6iBsGACE&t=14s>.

The project was mentioned in three articles as part of the Festival of Farmland Biodiversity 2022:

- <https://www.tirlan.com/our-story/news/shane-oloughlin-protecting-the-land-for-the-next-generation> Shane O'Loughlin - protecting the land for the next generation
- <https://www.agriland.ie/farming-news/addressing-challenges-to-farmed-landscape/>
- <https://www.farmersjournal.ie/watch-one-third-of-98-wild-bee-species-threatened-with-extinction-700360>

Other

An online hoverfly identification training course was created (Owen Beckett, Saorla Kavanagh and Úna Fitzpatrick). The free course can be accessed at: <https://learn.biodiversityireland.ie/>.

The first hoverfly identification flyer was produced: Six species common on farmland.

Scoring System Guidance Document and one page Scoring System Guidance Sheet was distributed to participant farmers.



Figure 28 Front and back of the Hoverflies: six species common on farmland flyer.

Seasonal Farmland posters for pollinators (Ruth Wilson and Úna Fitzpatrick) <https://pollinators.ie/farmland/>.

A monthly project newsletter was established in June 2020 and is distributed to the participant farmers, the Operational Group, and other interested parties. The newsletters are available to download on the National Biodiversity Data Centre's website: <https://www.biodiversityireland.ie/farmland/>.

The Project manager is disseminating the project through Twitter (@SaorlaKK, #FarmlandBiodiversity) and is further supported by the AIPP and Data Centre's Twitter accounts (@PollinatorsIreland and @BiodiversityIreland). Biodiversity Ireland's Facebook page is also used to disseminate the Project's updates.

The Protecting Farmland Pollinators Project is featured on the European Results based Payments Network website, (see: <https://www.rbpnetwork.eu/country-infos/ireland/protecting-farmland-pollinators-17/>).

The project manager also joined a European Innovation Partnership (EIP) webinar working group. The webinars are organised by the European Forum on Nature Conservation and Pastoralism with support from the Heritage Council and in collaboration with Galway-Mayo Institute of Technology. The webinars aim to bring together the broader land management /agri-environment EIP projects within Ireland.

Pre 2021

- Protecting Farmland Pollinators Annual Report, October 2021 <https://biodiversityireland.ie/projects/protecting-farmland-pollinators/>.
- A Children's Farming Newsletter was published in May 2020 and is available here: <https://www.biodiversityireland.ie/wordpress/wp-content/uploads/Newsletter-Farming-Kids-EIP-Pollinators-Issue-1.pdf>.
- A WhatsApp group was set up for the 40 participant farmers and their families. Thirty farmers are currently in the group. There is a great buzz in the group with lots of ideas and photos being shared.
- The Project website was launched in February 2020 www.biodiversityireland.ie/farmland/.
- Participant beef farmer Kim McCall and Dr Úna Fitzpatrick (Project Co-ordinator) were interviewed about the project on Nationwide May 2020. The coverage of the project is available at: https://www.youtube.com/watch?v=VFQlTrWUGh4&feature=emb_logo.
- The project manager participated in an interview with 'Midlands Science' for an online TV series for children funded by Science Foundation Ireland: https://www.youtube.com/watch?v=mA8pQNs_8MQ&feature=youtu.be.
- Neus Rodriguez Gasol (ecological survey team member) wrote a blog describing the different methods being used to assess Farmland Biodiversity. It is available at: <https://www.biodiversityireland.ie/measuring-farmland-biodiversity/>.
- A short blog was published by the AIPP for Pollinator week: 'Working together with farmers to help pollinators' <https://pollinators.ie/working-together-with-farmers-to-help-pollinators/>.
- The Farmers Journal <https://www.farmersjournal.ie/farmers-taking-part-in-new-pollinator-project-530842>
- The Kildare Nationalist <https://kildare-nationalist.ie/2020/03/10/new-project-aims-to-get-farms-buzzing-again/>.
- The Irish Times <https://www.independent.ie/business/farming/tillage/helen-harris-how-does-biodiversity-drive-square-with-the-demand-for-cheap-food-39029208.html>.
- Saorla Kavanagh presented the project at a Tillage Industry Ireland meeting in January 2020. The project was also presented at a Clare Biodiversity Training workshop, an AIPP consultation meeting at the Ulster Beekeepers Association Annual Conference in February 2020, the Burren Winterage School, October 2020 and at a Teagasc Tillage Training workshop in December 2020.
- Andrew Bergin (participant tillage farmer) presented the project at the *Halting the Loss of Pollinators Conference*, Brussels, 2020.



Figure 29 Images shared in the WhatsApp group by participant farmers Colm Flynn, Fergal Byrne, James Creighton, John O'Loughlin, Kim McCall, Rachael Creighton, and William Mulhall.



Final Year: Plans for 2023

The aim is to ultimately create a scoring system that is fully evidence-based. The data from the 2020 surveys will be used to achieve this.

Large amounts of data on the biodiversity present on each of the 40 test farms were successfully collected between May-August 2020. Further analyses of these data will be carried out. The data generated from the farm surveys will be used to answer the following questions:

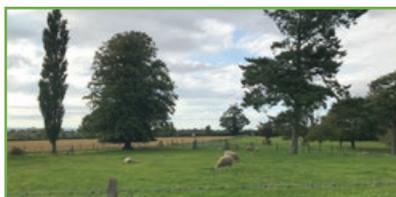
1. Do farms that score higher have a greater abundance and/or diversity of pollinators (wild bees/hoverflies)?
2. Do farms that score higher have a greater abundance and/or diversity of biodiversity?
3. Which of the pollinator measures are most effective in Ireland?
4. How does pollinator diversity and abundance vary by farm type and what actions are most effective in each farm type?

“How does pollinator diversity and abundance vary by farm type and what actions are most effective in each farm type?”

Development of resources to support farmers

Action Sheets

Three additional evidence-based Action Sheets will be produced:



Action Sheet 2

Trees for Pollinators on the farm



Action Sheet 3

How to manage hedgerows for pollinators on the farm



Action Sheet 4

Fields and flowers for pollinators on the farm

Guidance document

A guidance document on how to take action to protect pollinators on the farm will be produced. This document will contain all the evidence-based Action Sheets. It will provide examples on how best to provide food, safety, and shelter for pollinators and wider biodiversity on the farm. This document will be produced in consultation with farmers and will be based upon the All-Ireland Pollinator Plan's 'Farmland Guidelines'. This document will ensure the greater protection of farmland pollinators across the participant farms and will help to improve awareness and understanding of the project for the whole farming community. It will include lots of real-life examples to make it as easy as possible for farmers to understand the features on their farm that are most beneficial for pollinators.

Final Report

The final report will highlight all the project's success stories and the lessons learned.

Training

Training will be available online and on the farm. Training will be made available to all 40 farmers.

Farm Walks

Three farm walks will be held in 2023

Promotional Flyers

Four more hoverfly flyers will be produced. These flyers will show different hoverfly species and will list their key identification features. The following Flyers will be produced:

- Bumblebee mimics
- Garden Hoverflies
- Wasp mimics
- Spring hoverflies

Farmer profile

Andrew Bergin is a tillage farmer from Athy, Co Kildare. He farms 130 hectares of mostly owned land and grows a range of combinable crops, including barley, beans, oil-seed rape, oats, peas, and wheat.

Andrew uses a no till farming system. He manages the soil to encourage high levels of biological activity. He sows cover crops and is constantly experimenting on the farm to see what species work best for his soil and rotation. His approach is enabling him to improve the soil structure, the microflora and insect populations both below and above ground. Integrated crop management is practiced, minimising the use of pesticides. No insecticide has been used on the farm in the last 5 years.

Andrew cuts most of his hedges on a 3-5-year rotation. Most of his fields contain 3-metre margins rich in floral diversity. Both his hedges and margins are usually buzzing on a summer's day. The field margins act as roadways for the tractor allowing access to the field all year round benefiting both the farmer and biodiversity. Areas on the farm that were identified as difficult to cultivate were planted with a variety of tree species or allowed to naturally rejuvenate. Some of these have been in place for over 10 years and provide excellent cover for birds. It is not surprising that there is always bird song on the farm, whether it is a yellow hammer, lapwing, or a common robin. In one area, the pyramid orchid has established and is flourishing.



Figure 30 Grattonsbrook Farm



Andrew's farm is moving away from excessive inputs and using new ideas and knowledge to manage his farm.

"It is important to get involved in and look at local research so we can each discover what is best for our own soils, not what chemical is best to throw on it."

Andrew is an active participant in the project offering support and advice whenever required. He is the highest scoring tillage farmers and received 340,498 pollinator points in the farming year 2020/2021. Andrew is a member of BASE Ireland, the Danu EIP, a former IFA (Irish Farmers Association) national committee chairman and has been involved in several business start-ups, including spending five years as Technical Director of Cropsure Ltd, which runs the Irish Grain Assurance Scheme. He has a National Certificate in Business Studies and a Certificate in Agriculture.



Figure 31 Grattonsbrook Farm Walk September 2022



Thanks to the participant farmers

Farmers have used the whole-farm pollinator scorecard to score their own farms for two consecutive years. Farmer engagement with the project has been very positive. Farmers have provided positive feedback on the locally led approach to the project, the results-based payment mechanism, and the simplicity of the scorecard. The farmers have been a great team to work with and an invaluable resource in terms of providing vital information on what biodiversity friendly management practices are possible on the farm.



Protecting Farmland Pollinators



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