



Farmer Clusters for Realising Agrobiodiversity
Management across Europe

Advanced Farmer Cluster Facilitator training programme and training events

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1. Background to the FRAMEwork project

1.1 FRAMEwork Project Executive Summary (*abbreviated*)

Biodiversity is essential for agroecosystem resilience, sustainability, and long-term food security. Traditionally, management for short-term economic returns has taken priority over management for the environment. Current mechanisms for compensating and encouraging farmers to apply biodiversity sensitive management strategies are often inefficient, being applied at individual farm rather than landscape level, and tend to be generic solutions, imposed from the top down at an EU or national level. Monitoring is rarely carried out and there is therefore little scope for evaluating the success of strategies in achieving improvements to farmland biodiversity.

The FRAMEwork project has been designed and develop a novel alternative to this called the **FRAMEwork System for Biodiversity Sensitive Farming** to enable the transition of EU farming systems to a position where they can conserve biodiversity and benefit from the enhancement of ecosystem services, while mitigating agronomic or economic risks. The FRAMEwork System combines the following elements:

- **Advanced Farmer Clusters** – local farmer groups working as a collective to deliver landscape scale management, supported by a Cluster Facilitator with expertise in agriculture and the environment, and linked to a local Cluster Stakeholder Group to inform and promote policy and practice, organised into regional, national, and international networks.
- **Technical Resource** – technical specialists associated with the regional, national, international networks to provide technical information, methods, and tools to support agrobiodiversity monitoring, management and policy including the dedicated DSTs – FRAMEselect and FRAMEtest.
- **Scientific Innovation** – researchers associated with regional, national, international networks to provide knowledge on the ecology, sociology and economics that underpins the functioning of sustainable agricultural systems.
- **Citizen Observatory and Information Hub** – an open access platform to support FRAMEwork networks, sharing activities, information, data and resources between farmers, scientists, policy makers, and citizens.

The FRAMEwork project will design, build, test, and deploy a prototype of the FRAMEwork System for Biodiversity Sensitive Farming and will work with 3 concepts important to the success and delivery of the project: (i) promoting collective landscape management; (ii) applying the approach across a diversity of European farming systems; and (iii) understanding and supporting the social and ecological change associated with a transition to biodiversity sensitive farming.

1.2 Project Partners

No	Participant organisation name	Type	Country
1*	The James Hutton Institute (HUTTON)	Research Inst	UK
	Game and Wildlife Conservation Trust (GWCT)	Non-profit	UK
3	Groupe de Recherche en Agriculture Biologique (GRAB)	Non-profit	FR
4	Universitaet fuer Bodenkultur Wien (BOKU)	University	AT
5	Eesti Maaulikool (EMU)	University	EE
6	Hoehere Bundeslehr- und Forschungsanstalt fuer Landwirtschaft Raumberg-Gumpenstein (AREC)	Research Inst	AT
7	Fundacion Artemisan (ARTEMISAN)	Non-profit	ES
8	Scuola Superiore di Studi Universitari e di Perfezionamento Sant'anna (SSSA)	University	IT
9	The University of Hertfordshire Higher Education Corporation (UNI OF HERTS)	University	UK
10	Centro de Investigacion Ecologica Yaplicaciones Forestales Consorcio (CREAF)	University	ES
11	Institut National de la Recherche Agronomique (INRA)	Research Inst	FR
12	Internationales Institut fuer Angewandte Systemanalyse (IIASA)	Research Inst	AT
13	Universiteit van Amsterdam (UvA)	University	NL
14	Luxembourg Institute of Science and Technology (LIST)	Research Inst	LU
15	Universitaet Osnabrueck (UOS)	University	DE
16	Taskscape Associates Limited (TAL)	SME	UK
17	Ceska Zemedelska Univerzita v Praze (CULS)	University	CZ
18	Nordisk Fond for Miljo og Udvikling (NORDECO)	SME	DK

*Coordinating institution

1.3 Purpose of the Deliverable

The objective of deliverable 2.2 is to develop training materials and to deliver training events for facilitators, following feedback of their requirements.

In this report, we summarise facilitator training events that have taken place since the project's inception. In relation to the facilitator training programme, which is targeted towards new facilitators we outline the training content, mode of delivery and feedback process.

2. Summary of Facilitator training events

The project aims to develop and provide training programmes and events for facilitators, farmers, and volunteers. Training has been provided in the form of 1) peer to peer learning, 2) training from experts, and 3) online learning.

2.1. Peer to peer learning

Monthly online meetings were held for facilitators and lead partners in Farmer Clusters (FC) from February to September 2021. These meetings were used as a platform to discuss progress with the establishment of each FC, provide an opportunity for facilitators to ask questions, share experiences and bounce ideas off each other.

In mid-June 2022, the meetings took a more formal format with each FC delivering a short presentation (Table 1, Figure 1) outlining progress in their FC, informally discuss issues and learn from each other.

Table 1. Presentation dates of formal FC meetings held in 2022 and 2023.

Facilitator presentation	Date
Zeeasterweg Farmer Cluster (NL)	9/22
Buchan Farmer Cluster (UK)	9/22
Velké Hostěrádky Farmer Cluster (CZU)	11/22
Born Farmer Cluster (LUX)	11/22
Mostviertel Farmer Cluster (AU)	1/23
Cranborne Chase Farmer Cluster (UK)	1/23
Cazadores de Aguilar Farmer Cluster (ES)	4/23
Kanepi kihlkund Farmer Cluster (ET)	4/23
Mostviertel Farmer Cluster (AU)	7/23
Val Graziosa Farmer Cluster (IT)	7/23
Basse Durance Farmer Cluster (FR)	7/23

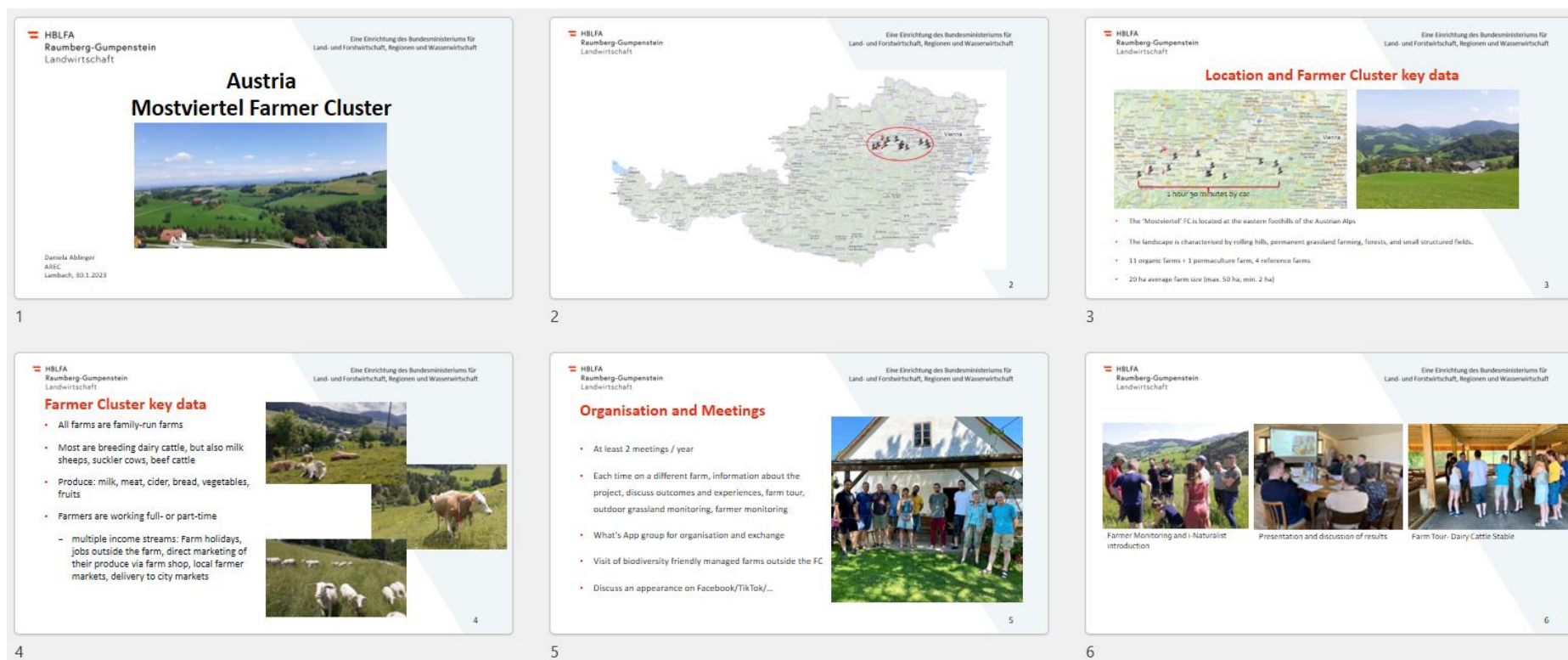


Figure 1. Slides from the Mostviertel Farmer Cluster presentation given in January 2023, which covered areas such as location, key data, organisation and meeting structure, biodiversity friendly measures and how they address the wider public.

2.2. Training from experts

Over the first 2 years of the project, a number of training events were organised for facilitators. These are summarised in Table 2.


Table 2. Summary of training event organised for the facilitators.

Date	Training Description
Jan. 2021	Being a facilitator GWCT held an online training meeting with new facilitators where facilitator's role and responsibilities were defined alongside ground roles for working with farmers (Figure 2).
2021	Biodiversity Monitoring Protocol LIST, HUTTON and GWCT developed a series of expert monitoring protocols for assessments of pollinators, birds and vegetation (Task 5.4: Indicator monitoring tool development). Training in the use of these protocols was provided to all facilitators by LIST and GWCT, who were available to provide expert advice, and supporting materials to less experienced facilitators. This period of training covered the 2021 trial biodiversity surveys and baseline surveying in 2022. Following additional reviews of the protocols, updated versions of the data entry and recording sheets were circulated by GWCT in March 2024 and project partners (LIST, HUTTON and GWCT) will again be available to provide expert advice to facilitators during the 2024 biodiversity monitoring period.
2022	Geographic Information System Mapping Protocol HUTTON and GWCT developed a Geographic Information System mapping protocol and held a series of meetings with FC facilitators to discuss any issues with implementing the protocol. HUTTON have provided additional one-to-one advice and training for facilitators in relation to FC mapping when necessary.
2022	iNaturalist Facilitators received training on the use and value of the iNaturalist platform for FC activities provided by IIASA. The iNaturalist platform is now being used as a tool to record citizen science observations by the several FC farmers and other citizens.
Mar. 2023	Running a Farmer Cluster At the 2023 annual meeting, farm walks were planned that involving elements of facilitator training. In the morning walk on the established Martin Down FC lead by Peter Thompson (who was involved in initially setting up FC in the UK and Megan Lock (a GWCT FC facilitator), there was a strong focus in the session on discussing how to run a FC, common obstacles and how to engage with farmers. They areas they covered were: <ul style="list-style-type: none"> • The history of Farmer Clusters in the UK • The highs and lows – what has been challenging for you as a facilitator, how have you overcome any issues? • Cluster aims – how were they selected? • Monitoring – what monitoring has been done? How do you involve farmers and volunteers? • Farmer engagement • General tips from your experience – what has worked or not worked in your experience? • Farm events and visits to other farms/farmer clusters The final session, a Q&A was held with two English FC facilitators. They covered the following: <ul style="list-style-type: none"> • The Farmer Cluster – How and why was it set up? How are you funded (pros and cons)? Some information on the farming system and area. What are the FC aims and how were they decided? Did you steer them or did they decide themselves?

Date	Training Description
	<ul style="list-style-type: none"> • Meetings – how often to you meet with your Cluster? What does a typical meeting look like? Is it short? Do you tag an activity along with it? Do you have problems with farmer engagement and how do you deal with this? • Monitoring – are you monitoring species to meet your clusters aims? How is monitoring conducted? Are farmers involved in monitoring? Collaboration with volunteers? • Outreach – do you hold any Farmer Cluster events e.g. open farm Sunday, does this help with farmer motivation? • Training – what kind of training activities do you hold? Are these just for farmers or the wider audience? How are the events selected – by the farmers? • Problems – what has been difficult in setting up and managing the Farmer Cluster? • What have you learned from these problems? Solutions? <p>Evening speakers were also invited to the annual meeting dinner, Andrew Hoodless (Head of Research, GWCT) and Nick Sotherton (retired Head of Research, GWCT) gave Past to Future Perspectives - talking about evolution of landscape scale, bottom-up collaboration on farms. Reflecting on the origins of Farmer Clusters, the present and looking to the future - giving the facilitators energy, inspiration or hope for continued progress.</p>

Optimised FC approach

- Feasible/achievable and delivering the greatest changes with the given resources
- Success is measured – citizen science and scientific monitoring
- Creates a legacy that persists beyond the project and FC
- Is acknowledged by stakeholders/public etc – recognition/reward for job well done



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Approach – job list

- 1) Define cluster members and the geographic boundaries
- 2) Decide on whether a legal agreement is needed between partner and cluster
- 3) Select and employ a facilitator. Define their job role.
- 4) Farmers to meet and decide their priorities
- 5) Facilitator to visit all farms and identify their potential – map location of all non-crop habitats
- 6) Farmers & facilitator to identify biodiversity that will be first targeted, prepare a programme to proceed – year plan
- 7) Identify potential funding sources – Agri-environment, sponsors
- 8) Go for easiest options that will deliver a benefit first – boost farmer confidence

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Approach – job list


- 9) Plan training events based around the targeted biodiversity – encourage team bonding, social event + training
- 10) Farmers and facilitators to discuss monitoring – potential for citizen science
- 11) Partner to discuss with farmers the extent of any media profile. Do they wish to independently promote their FC or via project partner
- 12) Identify willingness to connect with local stakeholders, host events etc
- 13) If appropriate start to build media profile – FC website, Facebook, Twitter etc



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Ground rules

- Must always be farmer-led – we are monitoring the approach not leading it
- Facilitator must be main contact with farmers, all enquiries via the facilitator or partner science lead if appropriate
- Stakeholders that have specialist knowledge and wish to be involved – invite to training events/contribute to Hub, farmers can then decide on whether to adopt recommendations
- FC meetings – farmers only + facilitator/science lead if invited
- Don't overload farmers with requests for information
- Fieldworkers – use a code of conduct to avoid irritating farmers
- First meeting with farmers – discuss ground rules, access to data, access requirements, willingness to participate in social studies & data anonymity – prewarn them so they can discuss these issues



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Facilitators

- Do they need training?
- Key topics for training?
- How to achieve this – online/study tour – UK possible (arable/horticultural/livestock)

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Monitoring – T2.3

- Overlap with T3.2, T5.2, T5.4, T7.1 – need to clarify roles & responsibilities (separate meeting)
- When – years 1, 3, 5 in project application
- Experimental designs - Before-After, Control-Impact or BACI
- Common protocols for set of key indicators?
- Give feedback to farmers on what has been found - motivator

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Figure 2. Slides from presentation providing initial guidance to FRAMEwork Farmer Cluster facilitators on their role.

In addition to these and following consultation with FRAMEwork FC facilitators, the facilitators received in person training in:

- engagement of farmers and the public in citizen science (Luxembourg, 03 May 2022);
- how to run a bioblitz (Luxembourg, 03 May 2022);
- game and wildlife monitoring through the Observatorio cinegético (Aguilar, Spain, 3 May 2023); and
- Mapit Spatial app (Aguilar, Spain, 3 May 2023).

Finally, some facilitators received local in person training for monitoring, bird identification and the use of cover crops to introduce biodiversity. For example:

- In November 2020, the facilitator from the Spanish FC (ARTEMISAN) received hand-on training on the use of cover crops by experts at Cordova University, who have expertise in implementing cover crops, though with limited success. They proposed two options regarding cover crops: 1) to allow natural vegetation to grow and conduct two cuts (March and May); or 2) use non-palatable plant species for wild rabbits, which are a problem because they may eat everything. The facilitator had a further meeting on June, 9th 2021 to visit the Experimental Area and review the implemented measures.
- the facilitator from the Burgenland Austrian FC (BOKU) received training on other variants of monitoring provided by the ÖKL (Austrian Board of Trustees for Agricultural Engineering and Rural Development) (Figure 3).



Figure 3. Field work with people from the ÖKL on 2021/07/15.

- The facilitator from the Scottish cluster (HUTTON) received training on bird identification and how to perform bird surveys (Figure 4).



Figure 4. Bird identification training received by the Scottish facilitator on July 15th, 2021.

2.3. External online learning

In January 2023, several Farmer Cluster Facilitators attended the “Farmers, citizen science and environmental monitoring” online symposium, targeted at those interested in working with farmers as 'citizen scientists' to support environmental monitoring. It was hosted by the UK Environmental Observation Framework and its Citizen Science Working Group and supported by UK Centre for Ecology & Hydrology and Joint Nature Conservation Committee, with speakers from across Europe sharing their experiences.

3. Training programme

The Training Programme presented here draws together learnings from the FRAMEwork Farmer Clusters and externally sourced information. Relevant resources, including tools and media content produced by the project, will be linked or embedded around the Training Programme modules as part of their dissemination on the project's Info Hub Recodo, the online home of our Advanced Farmer Cluster Network. Red text represents content that is planned or in progress by the project.

3.1 Course content

Training programme: Promoting biodiversity across farming landscapes

Background

There is only so much that an individual farm acting in isolation can achieve alone. By working together as a Farmer Cluster, empowered by an advisor or 'facilitator', farmers and land managers can collectively deliver greater benefits for biodiversity at a landscape scale: managing functional biodiversity vital to their own farming systems, like soil health and pollination, while contributing to broader sustainability and conservation priorities in their regions.

Overview:

This course is for those exploring the world of Farmer Clusters:

- ✓ Are you interested in setting up a Farmer Cluster but don't know where to start?
- ✓ Are you a Facilitator, lead Farmer, or supporter looking for best-practice information and insights?
- ✓ Are you curious about Farmer Clusters as an approach to tackling biodiversity loss and agricultural sustainability?

On this course, key actors in Farmer Clusters, including facilitators and lead farmers, will gain a better understanding of the skills needed to create and manage Farmer Clusters - from working with farmers on the ground to increase biodiversity, to enlisting the support of wider actors supporting biodiversity within agricultural ecosystems. No Farmer Cluster succeeds alone and interested parties from NGOs, policy, finance, ethical consumerism, and community advocacy will also find this course valuable.

Through our modules you'll explore key topics such as how to set up and manage a Farmer Cluster and also cover some of the common issues Farmer Clusters experience in their initial phases. One of the main aims of Farmer Cluster groups is to improve biodiversity, or an element of biodiversity, so we'll provide context on the importance of agricultural biodiversity, how it can be measured and methods that Farmer Clusters can apply to improve biodiversity at a landscape scale. You'll also learn about methods of engagement and community involvement in Farmer Clusters and how citizen science can help your group achieve their goals. Lastly, you will learn about current funding streams available to

Farmer Cluster groups. Throughout, we'll use case study examples and content from across our new European network of Clusters to ground the material in real world activity.

Course content

The programme will be delivered online and is divided into 5 modules, which are outlined below:

- Module 1: Farmer Cluster creation and management
- Module 2: Understanding biodiversity in agriculture
- Module 3: Monitoring Biodiversity
- Module 4: Managing agricultural landscapes for biodiversity
- Module 5: Engagement and outreach

What will you achieve?

By the end of the course you will...

- ✓ Understand the ethos behind Farmer Clusters
- ✓ Understand the main obstacles and issues faced in Farmer Cluster facilitation and identify ways to overcome them
- ✓ Be able to describe biodiversity monitoring approaches appropriate for different farming contexts
- ✓ Be able to describe a variety of biodiversity friendly habitat management approaches
- ✓ Understand the importance of internal and external Farmer Cluster communication

Who is the course for?

There are no previous training or entry requirements for this course. The course is delivered online and is self-guided. It will be of particular benefit to new farm advisors or farmers with an interest in learning about farm management for biodiversity.

Module 1: Farmer Cluster Creation and Management

Learning goals

By the end of this module, you will....

- ✓ Be able to define what a Farmer Cluster is and why they are important
- ✓ Understand the origins of Farmer Clusters
- ✓ Be able to identify the key actors in a Farmer Cluster

- ✓ Understand the key steps in establishing a Farmer Cluster
- ✓ Identify barriers that might hinder the success of a Farmer Cluster

Section 1: Background

Introduction

From biodiversity enhancements to farm business support, there are many potential benefits to establishing or joining a Farmer Cluster. The process of establishing and managing a Farmer Cluster can, however, seem like a huge task. This module will guide you through the main routes to establishing a Farmer Cluster, common pitfalls in their management and ways to overcome them.

What is a Farmer Cluster and why are they important?

A 'Farmer Cluster' is a regional community of farmers who share knowledge and support one another in, improving the ecological health of their farms.

Farmer Clusters offer a way to scale-up biodiversity conservation, from farm-scale to landscape-scale and achieve stronger joined-up impacts on ecosystem health.

They often bring diverse groups of farmers together - from conventional to organic - and provide opportunities to collaborate with and learn from peers, researchers, NGOs and local communities.

Farmer Clusters can help farmers keep pace with their fast-evolving sector through aspects like group training and support navigating Agri-Environmental schemes.

Farmer Clusters origins and history

The first Farmer Clusters were piloted in England by the Game and Wildlife Conservation Trust in 2013. The idea grew from a government funded Nature Improvement area (NIA), which was farmer Led, the Marlborough Downs NIA and the Grey Partridge Recovery project on the Peppering Estate at Arundel, Sussex, England. From these projects, the importance of peer-to-peer learning and the bottom-up, farmer led approach to farmland management for conservation became clear. This was opposed to previously imposed top-down processes for farmland conservation in England, where environmental priorities were set by government bodies. Today there are over 100 Farmer Clusters in England, the majority of which have been set up since 2015 when facilitator funding became available to Farmer Cluster groups.

In 2020, Farmer Clusters were introduced to Europe through the FRAMEwork project (www.framework-biodiversity.eu) which is establishing and piloting 11 Farmer Clusters across different countries, representing different climatic zones and cultures.

Section 2: Farmer Cluster Structuring

Key actors

1. Lead Farmer: They could also be described as the group chairman. They are the steering member of the group.
2. Facilitator: The facilitator has a dual role of providing advice to farmer member to help them achieve their environmental objectives and offering administration support
3. Volunteers: Enable data on farmland wildlife to be gathered at a much wider scale and in more depth than a Farmer Cluster could achieve on its own.

Read the following infographics on how to set up a Farmer Cluster.

Scenario 1:



Scenario 2:



Section 3: Running a Farmer Cluster

Keys tasks for facilitators running a Farmer Cluster

- Regular meetings to discuss aims and progress will help keep the group on track with their targets.
- The facilitation of wildlife monitoring activities is important to determine if the Farmer Cluster is achieving its aims. Monitoring is usually focused on the group's priority species, species groups or wider environmental interests e.g. soil health.
- Training events are needed to upskill the key actors in a Farmer Cluster. They are particularly useful in providing habitat management and monitoring advice.
- Creating a public profile for your Farmer Cluster can play an important role in widening your network, attracting volunteers, and boosting farmer motivation.
- Identifying funding opportunities

Common Farmer Cluster challenges

- Lack of motivation. This is something you should try to foresee in the early stages of Farmer Cluster formation or, if possible, before you start to put a group together. The first step is to recognise farm-level and regional conservation priorities that farmers are already impacted by, aware of, or interested in. The facilitator's role is to ensure every farmer has a voice in the group to help members feel invested and motivated. Facilitators often also draw out new motivations by sharing knowledge and opportunities that farmers may not yet be aware of.

- Poor meeting attendance. Make sure your meetings are timed around what best suits the group. This could be done by using a [Doodle poll](#) to arrange each meeting or by having a set meeting time monthly or quarterly. When a group member has missed several meetings phone them or arrange to meet them in person to understand why they can't attend.

Activity

Draft a first-year management plan for your current or proposed Farmer Cluster by answering the following questions:

- Who will facilitate the group?
- Who will you invite to join the group? Do they share commonalities?
- When will you hold your first meeting?
- Who will you invite to the first meeting?
- How frequently will you hold meetings going forward?
- Where will you hold group meetings?
- What management actions could the group take to improve biodiversity?
- What elements of biodiversity are likely to be of interest to the group/your area?
- What are the groups potential training requirements?
- How many training events will you hold in the first year?
- What external actors might be able to help your group?
- What funding options are there for your group?

Additional materials (red text indicates material is not yet published)

Learn more about Farmer Clusters and how to manage Farmer Cluster groups in the guidelines below. These guidelines help answer fundamental questions including: How to start a Farmer Cluster? How can I motivate my group? And what are the key tasks in managing a Farmer Cluster?

- [Farmer Clusters- An Overview](#)
- [Starting A Farmer Cluster](#)
- [Managing A Farmer Cluster](#)
- [FRAMEwork: a system-wide approach to biodiversity sensitive farming in Europe - IOBC-WPRS](#)

Dive deeper into how Farmer Clusters arose and their benefits including the provision of farm business support (e.g. support in applying for agri-environment scheme funding), social capital (e.g. support network, shared learning), power and influence, self-promotion and landscape-scale delivery of habitat change in the one-hour video below:

- [Benefits of Cluster Farmer Groups - Groundswell Sessions 2021](#)

Quiz (answers in green)

Ensure you have read all of the given materials and additional materials before taking this test.

1. Fill in the gaps: A 'Farmer Cluster' is a community of farmers, located in the same region, who share knowledge, support and motivate each other to improve biodiversity and the ecological health of their farms.
2. Where were the first Farmer Clusters piloted?
 - a. England
 - b. Italy
 - c. Norway
3. Name the key actor. They could also be described as the group chairman. They are the steering member of the group.
 - a. Facilitator
 - b. Lead Farmer
 - c. Volunteer
4. Which of the following are key tasks for a Farmer Cluster facilitator? Tick all that apply
 - a. Organising meetings
 - b. Identifying funding opportunities
 - c. Organising training events
 - d. Undertaking farm habitat management

Module 2: Understanding Biodiversity in Agriculture

Section 1: Importance of Biodiversity in Maintaining a Healthy Planet

Learning goals:

By the end of this module, you will...

- ✓ Be able to define biodiversity.
- ✓ Be able to describe the critical role of biodiversity in sustaining ecosystems and essential functions.
- ✓ Recognise the threats to biodiversity and the need for conservation efforts.

Definition: Biodiversity can be defined as the diversity of living organisms with an ecosystem. This can include genetic, species and ecosystem diversity and represents a broad spectrum of organisms from microscopic bacteria to large plants and animals.

Brainstorming activity:



Biodiversity is under threat:

Biodiversity provides essential services such as climate regulation, pollination, and food supply as well as the creation of medicines and coastal protection. However, the expansion and intensification of human activities have significantly reduced biodiversity, leading to habitat destruction, population declines and species extinctions. Habitat destruction, hunting and climate change are just a few broad factors threatening biodiversity worldwide.

Biodiversity loss on farmland has occurred primarily due to intensive agricultural practices that prioritise high yields and monoculture crops over ecological diversity. Pressure on farmers to continue in this way has only increased as markets have sought cheaper and more convenient food.

Key factors contributing to biodiversity loss on farmland include:

1. *Habitat Destruction*: Conversion of natural habitats such as woodlands, wetlands and biodiverse grasslands into agricultural land or developments has resulted in the loss of crucial diverse ecosystems and species.
2. *Monoculture Farming*: Pressure to increase yields and accommodate large machinery has resulted in large-scale cultivation of a single crop species, reduced habitat diversity, disrupted natural ecological processes and reduced food and shelter availability for wildlife.
3. *Chemical inputs*: Widespread use of synthetic pesticides, herbicides and fertilisers in agriculture contaminates soil, water and air, negatively affects non-target species and disrupts ecosystem balance.
4. *Mechanisation and lands use change*: Intensification of agriculture through mechanisation, irrigation and land drainage alters landscapes, has reduced biodiversity and fragmented habitats limiting movement and gene flow for many species.

5. *Loss of field boundaries as wildlife networks:* Removal of hedgerows, undisturbed field corners or margins and other semi-natural habitats has eliminated valuable wildlife corridors, nesting sites, and food resources for many species.

Overall, the shift towards industrialized agriculture and intensified land use practices has led to significant biodiversity loss on farmland, threatening ecosystem resilience, natural pest control, and long-term agricultural sustainability.

Why we need biodiversity:

Biodiversity plays a crucial role in maintaining a healthy and functioning planet. From large animals to microorganisms, all life on Earth contributes to essential functions such as soil enrichment, pollination, food production and medicine discovery. Biodiversity also provides protection against natural disasters and has significant spiritual and cultural value.

The global necessity for biodiversity can be broken down into four key pillars:

1. *Ecological balance:* Diversity within genetics, species and habitats within ecosystems is essential for promoting resilience, adaptation, and stability in natural systems. It ensures the long-term survival of species by facilitating adaptation amidst changing environmental conditions, as well as regulating population dynamics and subsequently maintaining ecosystem functionality. Loss of genetic biodiversity can disrupt these critical balances, leading to ecosystem degradation and reduced resilience to environmental stressors.
2. *Ecological services:* Biodiversity serves as the foundation for essential ecological services such as water purification, air filtration, soil formation and waste decomposition which are vital for maintaining the health and balance of ecosystems. This in turn contributes to climate regulation via carbon sequestration, stabilising weather patterns and mitigating the impacts of climate change such as floods, droughts and storms.
1. *Industrial services:* Biodiversity forms the foundation of various industries, including agriculture, pharmaceuticals, ecotourism, and forestry, driving economic growth, creating job opportunities and sustaining livelihoods worldwide. Biodiversity serves as a reservoir of medicinal resources, from plants, animals to microorganisms, many of which are essential to develop pharmaceuticals and treatments. Preserving these resources are crucial for ensuring future medical breakthroughs and supporting sustainable industrial development.

Importantly for this course, biodiversity also directly contributes to food security by providing a diverse array of crops, livestock, and wild species essential for agriculture, as well as supporting vital processes like pollination, soil fertility, and pest control.

4. *Ethical and moral:* Biodiversity is deeply rooted within human cultures, traditions, and spiritual beliefs serving as a source of inspiration, creativity, and identity for communities around the world. Preserving biodiversity is our collective responsibility - to safeguard natural heritage for future generations and recognise the unique value of all living organisms.

In summary biodiversity is fundamental to the health of ecosystems, economies and societies worldwide. At present, almost half of habitable land worldwide is used for farming^[1] with around 40%

of species categorised as threatened^[2]. A report from the Royal Society^[3] suggests that the global food system is the single greatest threat to biodiversity with successful and sustainable conservation requiring rapid agricultural improvements. Only 3-5% of the world's ecosystems remain functionally intact^[4].

Meanwhile, 33% of Agricultural land has been degraded with most future land degradation predicted to occur in areas with the largest amount of arable land remaining and a risk of 90% degradation by 2050^[5]. Soil degradation's annual cost for the European Union is estimated to be tens of billions of euros^[6]. The demand for food security to feed a changing world remains strong and, although fluctuating with global economic circumstances, consumer preferences for more sustainable products have emerged^[7] with markets opening up new 'green' opportunities^[8].

^[1] [Global Change Data Lab](#)

^[2] [Biological Diversity Center](#)

^[3] [‘Preserving global biodiversity requires rapid agricultural improvements’, Royal Society](#)

^[4] [New Scientist/Frontiers in Forests and Global Change DOI: 10.3389/ffgc.2021.626635 -](#)

^[5] [United Nations Office for Disaster Risk Reduction / UN Food & Agriculture Organisation \(FAO\)](#)

^[6] [ibid](#)

^[7] [‘The path forward for retail’s sustainable future’ Bloomberg New Economy Forum and McKinsey & Company](#)

^[8] [Brainy Insights Report](#)

All these realities create an urgent need for conservation and sustainable management efforts that work for agri-food businesses and nature. Especially, the natural resources that underpin land-based food production.

Sustainable development - working in harmony with nature:

Reducing carbon emissions, protecting biodiversity hotspots, and actively restoring ecosystems through hands-on management and community involvement can all contribute towards ensuring a prosperous and sustainable future for all life on Earth.

Farmers play a crucial role in combating biodiversity loss through initiatives like Farmer Clusters, facilitating members to collectively work towards sustainability and conservation goals. By engaging in agrobiodiversity efforts, farmers not only enhance the ecological health of their individual farms and landscapes but also contribute to mitigating environmental threats to agriculture. Their actions help protect species important for culture and leisure while navigating evolving markets, consumer preferences and policies aimed at greater sustainability and nature protection. Through Farmer Clusters, farmers can effectively address biodiversity challenges and contribute to conservation efforts locally, regionally, and nationally.

Section 2: The importance and benefits of Biodiversity in Agricultural systems

Learning Goals:

- ✓ Understand how biodiversity promotes agricultural sustainability and resilience.
- ✓ Recognise the benefits of agricultural biodiversity for soil health, pest control and food production.

Biodiversity across farming systems:

Agricultural biodiversity promotes sustainability and resilience in several key areas:

1. *Resilience to climate change:* Diverse agroecosystems are more resistant to climatic variations and extreme weather events, providing stability in agricultural production.
2. *Natural pest and disease control:* Increased biodiversity leads to a greater diversity of natural enemies of pests and diseases, reducing the need for chemical inputs like pesticides. This helps mitigate crop losses, which can reach 10-16% globally due to plant diseases.
3. *Sustaining soil health:* Diverse plant and microbial communities contribute to soil structure and health, enhancing nutrient cycling, fertility, and organic matter decomposition. Practices like crop rotation support soil health and attract beneficial organisms.
4. *Pollination:* Many agricultural crops rely on pollinators for reproduction. Diverse habitats support a wider range of pollinating species, ensuring adequate pollination, and enhancing crop yields.

Societal benefits:

1. *Health and nutrition:* Agricultural biodiversity plays a crucial role in human health and nutrition by providing a wide variety of crops that form the basis of nutrition guidelines worldwide.
2. *Ecosystem balance:* It also contributes to environmental sustainability by reducing reliance on harmful chemicals and promoting ecosystem balance.
3. *Nature connectedness:* By fostering a deeper connection between people and their environment, agricultural biodiversity enhances the aesthetic appeal of landscapes and promotes overall societal well-being.

Therefore, advocating for the conservation of agricultural biodiversity is essential to ensure its continued benefits to society and the environment.

Case Studies: What Can Farmer Clusters Achieve?

To support biodiversity, farmers work together to create a more diverse landscape. Many different priorities, farm systems, and ecosystems means there are many different needs to be met! But the good news is many of the solutions that provide the most benefit actually require less effort. Work smarter not harder and biodiversity will thank you!

Key areas:

Key areas include concepts such as:

- Providing non-crop habitats
- Supporting local species: e.g. local plants will be better adapted to your soil types, these in turn will support local invertebrates
- ⊖ Managing habitat networks – ensuring connectivity between non-crop habitats so that species can move freely and successfully inhabit the areas they need.
- Providing nesting sites – bird and bee boxes, bare ground, tussocky grass
- Managing inputs sympathetically
- Informed agrochemical use – minimal, appropriate, and targeted
- Reduced hedge cutting - for example, cut hedges on a rotation of every 2-3 years
- Leaving some areas “messy” – longer grass, dead wood, arable plants

Velke Hosteradky Farmer Cluster, Czech Republic: Creating a Biodiversity Path - [News \(recodo.io\)](https://recodo.io/news/velke-hosteradky-farmer-cluster-czech-republic-creating-a-biodiversity-path)

This blog highlights the successful establishment of a biodiversity path within the Velke Hosteradky Farmer Cluster, showcasing community efforts in the Czech Republic. Key takeaways:

2. *Community Collaboration*: The project involved collaboration among local farmers and community members to plan and develop the biodiversity path, marked by information boards, demonstrating the power of local collective action towards sustainable practices.
3. *Social Capital Building*: The path serves as a social capital-building project, connecting farms and communities while highlighting sustainable farming practices and local products like wine, jams, and cereals.
4. *Public Education*: The pathway aims to educate the public, including families, sustainable food and nature enthusiasts and general consumers about the relationship between farming and their landscape. Visitors will learn about more sustainable farming practices and their effects on the local environment.
5. *Promotion of Sustainable Practices*: Highlighting specific measures, such as flower strips to support pollinators or installing bird boxes, demonstrate practical steps farmers take to enhance biodiversity on their land. The biodiversity path also showcases interventions like mitigating erosion and retaining water, emphasizing the landscape-scale importance of sustainable land management practices.

Overall, the initiative serves as an inspiring example of how farmers can come together to promote biodiversity, educate the public, and contribute to sustainable agriculture practices in their communities.

Cazadores de Aguilar Farmer Cluster, Spain: Introducing Cover Crops - [View farmer cluster \(recodo.io\)](https://recodo.io/view-farmer-cluster)

Environmental context: Andalusia is facing unprecedented global heating impacts on agricultural systems, with changing rainfall and temperatures causing acute droughts, flooding and desertification.

Agricultural context: Intensifying practices over the last few decades have seen extreme reductions in the biodiversity and ecological health vital to olive farming and rural leisure pursuits. Current practices contribute to the loss of fertile topsoil and desertification as well as significant habitat loss. Wider impacts of unhealthy agricultural ecosystems include erosion and water management issues which damage Spain's road and reservoir infrastructure exacerbating climate challenges like droughts and flash floods.

Generally: The struggles of Spanish agriculture at the frontier of the climate crisis has received greater awareness in recent years with 80% of Spaniards 'very' or 'fairly' concerned about climate change.^[1] Farmers and hunters, especially younger generations, are also becoming more aware of the environmental challenges they must navigate. Although without collaboration and support, this awareness doesn't automatically facilitate a broader change of practices.

Policy and Regulation: The EU's recent 2023 CAP introduced requirements for percentages of Organic production, chemical usage, and vegetation management practices in Spanish olive groves. These measures aim to improve soil health, water management, drought resilience and natural pest control.

^[2]

Farmer Cluster Activity

The Cazadores de Aguilar Farmer Cluster, established 2021, has seen members learn how changing their practices can support biodiversity, soil health and environmental functions.

The fundamental intervention has been adapting vegetation removal regimes to allow for more vegetative diversity within the olive groves. This has included farmers in the Farmer Cluster drawing on the support of NGOs, like Artemisan, who help facilitate the Farmer Cluster. This collaboration has seen natural seed banks be re-established and vegetation strip mixes trialled on Farmer Cluster farms. There's also been collaboration on biodiversity monitoring in the Farmer Cluster.

Rand national stakeholders have been invited to Aguilar to observe progress and attend Farmer Cluster knowledge exchange events— spearheading a local initiative that has picked up regional, national and international support.

Summary:

Farmers in this Andlucian Farmer Cluster, as well this Farmer Clusters' facilitation, provide an excellent example of where concerns for functional ecological health meet with culture, leisure and regional sustainability priorities.

Improving the soil health of olive groves has secondary benefits beyond improving functional biodiversity and sustainability on-farm. It helps conserve water vital for olives and provides habitat for game species valued by Spain's significant population of weekend hunters. It also helps mitigate damaging erosion which causes landscape degradation, urban flooding, and reservoir siltation.

Farmers undertaking measures to support soil health and agrobiodiversity have the opportunity to access new agri-environmental schemes and market opportunities available for greener produce and sustainable investment.

Examples like this bring home how individual actions made together within Farmer Clusters can have ripple effects that improve biodiversity and sustainability outwards - from individual farms to entire regions.

And the context which Farmer Clusters respond to today - where navigating paperwork, operational changes and environmental realities is easier when tackled alongside a group of neighbours and with the support of a facilitator.

^[1] [Pew Research Center's Global Attitudes Survey](#)

^[2] [CAP LINK?](#)

Basse Durance Farmer Cluster, France - [View farmer cluster \(recodo.io\)](#)

In the Provence region of Southeastern France, farmers are coming to terms with the agri-environmental impacts of global heating as well as new regulations on chemical inputs.

Many farmers and orchard managers in the region have concerns that longstanding production practices are becoming unviable and that the region's traditional orchards are under threat.

Many farmers think the future may necessitate a change from the traditional fruit and nut orchards of the region to installing olive groves.

In the medium term, their actions in Farmer Clusters to support and utilise agrobiodiversity to boost the ecological health and resilience of their orchards is part of broader adaptation strategies.

Supporting agrobiodiversity can boost natural pest control, conserve water, and help reduce the levels of chemical inputs required within orchards, increasing farms' environmental and financial resilience.

The Barn Owl Box Initiative - [Home | Owl Box Initiative](#)

The Barn Owl Box Initiative in the UK aims to provide suitable nesting sites for Barn Owls to help conserve and increase their population. This initiative presents an opportunity for collaborative conservation efforts. The project worked with a network of Farmer Clusters by installing specially designed nest boxes in appropriate locations across these landscapes. By providing safe and secure nesting sites, the initiative helps address the decline in natural nesting sites due to habitat loss and human disturbance.

Farmer Clusters facilitate the coordination of box placements, maintenance, and monitoring, maximising the effectiveness of the initiative while fostering community engagement and mutual support among farmers. This collaborative approach not only benefits Barn Owl populations but also contributes to the overall ecological health and sustainability of agricultural landscapes.

Additional materials

- [What is Biodiversity? \(youtube.com\)](#)

- [Why is biodiversity important - with Sir David Attenborough | The Royal Society \(youtube.com\)](#)
- [Importance of agricultural biodiversity \(youtube.com\)](#)
- [State of Nature 2023 - report on the UK's current biodiversity](#) (maybe add similar reports from other countries?)

Activity

Identify a species which your Farmer Cluster has noticed in decline on their land. If you don't have a Farmer Cluster, think about declining species you may remember seeing growing up! For example, maybe you remember seeing certain birds or insects on the farm when you were younger that are no longer as common:

Research the key habitat requirements for the local/threatened species, discuss why this species may have declined in your area in recent years and what you might do to start supporting them better.

A common question that Farmer Cluster Farmers and Facilitators across our new Farmer Cluster Network ask us is 'where can I find information on biodiversity in my region or on my land? Commonly, up-to-date data requires up-to-date monitoring. This can be either farmer-led or in collaboration with community members or expert scientists.

You'll learn more about this later in Modules 3 and 5 which cover: 'Monitoring Biodiversity on farmland' and 'Communication and Engagement'. However, it is important for Farmer Clusters to collectively get a sense for the status of biodiversity in their regions as well as conservation priorities relevant to them.

To help you get started with this task and for more information on the state of biodiversity and land use where you are visit:

- ✓ Global Level – <https://ourworldindata.org/biodiversity>
- ✓ National / Regional level - [The Global Biodiversity Information Facility \(GBIF\)](#) and [Biodiversity Information System for Europe](#).
- ✓ iNaturalist - <https://www.inaturalist.org>

Want to zoom in even closer? Use the resources provided below to find out more about biodiversity in your region, including information like:

- ✓ Species occurrence records
- ✓ Species Distribution maps
- ✓ Taxonomic information
- ✓ Ecological data
- ✓ Conservation status assessments
- ✓ Habitat information
- ✓ Habitat maps

These resources vary in their scope, focus and data availability but they all contribute to the goal of making biodiversity data accessible and usable for land management, research, conservation, and policymaking in their respective countries.

- ✓ **Austria:** Biodiversity Information System for Europe
- ✓ **Belgium:** Belgian Biodiversity Platform (BBPF): [BBPF](#)
- ✓ **Bulgaria:** Bulgarian Biodiversity Portal: [Bulgarian Biodiversity Portal](#)
- ✓ **Croatia:** Biodiversity Information System [for Europe](#)
- ✓ **Cyprus:** Cyprus Biodiversity Data Portal: Cyprus Biodiversity Data Portal
- ✓ **Czech Republic (Czechia):** Biodiversity Information System for Europe
Pladias Database of Czech Flora and vegetation
- ✓ **Estonia:** Estonian Biodiversity Data Centre (EBDC): [EBDC](#)
- ✓ **Finland:** Finnish Biodiversity Information Facility (FinBIF): [FinBIF](#)
- ✓ **France:** National Inventory of Natural Heritage (INPN): [INPN](#)
- ✓ **Germany:** German Biodiversity Data Portal (GBIF Germany): [GBIF Germany](#)
- ✓ **Greece:** Greek Biodiversity Data Centre (GBIF Greece): [GBIF Greece](#)
- ✓ **Iceland:** Icelandic Biodiversity Information Centre (ICB): [ICB](#)
- ✓ **Ireland:** National Biodiversity Data Centre (NBDC): [NBDC](#)
- ✓ **Italy:** Italian Biodiversity Network (RNB): [RNB](#)
- ✓ **Latvia:** Latvian Biodiversity Information System (LBIS): [LBIS](#)
- ✓ **Lithuania:** Lithuanian Biodiversity Information System (LIBIS): [LIBIS](#)
- ✓ **Luxembourg:** Luxembourg Biodiversity Data Centre (CND): [CND](#)
- ✓ **Malta:** Malta Biodiversity Information System (MBIS): [MBIS](#)
- ✓ **Norway:** Norwegian Biodiversity Information Centre [Artsdatabanken](#): [NBIC](#)
- ✓ **Poland:** Polish Biodiversity Information Network (PBIN): [PBIN](#)
- ✓ **Portugal:** Portuguese Biodiversity Data Centre (GBIF Portugal): [GBIF Portugal](#)
- ✓ **Spain:** Spanish Biodiversity Information System (GBIF Spain): [GBIF Spain](#)
- ✓ **Sweden:** Swedish Species Information Centre (ArtDatabanken): [ArtDatabanken](#)
- ✓ **Switzerland:** Swiss Biodiversity Forum (SIBF): [SIBF](#)
- ✓ **Ukraine:** Ukrainian Biodiversity Information Network (UBIN): [UBIN](#)
- ✓ **England:** National Biodiversity Network (NBN): [NBN](#)
- ✓ **Scotland:** Scotland's Environment Web: [Scotland's Environment Web](#)

If your country is not listed above don't forget you can also check out the individual country profiles within:

- The Biodiversity Information Facility for Europe - <https://biodiversity.europa.eu>
- Convention on Biological Diversity - <https://www.cbd.int>
- Birdlife International's Data Zone - <https://datazone.birdlife.org>
- The Biodiversity Indicators Partnership Europe powered by Nature Serve USA - <https://www.bipindicators.net>
- The Global Biodiversity Information Facility (GBIF)

Quiz

Ensure you have read all of the given materials and additional materials before taking this test.

1. How much have insect populations dropped in Europe in the last 50 years according to David Attenborough?
 - 75%
 - 70%
 - 80%
 - 65%
2. What country did Nicole exemplify as experiencing extreme weather events?
 - Ghana
 - Spain
 - California
 - Australia
3. Which of the following strategies can be adopted by farmers to support and improve biodiversity on their land. (Ans 1 and 3)
 - Put up nesting boxes
 - Dig steeper ponds
 - Cut hedges every 2-3 years
 - Increase amounts of agrichemicals used to suppress pests
4. How much is pollination worth in the UK per year?
 - 403-603 million
 - 300-330 million
 - 3 billion
 - 703-803 million
5. Why is biodiversity important? (Ans 1 and 3)
 - Climate regulation
 - To keep things neat and tidy
 - Food and medicine supply_

Module 3: Monitoring Biodiversity on farmland

Monitoring on your Farmer Cluster

Learning goals

By the end of this module, you will....

- ✓ Recognise the importance of a baseline biodiversity survey

- ✓ Understand what you can monitor and who can do the monitoring

Introduction

Farmland biodiversity can contribute to food system sustainability, disease and pest control and climate change resistance as well as being recognised due to its cultural significance. Monitoring changes in Farmer Cluster biodiversity allows farmers and land managers to make informed decisions to conserve and restore natural ecosystems.

How often should you survey?

Soon after a Farmer Cluster has been formed, it is important to conduct a baseline biodiversity survey. Baseline surveys are essential to establish the starting point for biodiversity in the landscape and to track changes against over time.

Progress surveying, to establish changes relative to the baseline, can be conducted at varying frequencies depending on the Farmer Cluster aims and the species, species groups or ecosystem service selected for monitoring. Committing to long-term monitoring is key to ensure you pick up changes over time and more frequent monitoring will help to reduce noise in your data.

What should you survey?

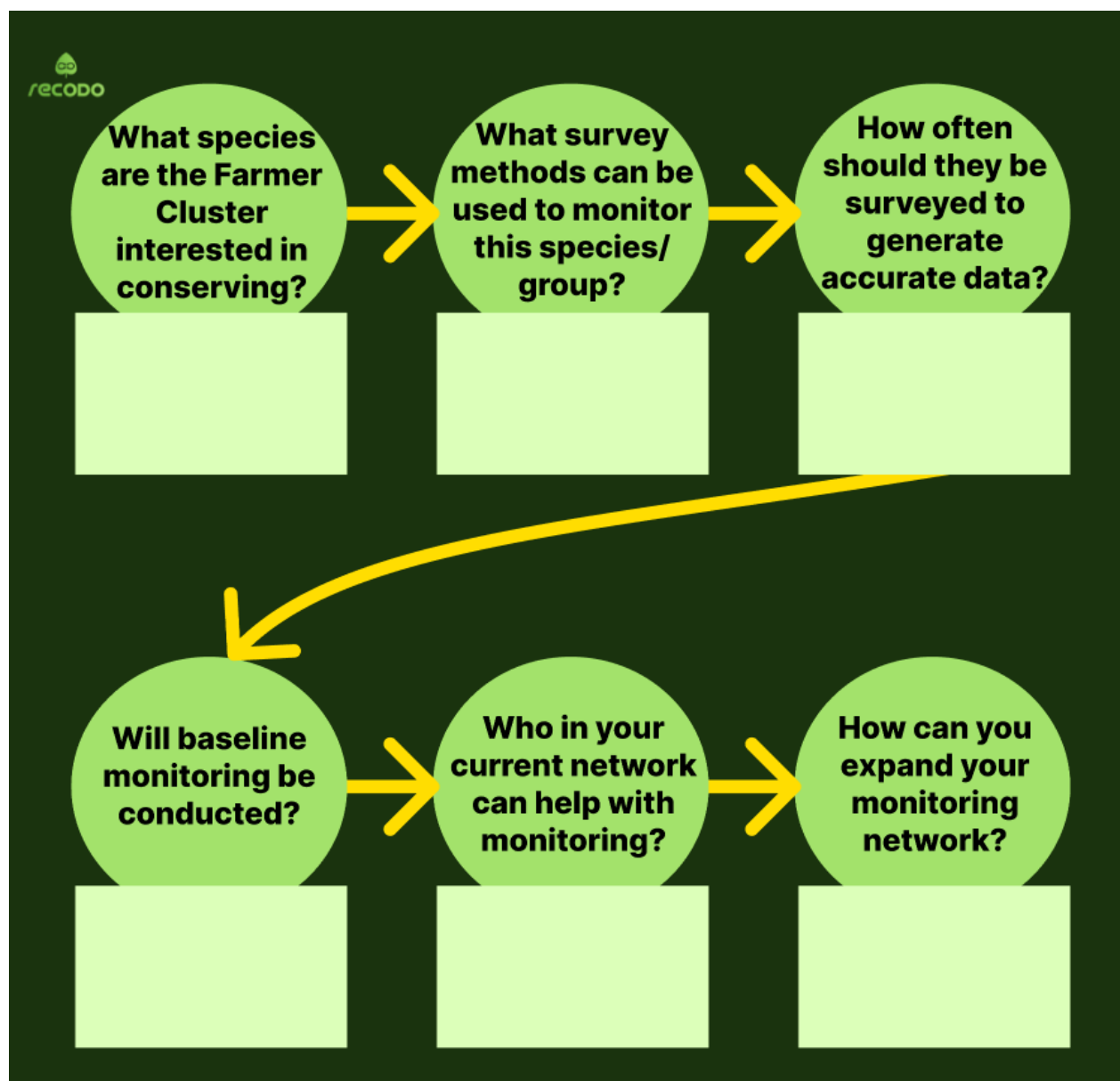
We always recommend that Farmer Clusters conduct robust monitoring of their target species, which are often represented by regionally rare or declining species. In addition to this, surveying elements of biodiversity that are impacted by landscape scale changes should be considered, for example farmland birds or wild bees, the latter may be of particular interest if the Farmer Cluster is growing a pollinator dependant crop. This will help a Farmer Cluster establish if their landscape scale management changes are creating wider benefits.

Who will monitor your Farmer Cluster?

Depending on the skills available, the Farmer Cluster Facilitator might be able to conduct part or all the surveys. Otherwise, local experts can be hired, or the surveys can be conducted as part of larger citizen scientist projects. The farmers can also conduct surveys, especially if entering the data using an app such as iNaturalist.

Activity

Think about your current or proposed Farmer Cluster and answer the questions below:



Case studies

Biodiversity monitoring with camera traps on the Born Farmer Cluster, Luxembourg

The Born Farmer Cluster was interested in understanding nocturnal biodiversity on their orchards, as they felt this represented a gap in their knowledge. To do this the facilitator, together with farmers and six enthusiast volunteers, installed camera traps across the Farmer Cluster's apple orchards, with responsibility for individual camera traps being shared between the group.

Over a three-month period, the group captured more than 5,000 images on the cameras. Amongst the images captured were a range of rare and elusive species which encouraged the group to continue the project for a further five months, which more than doubled their nocturnal photo library.

Scientists designed the sampling strategy and farmers maintain the cameras and the images are uploaded to a citizen science database. This Farmer Cluster project therefore serves as a fantastic example of collaboration between scientists, farmers and volunteers with each person playing a crucial role.

Olive fruit fly monitoring in the Calci Farmer Cluster, Italy

The olive fruit fly is a pest of olive crops. In Italy damage by this pest is estimated to reach up to 30% of the crop in the worst impacted areas. This comes with huge economic costs, for example in Spain the control of this pest is estimated at over €100 million annually.

Monitoring of this pest was therefore a priority for the Calci Farmer Cluster in Italy. Farmers participated in monitoring with the newly developed Poderi app, with feedback and support from researchers at Sant'Anna School. To determine infestation levels, monitoring involved the detection of oviposition bites by the fly, at weekly intervals on approximately 100 olives per 100ha. The presence of the olive fruit fly was also monitored with a pheromone trap.

Additional materials (red indicates the material is not yet available online)

Monitoring protocols

Please see the below examples of other monitoring protocols that could be used by Farmer Clusters:

- Earthworm sampling [How to count earthworms | AHDB](#)
- Big farmland bird count [Big Farmland Bird Count - Game & Wildlife Conservation Trust](#)
- Camera trapping [CameraTraps-WWF-guidelines.pdf](#)
- Moth monitoring [Farmer-Moth-Monitoring-Report-2022-WEB.pdf](#)
- How to assess functional biodiversity in orchards? <https://ebionetwork.julius-kuehn.de/index.php?menuid=25>

Good species identification skills are needed to accurately record the species occupying farmland, below we provide some links to training guidance to improve species identification skills:

- Birds
 - [GWCT Bird Guides.indd](#)
 - [BFBC Guide To Similar Birds](#)
 - Cornell Lab's Merlin bird identification app. Retrieved from: [Merlin Bird ID – Free, instant bird identification help and guide for thousands of birds – Identify the birds you see](#)
 - [Big Farmland Bird Count: How to identify farmland birds and take part - YouTube](#)
- Plants
 - Centre for Ecology and Hydrology's, Rare arable flowers identification app. Retrieved from: [Rare Arable Flowers on the App Store \(apple.com\)](#)
 - Seek app by iNaturalist [Seek by iNaturalist · iNaturalist](#)

- Invertebrate beneficials on farmland
 - [untitled \(agricology.co.uk\)](#)
- Pollinators
 - [Monitoring Pollinators, Interreg VB North Sea Region Programme](#)
 - [Monitoring Pollinators & Pollination Potential - YouTube](#)
- Beetles
 - [Finding and Identifying Dung Beetles - Dung Beetles for Farmers](#)
 - [An Introduction to Ground Beetles: Beneficial Predators on Your Farm | eOrganic](#)
- Spiders
 - [Introduction to Spiders workshop with Chris Cathrine - YouTube](#)
 - [Introduction to Spiders workshop with Chris Cathrine Part 2 \(youtube.com\)](#)

You can find more biodiversity monitoring resources through the [recodo resource finder](#).

Quiz

Ensure you have read all of the given materials and additional materials before taking this test.

1. What is a baseline survey?
 - a. [Measurements taken before a project begins against which change and progress can be assessed](#)
 - b. Measurements of change taken as a project progresses
2. Who can you involve in monitoring?
 - a. Farmers
 - b. Scientists
 - c. Volunteers
 - d. [All of the above](#)

Module 4: Managing agricultural landscapes for biodiversity

Section 1: Introduction

Learning goals:

- ✓ Understand the links between farming and biodiversity decline
- ✓ Understand the broad themes around how farming methods can be adjusted and integrated for wildlife friendly habitat
- ✓ Understand the role of semi-natural habitats for improving biodiversity, how to establish them and how to manage them sympathetically for nature:
 - Hedgerows
 - Flower strips
 - Grasslands
 - Woodland and scrub
 - Agroforestry
- ✓ Understand how to utilise integrated pest management practices for the benefit of wildlife and farm production
- ✓ Understand what organic and regenerative farming is and what the benefits are for biodiversity
- ✓ Recognise the value of nest boxes as tools for farmer engagement as well as wildlife benefits

Managing agricultural landscapes for biodiversity involves adopting holistic approaches that prioritise the conservation and enhancement of natural ecosystems within agricultural areas. Agricultural practices can have a significant impact on biodiversity and more widely on the ecosystem.

Links between farming and biodiversity loss:

1. *Agricultural intensification*: Post World War two, agricultural practices have evolved significantly, with increased mechanisation, use of pesticides and herbicides, and land consolidation to biodiversity declines.
2. *Genetic Diversity*: Traditional crop varieties have been replaced by selected varieties, resulting in a loss of genetic diversity and vulnerability to climate risks.

Optimising farming practices for nature:

1. *Wildlife Habitats*: Creating and managing wildlife habitats, such as hedges and flower meadows, is crucial for supporting biodiversity.
2. *Sustainable Farming Practices*: Sustainable farming covers a wide range of practices from using renewable energy sources, to natural pest management in lieu of chemicals and agroforestry.

3. *Diversification of Farming*: Encouraging crop diversity, adopting sympathetic cultivation and promoting local seasonal produce consumption are key strategies for enhancing biodiversity and reducing environmental impact.
4. *Policy and Governance*: Improving governance frameworks, public policies and incentive programs are essential to support widespread adoption of biodiversity-friendly farming practices.
5. *Collaboration*: Collaboration between naturalists and farmers, can help with biodiversity monitoring on farms and the development of nature friendly agricultural practices.

Watch this video: [Agriculture and biodiversity, growing with nature \(youtube.com\)](https://www.youtube.com/watch?v=...)

Brainstorming activity:



Section 2: Management of semi-natural habitats

Semi-natural habitats such as hedgerows, field margins, grassland and woodlands play a critical role in supporting biodiversity and enhancing ecosystem services in farmland across Europe. Managing these habitats effectively can contribute to the conservation of native flora and fauna.

a. Hedgerow Management

Importance of Hedgerows: Hedgerows are crucial for supporting biodiversity by providing food, shelter, and habitat for various plants and animals. They also serve as vital corridors for wildlife movement and contribute to landscape health and environmental sustainability.

Surveys and Assessment: Before implementing management activities, conduct surveys to assess existing plant and animal species within the hedgerow. This helps determine suitable management practices while avoiding disturbance to rare or protected species.

Protected Species: Be mindful of protected species like hazel dormice and bats, requiring licensed individuals to check for their presence. Avoid disturbing nesting birds during the breeding season.

Maintenance: Trim hedges on a two or three-year rotation to ensure the presence of flowers for pollinators and berries for birds. Different hedge shapes and sizes benefit various wildlife species, and buffer strips provide additional habitat.

Coppicing: Implement coppicing in winter, in sections, to encourage enhanced growth and rejuvenation while minimizing disturbance to wildlife.

Planting and Establishing New Hedgerows: Select native species, appropriate for your soil and landscape and plant during the dormant season. Proper site preparation and spacing are crucial for successful establishment.

Pollinator-Friendly Management: Maintain at least one mature Whitethorn or Blackthorn tree in each hedgerow. Adopt a three-year cutting cycle to ensure continuous flowering and fruiting, avoiding annual cuts that disrupt the hedgerow's lifecycle. Encourage Bramble and Ivy growth as they serve as crucial nectar and pollen sources during times of year where resources can be scarce.

Additional Considerations:

1. *Species Diversity:* Hedgerows support a wide variety of plant and animal species, contributing to overall biodiversity.
2. *Habitat Connectivity:* Hedgerows serve as vital corridors, facilitating wildlife movement and gene flow between populations.
3. *Seasonal Variation:* Manage hedgerows to provide resources throughout the seasons, supporting biodiversity.
4. *Hedgerow Structure:* Maintain diverse structures to maximize habitat quality for different wildlife species.
5. *Management Practices:* Utilise selective pruning, coppicing, rotational cutting, and hedge laying to enhance biodiversity and structural diversity within hedgerows.
6. *Hedge Laying:* Consider hedge laying as another form of management to thicken and strengthen the hedge while encouraging new shoots, as well as increasing the hedge value as a natural barrier between fields for livestock.

By incorporating these practices, farmers can effectively manage hedgerows to support biodiversity and contribute to sustainable farming systems.

For more information on hedgerow management, follow these links:

- [How to manage a hedgerow for wildlife | The Wildlife Trusts](#)
- [Managing Healthy Hedgerows \(youtube.com\)](#)

b. Field Margin Management

Grass and/or flower field margins are strips of land (often between field boundaries and crops or grassland), which play a vital role in supporting biodiversity and ecosystem services on farms. These habitats have huge potential across various farming landscapes and can be tailored to the needs of an area or individual farmer.

Field margins support a wide variety of wildlife, including insects, birds, mammals, and plants. They can be designed to provide food (pollen and/or source of insects), shelter (from predators and as overwintering sites) and nesting sites.

When implemented and managed correctly, field margins can contribute to soil protection, water quality improvement, erosion control and landscape connectivity. Well-managed margins can increase the ecological value of farmland, supporting natural pest control, reducing pest pressure, and improving soil health.

Agri-environment schemes can provide financial incentives for farmers to implement bio-diversity-friendly practices, including managing field margins, therefore promoting sustainable agriculture, while conserving and encouraging biodiversity.

Key concepts:

- *Vegetation Composition*: Diverse plant species in field margins are essential for attracting and supporting different wildlife species. Incorporating native plants, wildflowers, grasses, and shrubs can provide food and habitat for insects, birds, and small mammals.
- *Structural Diversity*: Field margins with varied structures, including tall vegetation, bare ground, and woody debris, offer habitat for different species with varying habitat requirements. Maintaining structural diversity is essential for supporting a wide range of wildlife.

Considerations when establishing grass or flower margins to maximise their benefits to biodiversity:

1. *Sowing Tussocky Grass Margins*: Tussocky grass margins are beneficial for supporting carabid beetles, which help manage aphids. These margins also provide cover and nesting sites for bees, small mammals, amphibians, and reptiles.
2. *Issues with Grass-only Margins*: Grass-only margins may have limitations, as wild grass seeds are less important in the diet of farmland birds compared to broad-leaved weed seeds. Additionally, dense grass swards can limit the growth of naturally occurring wildflowers, resulting in low species diversity.
3. *Inclusion of Wildflowers*: Incorporating wildflowers such as yarrow, yellow-rattle, black knapweed, and oxeye daisy in the mix enhances wildlife benefits. Choosing species that flower and set seed at different times throughout the year increases biodiversity.
4. *Naturally Regenerated Margins or Buffer Strips*: Naturally regenerated margins can be beneficial, especially in areas with relatively low soil fertility. These strips utilize the soil seed bank of local flora and require minimal inputs, resulting in a rich species demographic.

5. *Varying Depth and Timing of Cultivation*: Varying the depth and timing of cultivation and allowing patchy swards can enhance plant diversity. This approach benefits farmland birds by providing seeds and insect sources. However, highly fertile soils may have less success with naturally regenerated strips, making sown margins a better option in such cases.
6. *Beetle Banks*: Beetle banks are another form of strip that can be established in arable fields. They consist of tussocky grasses and are managed similarly to grass-only margins. Beetle banks benefit small mammals and predators of cereal aphids, such as spiders and carabid beetles.

Effective management of field margins involves a combination of practices such as mowing, grazing and selective cutting to create a diverse habitat maintaining a variety of vegetation heights and structures. These practices should be tailored to local conditions and species requirements to maximize habitat quality:

1. *Mowing*: Field margins are often managed through mowing to aid establishment and prevent scrub encroachment, with initial frequent cutting followed by less frequent cutting (once every two years or less).
2. *Uneven cutting*: Diversity in structure is important and can be achieved by cutting margins infrequently, rotating cutting across different margins or parts of margins, and allowing some woody vegetation or scrub to develop. Patchy management of margins benefits butterfly species, with variation in mowing timing and intensity creating structurally diverse swards for egg-laying and feeding opportunities.
3. *Timing*: Late spring and summer cutting should be avoided to preserve sources of pollen and nectar and prevent disturbance to nesting invertebrates, small mammals, and birds. Mowing timing and frequency influence the performance of different wildflower species on field margins, with open swards and reduced competition during winter benefiting certain species like lady's bedstraw.
4. *Collect cuttings*: Cuttings should ideally be removed to prevent the decline of annual weeds and the proliferation of certain perennial weeds, leading to a less diverse sward.
5. *Beneficial seed mixes*: Grass and wildflower seed mixtures can be used to establish field margins, with careful consideration of species selection to support wildlife, such as kale for birds and nectar-rich flowering plants for pollinators. Sowing wildflower mixtures, even with a few species, alongside grasses can enhance conservation benefits, especially when species with similar management requirements are chosen.
6. *Location*: Field margins should be strategically located next to features like hedgerows or wetlands to provide buffer zones and increase wildlife habitat diversity.

More information of field margins and flower strips:

- [Field margins, hedgerows, woodland and scrub.pdf \(agricology.co.uk\)](#)
- [Environment - Managing Margins with Nature in Mind - Teagasc | Agriculture and Food Development Authority](#)

- [Field margins for Functional Agro Biodiversity in the Hoeksche Waard The Netherlands \(youtube.com\)](https://www.youtube.com/watch?v=grhOHrgm8mQ)
- [Grassland Field Margins \(youtube.com\)](https://www.youtube.com/watch?v=grhOHrgm8mQ)
- Flower strips for pollinators and other beneficial insects (CZ/DE): <https://www.youtube.com/watch?v=grhOHrgm8mQ>
- Flowering strips on arable land: seed and sowing (CZ/DE): <https://www.youtube.com/watch?v=grhOHrgm8mQ>
- <https://www.youtube.com/watch?v=3wuPr0MXFJ4>

c. Grassland Management

Grasslands provide essential ecosystem services including carbon storage, flood prevention and soil stabilisation. There are various types of grasslands including wildflower meadows, lowland, and upland grasslands. Each has its own unique characteristics, species composition and management requirements.

Effective grassland management practices are pivotal for supporting the wildlife within these areas. Rotational mowing, grazing, and creating habitat features like tussocky patches and deadwood are key. Conservation considerations should drive grassland management decisions, with a focus on monitoring the response of invertebrate populations to interventions. By implementing these practices, farmers can enhance biodiversity, improve soil health, and provide crucial habitat for pollinators and other wildlife, contributing to the overall ecological balance of their landscapes.

- Rotational mowing involves cutting different sections of grassland at various times to maintain a mosaic of habitats with diverse vegetation heights, catering to different invertebrate species.
- Grazing by livestock can also enhance habitat quality by creating varied vegetation structures, although careful management is needed to prevent overgrazing. Tussocks and bare ground patches provide shelter and foraging opportunities.

Mowing should be carried out in late summer or early autumn to allow plants to flower and set seed, while grazing intensity and duration should be monitored to prevent overgrazing.

For more information about grassland management visit:

- [Grassland | The Wildlife Trusts](#)
- [Grassland management for invertebrates | Suffolk Wildlife Trust](#)
- [Magnificent Meadows](#)
- [Creating Meadows for Biodiversity \(youtube.com\)](#)

d. Agroforestry

Agroforestry is a sustainable land use practice that integrates trees into farming systems, blending agriculture and forestry. It includes various approaches like silvopastoral and silvoarable systems, hedgerows, shelterbelts, riparian buffer strips, forest farming, and home gardens. Silvopastoral

agroforestry combines trees with livestock, while silvoarable integrates trees with arable crops. It offers environmental benefits such as increased biodiversity, reduced run-off, enhanced carbon sequestration and decreased water pollution. Agroforestry requires careful planning and investment but provides long-term productivity and diverse revenues for farmers, making it a highly resilient land use strategy.

Agroforestry at its root is an old land use concept that combines agricultural, pastoral and forestry elements in one area. However, in its current form agroforestry is still a relatively new concept. A few pioneering farmers are planting commercial systems and some are already seeing concrete commercial and environmental benefits but trees grow slowly and we will learn more as these systems mature.

Despite facing challenges like misconceptions and profitability concerns, agroforestry offers numerous benefits, including increased land use efficiency and diverse product options.

The acronym PAMASAL aids in designing agroforestry projects:

- *Purpose*: Define your goals and beneficiaries.
- *Advice*: Seek guidance on site suitability, management, and marketing.
- *Measures of success*: Assess efficiency, effectiveness, and impact.
- *Agroecology*: Leverage natural processes for farming benefits.
- *Starting points*: Evaluate existing land use and gradual adaptation.
- *Adaptive management*: Plan for changes in tree growth and land use.
- *Layout*: Consider species selection, spatial arrangement, and phasing.

Efficiency involves optimizing yields and profitability, while effectiveness assesses outcomes and broader impacts, including environmental sustainability. Silvopasture combines trees and livestock, offering economic benefits like additional income streams and agroecological advantages such as improved soil health and biodiversity. Silvoarable systems integrate trees with crops, enhancing soil conservation, increasing crop production, and diversifying income streams. Proper design, management, and planning are crucial for maximizing the benefits of agroforestry practices.

Due to the multifunctional nature of agroforestry, predicting the exact financial outcomes for individual farms can be challenging. However, it is important to record financial details to assess the impact of trees on farm profitability. While robust financial models for agroforestry are still relatively rare, follow this link to discover some tools for planning and evaluating agroforestry systems.
<https://www.soilassociation.org/media/19141/the-agroforestry-handbook.pdf>

The multi-functional benefits of agroforestry include economic, environmental, and social. This approach necessitates efficient design and resource utilization in agroforestry systems to achieve net benefits.



Watch this video: [Basics of Agroforestry \(youtube.com\)](https://www.youtube.com/watch?v=...)

e. Woodland management

Woodland and scrub habitats are vital for farm wildlife, supporting diverse species like birds, mammals, insects, and plants. Encouraging natural woodland regeneration can be cost-effective by utilising pre-existing seed bed resources. Establishing these habitats improves biodiversity, provides shelter and contributes to landscape connectivity. Accessible woodlands provide recreational opportunities while conserving wildlife.

Diverse plant species support a diverse range of wildlife. Regular monitoring and long-term planning can help to ensure habitat resilience. Woodlands vary in size and type, from ancient woodlands to plantation forests, each supporting unique wildlife.

For more information visit: [Woodland – Farm Wildlife](https://www.woodland-farm-wildlife.org/)

Section 3: More wildlife friendly concepts and measures

a. Integrated Pest Management

Integrated Pest Management (IPM) is a sustainable approach to crop pest management that emphasises ecological principles and reduced/minimal pesticide use. IPM integrates various pest control strategies to reduce pest populations while minimising environmental impact and protecting human health.

Key Concepts for IPM in Various Farming Systems:

1. *Prevention*: Emphasis is on preventing pest problems through crop selection and habitat management to reduce the need for pesticide intervention.
2. *Monitoring and Identification*: Regularly monitor pests and their activity levels using traps, visual inspections, and other monitoring techniques. Identify pests accurately to determine appropriate management strategies.
3. *Thresholds*: Establish action thresholds based on pest population levels or crop damage. Determine when intervention is necessary to prevent economic losses but avoid unnecessary pesticide applications.
4. *Integrated Control*: Utilise a combination of biological, cultural, physical, and chemical control methods to manage pests effectively while minimising environmental impact and pesticide resistance.
5. *Sustainability*: Promote practices that conserve natural resources and support long-term agricultural sustainability.
6. *Evaluation*: Regularly evaluate the effectiveness of pest management strategies and adjust practices as needed based on monitoring data, pest pressure, and crop performance.

Overall, implementing IPM practices involves a combination of monitoring, cultural practices, biological control, and use of chemical control methods (as a last resort) tailored to specific farming systems and pest challenges. Advisors play a crucial role in disseminating IPM information, facilitating knowledge exchange and helping farmers adopt sustainable pest management practices to enhance agricultural productivity.

For more information on integrated pest management in specific farming systems visit:

a. Orchards

- [Orchard IPM \(Integrated Pest Management\) - An Overview \(psu.edu\)](#)
- [Agriculture | Free Full-Text | Approaches to Integrated Pest Management in Orchards: Comstockaspis perniciosus \(Comstock\) Case Study \(mdpi.com\)](#)
- [Orchard pests and pest control - People's Trust for Endangered Species \(ptes.org\)](#)
- [Organic pest report.pdf \(windows.net\)](#)

b. Olive groves

- [Applied Sciences | Free Full-Text | Current Status of the Main Olive Pests: Useful Integrated Pest Management Strategies and Genetic Tools \(mdpi.com\)](#)
- [mosca olive-eng \(ideassonline.org\)](#)

c. Arable

- [aic-ipm-arable-infographic-final vi.pdf \(voluntaryinitiative.org.uk\)](#)
- [RR98 final project report.pdf \(windows.net\)](#)

d. Grassland

- [Grassland Weed Control Reference Guide \(teagascagroreport.ie\)](#)

b. Organic farming

Organic farmers aim to produce food using methods that avoid inorganic chemicals (pesticides and fertilisers), instead relying on techniques such as crop rotation, composting, and biological pest control to maintain soil fertility and manage pests.

Key concepts around organic farming include:

1. *Holistic Approach*: Organic farming prioritises working with natural processes rather than relying on synthetic inputs.
2. *Soil Health*: Practices such as crop rotation, composting and avoiding synthetic pesticides and fertilisers enhance soil fertility and structure, promoting long-term soil health.
3. *Crop and Pest Management*: Techniques like crop rotation, companion planting and mechanical weed control are used to manage pests and weeds without synthetic chemicals. Biodiversity is promoted to provide habitats for beneficial insects and wildlife.
4. *Animal Welfare*: Organic livestock farming involves providing animals with access to outdoor areas, pasture, and organic feed. Antibiotics and growth hormones are prohibited, and animals are raised in conditions that allow natural behaviours.
5. *Certification*: Organic farms must be certified by recognized bodies to ensure compliance with organic standards covering soil management, animal welfare, and food processing. This credibility can have economic benefits when the produce is sold for higher prices than similar conventionally farmed produce.
6. *Environmental Benefits*: Organic farming reduces chemical inputs, conserves biodiversity, improves soil health, and reduces pollution and greenhouse gas emissions as well as run off and reducing issues with bio-accumulation in the areas wildlife.
7. *Consumer Trust*: Organic certification assures consumers that food has been produced using environmentally friendly and sustainable practices, fostering consumer trust.

Additional reading:

- Cover cropping - principles and use in organic farming (CZ): <https://www.youtube.com/watch?v=5l9RVar4Q-0>
- Basic principles and good practices (ENG): <https://www.fibl.org/en/shop-en/1141-organic-farming-principles>. Also available in CZ, DE, RO, RU

c. Regenerative farming

Regenerative farming is an approach to agriculture that focuses on restoring and enhancing the health of ecosystems, soils, and communities through a set of holistic practices. Key concepts of regenerative farming include:

1. *Soil Health*: Practices such as minimal tillage, cover cropping, composting, and crop rotation are used to build soil organic matter, improve soil structure, and enhance nutrient cycling.
2. *Biodiversity*: Diverse crop rotations, intercropping, and incorporating native vegetation help support a wide range of plant and animal species, promoting ecological balance and resilience.
3. *Water Management*: Techniques such as mulching, contour ploughing, and agroforestry help reduce water runoff, improve soil water retention, and mitigate the impacts of drought and flooding.
4. *Carbon Sequestration*: Practices such as agroforestry, rotational grazing, and perennial cropping systems enhance carbon storage, contributing to climate resilience by sequestering carbon in the soil and biomass.
5. *Holistic Management*: Regenerative farmers aim to create regenerative agricultural systems that benefit both the environment and local communities, promoting food security and rural livelihoods by emphasising the interconnectedness of ecological, social, and economic factors.
6. *Adaptive Management*: Farmers continually monitor and assess their practices, adjusting them as needed to optimize outcomes and resilience in the face of changing environmental conditions.
7. *Local and Indigenous Knowledge*: By respecting local ecosystems and cultures, regenerative farming fosters community empowerment and self-reliance.

Overall, regenerative farming seeks to create sustainable, resilient, and regenerative agricultural systems that restore ecosystems, promote biodiversity, and support thriving communities now and for future generations.

Practical activity

Introducing nesting boxes for bats or birds and bee hotels on farms is a popular way of increasing nesting opportunities of wildlife. Many species that nest in boxes provide additional ecosystem services such as pest control (e.g. bats, owls), cultural services (e.g. sparrows) and pollinating services (e.g. solitary bees).

Nest boxes are all different depending on the type of animal you are targeting. However, often different species within a certain animal type also require specific adjustments to make them appropriate and appealing e.g. Little owls require a tube like entrance, which bends at an angle before opening out into the main nesting chamber.

The positioning of your nest box is also highly important. For bats the position of a nest box in summer is preferred to be warm, unshaded but sheltered whereas in winter they prefer somewhere cool.

Read:

Building nest boxes for:

- i) Bats: [How to build a bat box | The Wildlife Trusts](#)
- ii) Barn Owls: [Barn Owl nestboxes: Free owl nest box plans \(barnowltrust.org.uk\)](#)
- iii) Passerines: [bto-nest-boxes-essential-guide.pdf](#)

- iv) Solitary bee hotels: [BEESPOKE-How-to-make-a-solitary-bee-hotel.pdf](https://beespoke.org/en/how-to-make-a-solitary-bee-hotel.pdf) (silenceofthebees.eu)

All of these activities can be run as events to engage farmer and the wider public on your Farmer Cluster. Choose one type and devise an action plan for creating and implementing a nest box scheme across your Farmer Cluster ensuring that the boxes are species appropriate and located effectively.

Case Studies

Flower strips and integrated pest management - [Developing flower strips in orchards](https://ebionetwork.julius-kuehn.de/index.php?menuid=54)
<https://ebionetwork.julius-kuehn.de/index.php?menuid=54>

Habitat manipulation, a key aspect of integrated pest management (IPM), leverages natural enemies to regulate pest populations, providing vital ecosystem services valued at over 400 billion USD annually worldwide. Despite its significance, biological control has been overshadowed by synthetic insecticides, leading to adverse effects like groundwater pollution and reduced biodiversity. Habitat manipulation involves enhancing conditions for natural enemies by providing resources like shelter, nectar, pollen, and alternative prey/host within agroecosystems. There are three main strategies: classical, augmentation, and conservation, each focusing on introducing or enhancing natural enemy populations. Factors influencing biological control outcomes include agricultural practices, landscape complexity, and cropping systems, with habitat manipulation based on vegetative diversity enhancing natural enemy performance. However, careful plant species selection is crucial to avoid unintended consequences.

In annual vegetable cropping systems, pests pose significant challenges, with habitat manipulation offering promise in creating a favourable environment for natural enemies. Floral supplementation has shown effectiveness in controlling aphids in lettuce crops, yet success depends on factors like floral resource arrangement and alternative food sources for pests. Similarly, habitat manipulation in apple cropping systems attracts predators like lacewings and syrphid flies, improving pest regulation. Challenges persist in demonstrating practical pest control benefits, highlighting the need for further research, collaboration, and easy-to-use methods. Integration with other pest control strategies and support from advisors, retailers, and consumers are essential for widespread adoption and effectiveness of habitat manipulation in IPM strategies.

Integrated pest management in orchards - [Agriculture | Free Full-Text | Approaches to Integrated Pest Management in Orchards: Comstockaspis perniciosus \(Comstock\) Case Study \(mdpi.com\)](#)

The implementation of Integrated Pest Management (IPM) strategies in apple orchards to control the codling moth (*Cydia pomonella*), a major pest in apple production. The study was conducted in Austria over three years, involving the comparison of IPM practices with conventional insecticide-based approaches. The IPM approach utilized several tactics, including the deployment of mating disruption dispensers to disrupt codling moth reproduction, the release of natural enemies (*Trichogramma* species) to control moth eggs, and the use of reduced-risk insecticides when necessary. The study found that the IPM strategy effectively reduced codling moth damage in apple orchards compared to conventional insecticide-based methods.

Additionally, the study highlighted the economic benefits of IPM adoption, as the cost of implementing IPM practices was lower than that of conventional insecticide applications. Furthermore, the IPM approach contributed to environmental sustainability by reducing pesticide use and minimizing the risk of pesticide resistance development in codling moth populations.

Overall, the case study demonstrates the efficacy and economic viability of Integrated Pest Management strategies in controlling codling moth infestations in apple orchards while promoting environmental stewardship and sustainability.

Integrated pest management of fruit crops, a case study of mango in India - [mosca olive-eng](#)

The publication discusses the implementation of Integrated Pest Management (IPM) strategies in mango cultivation in India, focusing on the use of eco-friendly and sustainable pest control methods to reduce reliance on chemical pesticides.

Mango cultivation faces various pest and disease challenges, including fruit flies, stem borers, mealybugs, and anthracnose. Traditional pest management methods often involve excessive use of chemical pesticides, leading to environmental pollution and health hazards.

The study highlights the adoption of IPM practices as an alternative approach to pest management in mango orchards. IPM involves a combination of cultural, biological, and chemical control methods to minimize pest damage while preserving natural ecosystems.

The report outlines the key components of IPM in mango cultivation, including the use of pheromone traps for fruit fly monitoring and control, biological control agents such as parasitoids and predators, and cultural practices like pruning and sanitation to reduce pest populations.

The study concludes that by emphasizing the importance of promoting IPM practices in mango cultivation you can ensure sustainable pest management, reduce environmental impact, and safeguard human health. Advocating for greater awareness and adoption of IPM strategies among mango growers to achieve long-term benefits for both farmers and the environment.

Regenerative farming AgriCapture project - [AgriCapture CO2 | The Allerton Project](#)

The AgriCapture project, conducted by the Allerton Trust, focuses on developing and implementing carbon capture and storage (CCS) techniques in agriculture. It aims to explore how agricultural practices can sequester carbon dioxide (CO₂) from the atmosphere, thereby mitigating climate change and promoting sustainable farming. The project aims to investigate various agricultural methods and technologies that have the potential to capture and store CO₂. This includes assessing the carbon sequestration capabilities of different soil management practices, crop types, and land-use strategies commonly employed in agriculture.

The AgriCapture project involves conducting field trials and experiments to evaluate the effectiveness of different carbon capture techniques. This may include testing the impact of cover cropping, reduced tillage, agroforestry, and other practices on soil carbon sequestration rates and overall greenhouse gas emissions from agricultural activities. The Allerton Trust collaborates with many research institutions, agricultural organizations, and industry partners to carry out the AgriCapture project. This

collaborative approach ensures access to expertise, resources, and data necessary for conducting comprehensive research and achieving project objectives.

The findings from the AgriCapture project have significant implications for farming practices and sustainability. By identifying effective carbon capture strategies, farm advisors can recommend practices that not only enhance soil health and productivity but also contribute to climate change mitigation efforts. The project aims to disseminate research findings, best practices, and practical guidance to farmers, policymakers, and stakeholders through various knowledge exchange activities. This includes workshops, seminars, publications, and online resources to facilitate learning and adoption of carbon-smart farming techniques.

Additional materials

Read the following EIP abstracts for more information on wildflower habitats and their management ([Farmer Clusters for Realising Agrobiodiversity Management across Ecosystems \(FRAMEwork\) | European CAP Network \(europa.eu\)](#)):

- Promotion of pollinators by flowering plants
- Establishing and maintaining a wildflower strip
- Increasing biodiversity using local plant species
- Reseeding of biodiversity-rich tall oatgrass mixture without ploughing for biodiversity enhancement

Quiz

Ensure you have gone through all of the materials and links provided in this module before starting this quiz.

1. What was the key plant sown into the old silage meadow to turn it into flower rich hay?
 - Yellow rattle
 - Clover
 - Knapweed
 - Daisies
2. What does the acronym PAMASAL stand for with regards to agroforestry design?
 - purpose, advice, measures of success, agroecology, starting points, adaptive management, and layout considerations
 - Primroses and magnolias are seriously all leaved
 - Propose, advocate, measures of success, agroecology, sown according to landscape
 - Purpose, advice, measures of sufficiency, agriculture, starting points, adaptive management, landscape
3. Why does Ruth (Broadleaf Wales) say it is important to have mixed species woodland - even when managing for timber?

- it protects the woodland from climate and disease as well as improving the benefits of the wider wildlife
 - It provides other options for timber contracts in the future
 - It makes finding the tree to cut down more challenging
 - It protects the woodland from her livestock
4. What does IPM stand for?
- Integrated pest management
 - Increased pest management
 - Involved preservation of margins
 - Integrated pest margins

Module 5: Communication and Engagement

Section 1: Communication

Learning goals:

- ✓ Understand the many forms of communication and the opportunities each provide.
- ✓ Understand the similarities and differences between internal and external communication strategies for Farmer Clusters in terms of:
 - Purpose
 - Implementation
 - Support strategies
- Recognise different strategies for:
 - Practical community engagement
 - Citizen science

Communicating the importance of biodiversity to your farmers and local communities will be key to the Farmer Clusters success and can be a stumbling block for many projects.

Good communication with Farmer Cluster members is important to motivate members and keeps your Farmer Cluster engaged. Promoting your work externally also has a range of advantages such as increasing collaboration opportunities and advertising Farmer Cluster businesses.

a. Farmer cluster internal communication

The **purposes** of using communication techniques to engage Farmer Cluster members include:

1. *Building relationships*: Effective internal communication helps establish rapport and trust while fostering a sense of community and belonging and strengthening interpersonal connections.
2. *Sharing information*: A clear communication plan facilitates the dissemination of important updates and news and provides clarity on the Farmer Clusters goals and objectives.
3. *Facilitating collaboration*: Good internal communication encourages teamwork, cooperation, and enhanced productivity by promoting ideas, sharing, and brainstorming.
4. *Motivating and inspiring*: Enthusiasm and commitment to shared goals can be achieved by recognising and celebrating achievements as well as providing feedback and constructive criticism.
5. *Resolving conflicts*: Encouraging open dialogue and active listening can facilitate mutually beneficial solutions when misunderstandings and disagreements are addressed.
6. *Empowering members*: Providing structure where members can take ownership of their roles and responsibilities also creates clearer opportunities to recognise gaps where more participation and involvement is needed, encouraging autonomy and initiative.
7. *Adapting to change*: Good internal communication helps manage uncertainty and address concerns as they arise, encouraging adaptability and resilience when organisational changes are communicated effectively.

Overall, the advantages of effective internal communication in your Farmer Cluster primarily include keeping members up to date, motivated and ensuring successful knowledge exchange.

Practical ways to **implement internal communication opportunities** include:

1. *Regular meetings or workshops*: Providing opportunities for real-time interaction and a sense of community either online or in person.
2. *Newsletter or Digest*: Highlight important updates, events, announcements, achievements and more. Include features such as member spotlights and project updates to keep members engaged.
3. *Webinars or Training sessions*: Address topics relevant to the Farmer Cluster's interests or objectives. Invite guest speakers or subject matter experts to provide learning opportunities and inspiration.
4. *Social Events or Mixers*: Create spaces where members can connect in a more relaxed setting. This can include team-building or group outings to strengthen relationships and a collaborative mindset within the cluster.
5. *Feedback surveys or polls*: Gathering input on how the Farmer Cluster is feeling about group activities, communication methods, the direction of the groups work and areas for improvement. Use this feedback to make adjustments and ensure that communication strategies are meeting the needs of the members.

6. *Collaborative projects or initiatives*: Encourage members to collaborate on projects or initiatives that align with the group's goals. Provide opportunities for members to contribute their skills and expertise, work together towards common objectives, and celebrate achievements collectively.
7. *Online Resource Hub or Knowledge Base*: Create a place where members can access relevant documents, articles, guides, and other resources. We recommend you use the Recodo platform.

Your options will need to be tailored to suit your Farmer Cluster; what members feel they need and how much time they want to spend working on initiatives. It is important to note however that as a facilitator, creating a well-structured plan that everyone is aware of and understands creates a positive domino effect, encouraging engagement and independent thinking within the Farmer Cluster.

b. External communication

Using communication tools to reach an external audience can be hugely impactful. Whether it is used to share information, news, or positivity, raise the Farmer Clusters profile or awareness about something happening in your landscape. Opportunities for collaboration within and outside of the Farmer Cluster members can also be supported by the use of media to communicate and create new opportunities.

In general, traditional media such as magazines, TV and radio are best used when trying to reach a specific audience. Social media channels such as Instagram, Facebook, X (Twitter) or TikTok are best used to reach a more diverse range of actors and audiences. However, even across social media platforms, there can be differences in the demographic that generally uses them and this is worth considering when choosing which platforms to use.

To start with it is advisable to create a social media presence on one or two platforms and ensure volume and quality of content is consistent and successful before branching out across other platform options. However, utilising multiple platforms, especially where they are all linked but have distinct individual content value, can complement your engagement and reach.

The **purposes** of using communication techniques to engage external audiences with a Farmer Cluster include:

1. *Increase Visibility and Reach*: Utilizing media platforms allows a group to expand its visibility and reach a larger audience beyond its immediate members or stakeholders. By creating compelling content and leveraging the sharing features of social media, the group can extend its message to a wider demographic.
2. *Build Brand Awareness and Recognition*: Having a distinct identity can help others recognise the Farmer Cluster and create new opportunities for collaboration. Consistent messaging, visual branding elements and engaging content help reinforce what the Farmer Cluster is working to improve and protect, this will also help to distinguish them from other Farmer Clusters.

3. *Engage with Stakeholders and Supporters:* Social media facilitates two-way communication, enabling the Farmer Cluster to engage directly with stakeholders, supporters, customers and the broader community. Through comments, messages and interactions, the group can foster meaningful relationships, address inquiries or concerns and gather feedback.
4. *Promote Events, Initiatives, and Campaigns:* Media platforms serve as effective channels for promoting upcoming events, initiatives, campaigns, or product launches. By sharing relevant information, updates and announcements, the group can generate excitement, drive attendance, and encourage participation.
5. *Share Valuable Content and Resources:* There are many types of media which allows the group to share valuable content, resources, insights, and expertise with its audience. Whether it's informative articles, educational videos, infographics, or case studies, providing relevant content establishes the Farmer Cluster as a trusted source of information.
6. *Showcase Achievements and Milestones:* Farmer Clusters can use social media to celebrate achievements, milestones, awards, and successes. Sharing accomplishments not only boosts morale within the group but also enhances its credibility and reputation.
7. *Support Fundraising and Donations:* Social media can be leveraged to support fundraising efforts, donation campaigns or crowdfunding initiatives. By sharing compelling stories, testimonials and calls-to-action, the group can mobilise its online community to contribute financially or advocate on its behalf.
8. *Monitor Trends and Gather Insights:* Social media provides valuable insights into audience preferences, behaviours and trends through analytics and engagement metrics. By monitoring conversations, sentiment and engagement levels, the group can adapt its strategies, tailor its messaging, and identify opportunities for increased interactions.
9. *Stay Updated and Relevant:* Participating in social media conversations allows the group to stay updated on industry news, trends, and developments in real-time. By actively listening and participating in relevant discussions, the group can demonstrate its expertise, stay relevant and position itself as a thought leader in its field.
10. *Drive Website Traffic and Conversions:* Social media serves as a powerful driver of traffic if they have a website, generating leads and further opportunities. By including links to relevant landing pages or blog posts in its social media posts, the group can funnel interested users towards desired actions, such as signing up for a newsletter.

The purpose of using social media to communicate with an external audience is, therefore, to foster meaningful connections to help achieve strategic objectives that contributes to the group's overall mission and success.

Practical points for **implementing external communication opportunities** include:

1. *Content Calendar:* Develop a content calendar outlining the types of content to be posted, the frequency of posts and the platforms where they will be shared. This ensures consistency and helps maintain an organised approach to content creation and distribution.

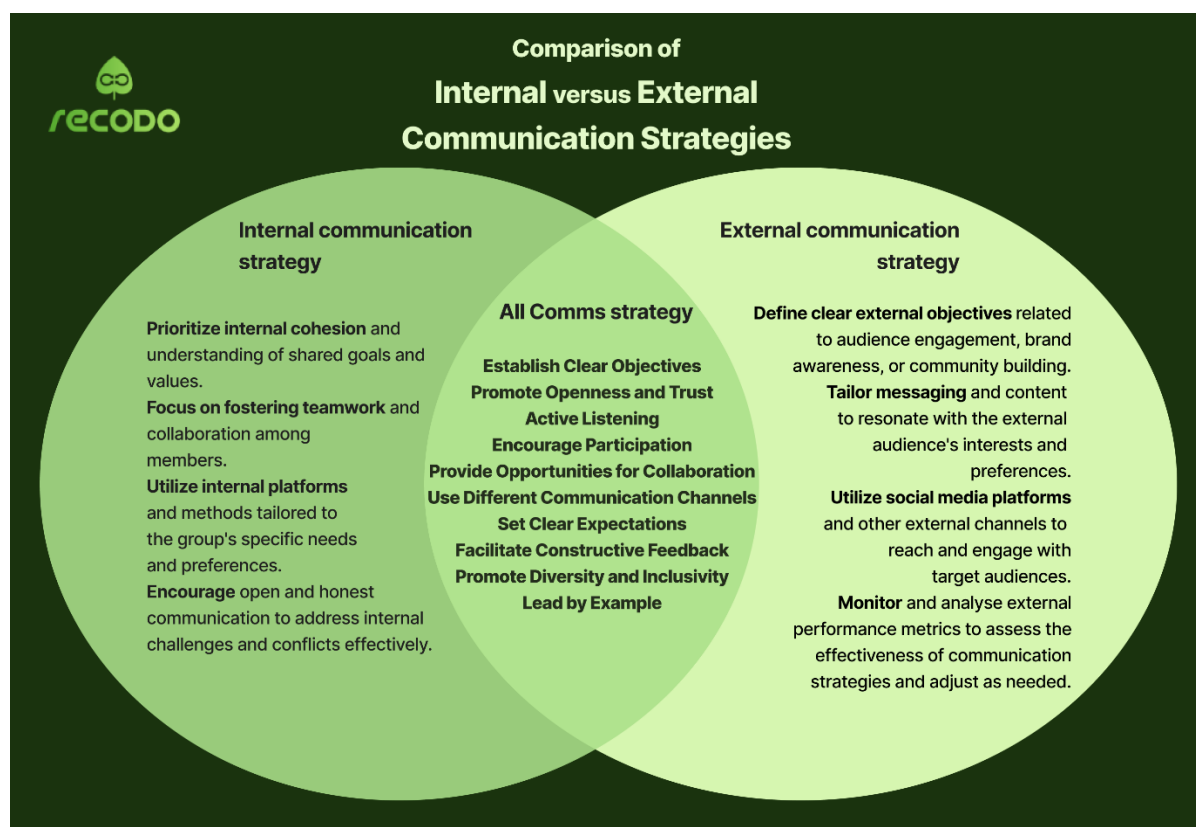
2. *Audience Segmentation*: Segment the target audience based on demographics, interests, and behaviours. Tailor content and messaging to each audience segment to increase relevance and engagement.
 - E.g. Short form videos capture a younger audience best and are preferable on TikTok or Instagram, whereas longer form written content is best for providing interesting resources for mature members subscribed to a newsletter.
3. *Engagement Campaigns*: Launch engagement campaigns such as contests, polls, quizzes, challenges, or user-generated content campaigns to encourage interaction and participation from the audience. These can generate a positive trajectory within platform algorithms facilitating content reaching a wider audience.
 - This can be as simple as “Guess the bird spotted on our land today”.
4. *Influencer Partnerships*: Collaborate with influencers or brand ambassadors relevant to Farmer Clusters aims to expand reach, credibility, and engagement with the target audience. A helpful partnership might be a well-regarded naturalist who is consistently active on your chosen media platform.
5. *Live Streaming*: Utilise live streaming features on platforms like Facebook, Instagram, or YouTube to host Q&A sessions, behind-the-scenes tours, or events in real-time, fostering immediate engagement and interaction.
6. *Paid Advertising*: Invest in paid advertising on social media platforms to increase visibility, reach and engagement with target audiences. Utilise targeted advertising options to reach specific demographics or interest groups.
7. *Hashtag Campaigns*: Create branded hashtags and launch campaigns around them to encourage user-generated content, increase brand visibility and foster community engagement.
8. *Educational Content*: Share relevant informative and educational content to position the group as a thought leader and provide value to the audience. This could include how-to guides, tutorials, industry insight, or expert interviews.
9. *Analytics and Optimization*: Regularly track and analyse key performance metrics using social media analytics tools. Use insights to optimise content, refine targeting strategies and improve overall performance over time.
10. *Cross-Promotion*: Cross-promote content across different social media platforms to maximise reach and engagement. Tailor content formats and messaging to fit the unique characteristics of each platform.
11. *Community Building*: Foster a sense of community among followers by responding to comments, messages, and inquiries, acknowledging user-generated content, and facilitating conversations among community members.

It is important to listen to the ideas from across your Farmer Cluster members, try new things and react to what works and what does not. You can play around with different platforms, posting times and content length to see what gets the best response.

c. Framework for supporting Farmer Cluster communications.

There are some clear themes to remember when creating any communication strategy, however the specific tailoring of your communication plan will depend on the audience.

Learn more about Farmer Cluster communication techniques and best practice in the following [guideline](#) and downloading the following [handout](#).



Section 2: Community engagement and citizen science

a. Community engagement

Working with your local community can be a great way to educate the general public about the work farmers are doing to help wildlife. It can also be a fantastic avenue to recruit volunteers that might be interested in helping with biodiversity monitoring or habitat management.

Farmers can increase their community engagement through various initiatives and activities aimed at fostering connections, collaboration, and support within their local community. Here are some effective ways farmers can achieve this:

1. *Open Farm Days*: Organise open farm days or farm tours where community members can visit the farm, learn about agricultural practices, and interact with farmers. This provides an opportunity for farmers to educate the public about farming methods, sustainability efforts and local food production.
2. *Farmers' Markets*: Participate in farmers' markets or create farm shops where farmers can directly sell their produce to community members. Farmers' markets not only provide access to fresh, locally grown food but also serve as a platform for farmers to engage with customers, build relationships, and receive feedback.
3. *Community Events*: Host or participate in community events such as festivals, fairs and agricultural shows. These events provide farmers with opportunities to showcase their products, share knowledge and connect with community members in a social atmosphere.
4. *Educational Workshops*: Offer educational workshops or seminars on topics related to agriculture, gardening, sustainability, or food preservation. These workshops can attract community members interested in learning new skills or gaining insights into agricultural practices and can increase public understanding for farmer's points of view.
5. *Volunteer Opportunities*: Provide opportunities for community members to volunteer on the farm, participate in farm workdays or get involved in community tree planting projects. Volunteering fosters a sense of ownership and pride in the local food system and strengthens community bonds.
6. *Collaborative Projects*: Collaborate with local schools, community organisations, or businesses on projects related to agriculture, environmental stewardship, or community development. This could include initiatives to address food insecurity, enhancing school programmes and much more.
7. *Community Supported Agriculture*: Offer programs where community members can subscribe to receive regular deliveries of fresh produce directly from the Farmer Cluster. These not only provide customers with access to local, seasonal food but also foster a sense of community and support for local farmers.
8. *Farm-to-Table Dinners*: Host farm-to-table dinners or culinary events that showcase local produce and highlight the connection between farmers and the food they produce. These events can bring together community members, chefs, and farmers in celebration of local food and agriculture.
9. *Community Outreach*: Engage in community outreach efforts by participating in local meetings, forums or advisory groups related to agriculture, land use, or environmental issues. By actively participating in community discussions and decision-making processes, farmers can contribute their expertise and perspectives to community development initiatives.

Increasing community engagement involves creating opportunities for farmers to connect with community members, share knowledge and resources, and work together towards common goals related to agriculture, food, and sustainability.

b. Citizen science

Citizen science can occur in many forms, here are a few instances that provide great benefits for Farmer Clusters:

1. *Tools for farmers:* Empower farmers with the tools they need to conduct their own surveys on aspects that interest them and the group.
2. *Document observations:* Encouraging farmers, land managers or keepers to document what they see, catch or experience in a standardised way, allows trends or themes to be drawn and acted upon.
3. *Community initiatives:* Where members of the public are given the opportunity to survey farmland areas as part of wider initiative not only creates large new data sets for investigation but fosters positive relationships between the community and farmers and allows for better connectedness with the environment and the value of nature on local farms.

Here are a few ideas for citizen science initiatives that farmers and other citizen scientists can conduct:

1. *Bird Monitoring:* Participants can be provided with field guides and training on bird identification, and they can then regularly observe and record bird species and behaviours. Data collected can contribute to scientific research on bird ecology and habitat preferences, helping farmers understand the role of birds in pest control and ecosystem health.
2. *Pollinator Surveys:* There are endless options when conducting surveys of pollinator populations, including bees, butterflies, and other insects. Participants can monitor pollinator activity in different habitats on the farm, identify species and record observations such as flower visitation rates and pollination behaviour. This data can inform conservation efforts, help farmers assess the effectiveness of pollinator habitat enhancements and contribute to research on pollinator health and biodiversity.

This can include pit counts, walked transects, pan traps, or sweep netting.

3. *Soil Health Assessments:* Participants can be trained to collect soil samples, measure key indicators of soil health (e.g., organic matter content, pH, nutrient levels), and assess soil structure and texture. The data collected can help farmers monitor soil health over time, identify areas for improvement and evaluate the impact of different agricultural practices on soil quality.
4. *Water Quality Monitoring:* Monitor water quality across farms or whole Farmer Clusters in streams, rivers, and other water bodies on or near their farms. Participants can collect water samples, measure parameters such as pH, temperature, turbidity, and nutrient levels and document observations of aquatic life. This information can help farmers identify sources of

water pollution, assess the impact of agricultural activities on water quality and implement conservation measures to protect aquatic ecosystems.

5. *Crop Phenology Observations*: Farmers can enlist citizen scientists to observe and record the phenology of crops grown on their farms. Participants can track key stages of plant growth and development, such as emergence, flowering, and fruiting, using simple observational protocols. By documenting crop phenology over time, farmers and researchers can better understand the effects of climate variability and agricultural practices on crop performance and yield.

These citizen science initiatives not only provide valuable data for on-farm decision-making and scientific research but also foster collaboration between farmers and their local communities, raise awareness about agricultural and environmental issues, and promote stewardship of natural resources.

Case Studies

Community outreach - [Homepage - Open Farm Sunday](#)

Open Farm Sunday is an annual initiative in the United Kingdom that invites the public to visit farms across the country to learn about farming practices, food production and rural life. Organised by LEAF (Linking Environment And Farming), Open Farm Sunday aims to connect people with the source of their food and promote understanding and appreciation for agriculture and the countryside. Participating farms open their gates to visitors, offering guided tours, demonstrations, and interactive activities such as tractor rides, animal encounters, and farm-to-fork experiences. Visitors have the opportunity to meet farmers, ask questions, and explore various aspects of farm operations, including crop cultivation, livestock management, conservation practices, and sustainable agriculture. Open Farm Sunday provides a valuable opportunity for education, engagement, and dialogue between farmers and the public, fostering greater transparency, trust, and support for the agricultural sector.

BioBlitz: [Guide to Running a BioBlitz : Bristol Natural History Consortium \(bnhc.org.uk\)](#)

The BioBlitz initiative is a collaborative event that brings together scientists, naturalists, and community members to identify and record as many species as possible within a designated area and time frame. Participants work together to explore and document the biodiversity of local ecosystems, including plants, animals, fungi, and microorganisms. The event typically involves guided walks, species identification workshops, and hands-on activities for people of all ages. By engaging the public in scientific research and environmental education, BioBlitz events promote awareness about the importance of biodiversity conservation and inspire stewardship of natural habitats. The collected data contribute to scientific research, conservation efforts, and the monitoring of biodiversity trends over time.

[Video about bio-blitz Luxembourg](#)

City Nature Challenge: [City Nature Challenge](#)

The City Nature Challenge is a global citizen science initiative aimed at documenting urban biodiversity across cities worldwide. Participants are encouraged to observe and record wildlife and plants using the iNaturalist app during a specific period. The challenge involves cities competing to see which can observe the most species, engage the most people, and find the most observations. The initiative aims to connect people with nature, raise awareness about urban biodiversity, and generate valuable data for scientific research and conservation efforts. Through community engagement and collaboration, the City Nature Challenge promotes environmental stewardship and encourages people to explore and appreciate the natural world in urban environments.

Activity

All outreach initiatives require meticulous planning and can be time consuming, it is essential to have clear targets and outcomes to ensure that the time spent on outreach is used efficiently and has recognisable pay backs.

Draft a brief action plan for how your Farmer Cluster might utilise a community engagement initiative to raise awareness for your chosen threatened species.

- What kind of event would it be: education, awareness walk, citizen science project etc.
- What roles would be required to implement it: host farm, speakers, [health](#) and safety etc.
- What social media platform would you use to advertise it: a podcast, [newsletter](#) or series of Instagram posts etc.

Additional materials

Read about the types of citizen science project running on the FRAMEwork Farmer Clusters:

- [Veteran Tree survey day](#)
- [Making Space for Rare Arable Plants](#)
- [From Barns to Boxes](#)
- [Farmer collaboration for biodiversity](#)
- [Pollinator and bird monitoring - workshop for farmers](#)
- [Educational excursion - take kids outside and let them learn about biodiversity in nature!](#)

More Citizen Science Initiatives:

Big farmland bird count: [Big Farmland Bird Count - Game & Wildlife Conservation Trust \(bfbc.org.uk\)](#)

The Big Farmland Bird Count (BFBC) is an annual citizen science initiative organized by the Game & Wildlife Conservation Trust (GWCT) in partnership with the Allerton Project and other organizations. It aims to engage farmers and land managers in monitoring bird populations on agricultural land across

the UK. Participants are encouraged to spend 30 minutes counting birds on their farmland during a specified week in February and report their findings to the BFBC website. The data collected helps to track bird populations over time, identify trends, and inform conservation efforts. By involving farmers in bird monitoring, BFBC promotes biodiversity conservation and sustainable land management practices while raising awareness about the importance of birds in agricultural ecosystems.

More information on fit counts: [Welcome to the UK Pollinator Monitoring Scheme \(PoMS\) | PoMS \(ukpoms.org.uk\)](#) (they also have an app!)

The PoMS Timed Pollinator Fit Counts is a citizen science initiative aimed at monitoring pollinator activity across the UK. Organized by the Pollinator Observatory Monitoring Scheme (PoMS), participants are encouraged to conduct timed counts of pollinators visiting flowers in their local area during specific time periods. These counts help gather data on pollinator populations, behaviour, and distribution, contributing to research on pollinator health and conservation. By engaging volunteers in pollinator monitoring, PoMS aims to raise awareness about the importance of pollinators and promote actions to support their conservation.

Read to below addition outreach and engagement guides:

- Farmers Weekly - Social media tips for farmers: [How to make the most of social media to promote farming - Farmers Weekly \(fwi.co.uk\)](#)
- AgriSocial - Social media platform tailored for farmers: [Home - Agrisocial](#)
- LEAF (Linking Environment And Farming) - Open Farm Sunday: [Homepage - Open Farm Sunday](#)
- National Farmers' Union (NFU) - Guides and advice on social media and communication for farmers: [Social media and video tips for farmers | How to shoot video – NFUonline](#)

Quiz

Ensure you have gone through all of the materials and links provided in this module before starting this quiz.

1. What are some of the purposes of internal farmer cluster communication strategies?
 - a. Building relationships
 - b. Platform for conflicts
 - c. Information exchange
2. What are some practical points for implementing external communication opportunities
 - a. Content calendar
 - b. Polls
 - c. Only following people who follow you back
 - d. Relying on word of mouth
3. What audience and platform are short form videos best utilised for?
 - Young audience on TikTok or Instagram
 - Mothers with young children

- Business men
 - Farmers
4. Which of the following options applies to the internal target communication frameworks
- a. **Prioritising internal cohesion**
 - b. **Establishing clear objectives**
 - c. **Encouraging participation**
 - d. Utilising social media platforms
5. What is the Leaf initiative in the UK for farm open days called?
- **Open Farm Sundays**
 - Open Farm Mondays
 - Open your farm days
 - Local farm open day
6. What are two citizen science initiatives the FRAMEwork Farmer Clusters have participated in?
- **BioBlitz and City Nature Challenge**
 - Bioblitz and fit counts
 - Fit counts and butterflies counts
 - Big farmland bird counts and city nature challenge

3.2 Feedback on course content

In 2022, initial meetings between GWCT, HUTTON and TAL were held to discuss progress in facilitator training on the ground and learnings that could be taken away to build the training programme. An initial document was put together by GWCT to summarise the range of training experiences facilitators had through FRAMEwork activities and key material that could be considered for inclusion. From this a further meeting was held between GWCT and TAL to finalise course modules. Draft course content was circulated to project facilitators, WP3 lead and WP6 partners for feedback and input on specific course content as well as seeking broader feedback on the course design and layout. Feedback on the initial draft was also provided by GWCT's Allerton project as training for farmers and farm advisors is a core element of their work ([The Allerton Project | Game & Wildlife Conservation Trust \(allertontrust.org.uk\)](https://allertontrust.org.uk)).

3.3 Mode of delivery

The training programme will be delivered via an online training platform. A range of platforms were initially reviewed for their suitability to host the training programme, namely:

- Udemy
- Coursea
- LinkedIn learning
- Teachable

- Thinkific
- WIX
- Future learn
- Learndash
- Trainer central

[Trainer Central](#) was put forward for further stress testing by TAL, due to its provision of multi-language support, capabilities to host unlimited learners and provision of course completion certificates.

4. References

Hall, J (2019) Improving Landscape-scale Delivery through Farmer Collaboration: a pilot study on Farmer Clusters exploring how farmer collaboration affects social and environmental outcomes at a landscape scale.

5. Disclaimer

The information presented here has been thoroughly researched and is believed to be accurate and correct. However, the authors cannot be held legally responsible for any errors. There are no warranties, expressed or implied, made with respect to the information provided. The authors will not be liable for any direct, indirect, special, incidental, or consequential damages arising out of the use or inability to use the content of this publication.

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