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Ecological Solutions and Evidence

PRACTICE INSIGHTS

Forming and managing a Farmer Cluster for improved farmland biodiversity in Europe

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Abstract

1. 'Farmer Clusters' are an English movement where groups of neighbouring farmers have identified and instigated their own conservation initiatives as a collective, providing a 'bottom-up' alternative to the 'top-down', government-initiated agri-environment schemes. Although cross-farm cooperation can be found in mainland Europe, this specific Farmer Cluster approach had not yet been tested before 2020.
2. FRAMEwork (Farmer clusters for Realising Agrobiodiversity Management across Ecosystems), an EU Horizon 2020 project, aims to identify whether Farmer Clusters could be established in other European countries and improve farmland biodiversity at the landscape scale.
3. FRAMEwork established 11 Farmer Clusters across nine European countries. The aim of this paper was to describe the different strategies used, the challenges faced and the potential solutions identified to provide future practitioners with guidance.
4. Forming the Farmer Clusters required a wide range of approaches, from contacting previously known farmers to using advertising campaigns. An integral part of the Farmer Cluster approach is the presence of a 'facilitator', someone with farming and environmental knowledge, who can support the group and assist them in their biodiversity-friendly actions.

5. Management of the Farmer Clusters required various strategies, and the facilitators were provided with training through the FRAMEwork project. These strategies were applied to unite the farmers within each Farmer Cluster, encouraging them to collaborate and identify their own biodiversity targets.
6. Expanding the scope of Farmer Cluster activities to enable farmers and local communities and volunteers to observe and monitor biodiversity themselves requires additional effort. However, it provides learning opportunities and capacity development in Farmer Clusters to enhance local collection of information and improved knowledge of local actions and outcomes.
7. *Practical Implication*. Farmer Clusters provide a strategy to tackle biodiversity restoration across European farmland at the landscape scale. They also offer tailored and targeted advice from expert facilitators, alleviating the constraints of the current 'top-down' process, allowing farmers more flexibility and ownership of their biodiversity goals. We encourage European policymakers to take up the Farmer Cluster model and provide a facilitation fund similar to that found in England to better aid farmland biodiversity recovery at the landscape scale.

KEYWORDS
agri-environment scheme, bottom-up, farmer groups, farming community, farmland biodiversity, landscape-scale

1 | INTRODUCTION

Agri-environment schemes (AES) were first introduced in Europe in the 1980s and were formally incorporated into European Union (EU) policy in 1992 with the first reform of the Common Agriculture Policy (CAP). The schemes have typically followed a 'top-down, action-based' approach where the environmental priorities and associated actions are set by government agencies, with the requirement that farmers follow these to receive payment. Furthermore, the schemes have typically been aimed at individual farms, with very few providing any advisory support (Natural England, 2013), and lacking any formal monitoring and evaluation. As a result, AES have been inflexible and uncoordinated, risk being poorly implemented and fail to provide evidence of their effectiveness and motivation for their ongoing use (Batary et al., 2015; Kleijn et al., 2006).

Although farms are individual entities, cross-farm cooperation can be found across Europe (Prager, 2015). For instance, in France, farm cooperatives (Groupement Agricole d'Exploitation en Commun) are well established (L'Insee and le Service de la Statistique et de la Prospective (SSP) du ministère de l'Agriculture et de la Souveraineté alimentaire, 2024) and often focus on social issues within the farm group and building strong links with the local community (Agricultural and Rural Convention (ARC), 2021). In the Netherlands, the government ceased accepting AES applications from individual farms in 2016, and now only accepts applications from farm cooperatives (groups of regional farms). These new schemes also offer much more flexibility, as although the environmental directives are still set by the government, the cooperative can 'fine-tune' the agreement for each farm. There is also flexibility in the location and activity of each scheme, allowing farmers to change dates or locations of an AES, giving them the freedom to determine how best to achieve the intended results and respond to the local weather conditions during that season or year (Terwan et al., 2016). Additionally, several European countries are now utilising results-based agri-environment payment schemes (RBAPS; Frangež & Suske, 2019). When these schemes and their management are more flexible than typical AES, a hypothetical contract agreement can be favoured by farmers (D'Alberto et al., 2024), though more intensive farmers are less likely to take up RBAPS contracts (Niskanen et al., 2021; Thiermann et al., 2023). RBAPS have been shown to work particularly well when neighbouring farms combine their efforts to create species or taxa specific habitat networks (Corncrake LIFE, 2024), using an indicator species to identify their success (Larkin & Stanley, 2021).

Within the United Kingdom, it was determined that to increase countryside biodiversity, conservation needed to be 'bigger, better and joined' (Lawton et al., 2010). The Grey Partridge Recovery Project in Sussex, England (Ewald et al., 2012; Potts, 2012) prompted a discussion around the potential of wildlife 'spillover' into neighbouring farmland by improving habitat networks (Thompson et al., 2015). Additionally, the Marlborough Downs Nature Improvement Area (NIA), one of the piloted NIAs at the time, happened to be farmer-led and particularly successful. This resulted in development of the Farmer Cluster (FC) approach where groups of farmers, located in the same region, shared knowledge and supported each other to improve the biodiversity of their farms. Rather than the prevailing top-down approach, FCs were conceived as 'bottom-up'; a term used to define when the farmers identified their own conservation priorities as a collective and were responsible for choosing which

biodiversity-friendly practices to implement, regardless of any prescribed schemes set out by the local governing body. This was done with advice and support from a 'facilitator', someone with expertise in either farmland conservation, agricultural biodiversity monitoring and/or AES. The Game and Wildlife Conservation Trust (GWCT) received government approval to pilot the FC approach between September 2013 and March 2015. The FC movement has since expanded with the help of the 'Facilitation Fund' (Natural England, 2023), which covered facilitation costs and has supported 224 groups since it started in 2015 (Rural Payments Agency, 2023), and, together with self-funded FCs, has seen 450,000 ha of land under FC management since their inception in 2010 (Game and Wildlife Conservation Trust (GWCT), 2019). This provides a proof-of-concept by which farmland conservation can be supported at scale. Furthermore, with innovative solutions for effective farmland conservation entering EU policy discussion (D'Alberto et al., 2024), trialling the English FC approach in Europe was perfectly timed.

2 | MATERIALS AND METHODS

The FRAMEwork project (Farmer clusters for Realising Agrobiodiversity Management across Ecosystems) commenced in October 2020 and is due to end in September 2025. Throughout the course of the project, the facilitators and facilitating teams presented updates on their FC and its activities, submitted regular periodic reports detailing their progress and any issues they faced, and used meetings with other facilitators and project partners to brainstorm solutions to problems they encountered. These interactions and documents were compiled to provide the contents for this manuscript, intended as guidance for any future practitioner or academic interested in the FC approach.

3 | FARMER CLUSTERS IN EUROPE

3.1 | FRAMEwork Farmer Clusters across Europe

Inspired by the growing number of FCs in the United Kingdom along with the presence of farmer cooperatives in other European countries, the FRAMEwork project, a multi-partner project funded by the EU Horizon 2020 funding programme, was established. The project is taking an action-based research approach to investigate the potential of FCs to promote biodiversity-friendly farming across Europe. Eleven FCs were initiated as part of the project during 2020–2021, ranging spatially from a dense network of boundary-joined farms to a sparser, wide-ranging farm network (Figure 1). These FCs have acted as living laboratories, providing

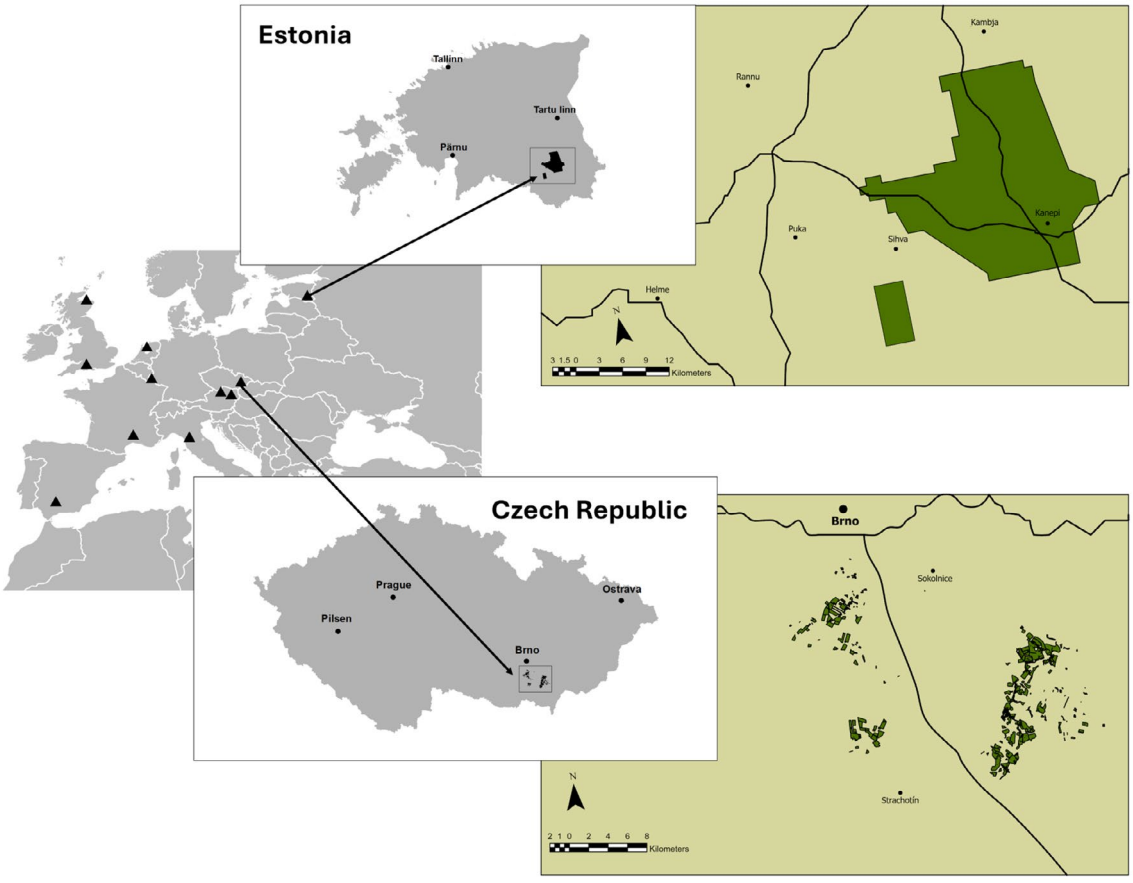

FIGURE 1 Farmer Clusters in the FRAMEwork project. Locations of all FRAMEwork Farmer Clusters in Europe, and demonstrations of the different spatial structures, with Estonia representing a highly adjoined Farmer Cluster, and the Czech Republic a more dispersed Farmer Cluster.

real-world platforms for the study of collective, landscape-scale management aimed at improving biodiversity across a spectrum of European farming systems including mixed, arable, permanent grassland and orchards (Table 1). Each FC is supported by a facilitator or facilitating team, defined its own biodiversity goals and has implemented different habitat improvements based on these goals (Table 1). However, forming and managing these FCs presented many challenges, and here we provide practitioners with guidance and solutions to typical issues they may face when forming and managing a FC.

3.2 | Forming Farmer Clusters in Europe

FRAMEwork sought to establish FCs using a variety of approaches. Based on the English experience, the importance of a lead farmer choosing to set up a FC and drawing on social, often neighbouring, contacts was favoured, particularly when building momentum and remaining farmer-led. However, with the Facilitation Fund, it is also common to find FCs that have formed with the input of an external organisation. Therefore, to establish FCs within the demands and constraints of the FRAMEwork project, a range of alternative methods for initiating the FCs was also used (Table 2). In all cases except England, the process was initiated by an external organisation (project partner); in some cases with specific landscape-scale conservation aims in mind. The English FC was already forming organically when they were approached. The ease with which FCs were established varied considerably between countries, being much easier in those where farmers had historically worked together, but was much more challenging where this was not the case. In the latter situations, the introduction of financial support schemes provided sufficient encouragement. In all cases, having a highly motivated lead farmer was key. Once the FC was established, either the farmers identified a facilitator themselves or used the facilitator selected by the external organisation. In all cases, the importance of the FC's activities being either farmer-led or largely co-developed with the organisation or facilitator was emphasised.

3.3 | Managing Farmer Clusters in Europe

Once the FCs were formed, the facilitator's role was to bring the group together, coordinate the FC's activities and provide expertise for environmental initiatives. Through the FRAMEwork project, facilitators received training during workshops to develop their ability to engage with farmers, build strong connections across the farming community and encourage environmental motivation in farmers. Strong and effective working relationships between the farmers and with the facilitator are key, though challenges are common (Table 3). A proven method to promote social trust and cohesion within Farmer Clusters is to initiate the process with informal, face-to-face gatherings. This approach, which proved successful in England, allows for organic relationship-building and open dialogue in a relaxed setting (McHugh, 2023). However, the establishment of FRAMEwork FCs faced unique obstacles due to the global COVID-19 pandemic. Lockdown restrictions, which persisted in most countries until mid-2021, significantly limited the potential for in-person meetings and traditional community-building activities. This necessitated alternative strategies for fostering trust and collaboration, such as virtual meet-and-greet sessions, one-on-one phone calls between facilitators and farmers, small socially distanced outdoor gatherings/workshops when possible and enhanced digital communication platforms for ongoing interaction. These adaptations, while not ideal, allowed for the continuation of FC development during unprecedented circumstances. As restrictions eased, a gradual return to in-person interactions helped solidify the relationships formed virtually, demonstrating the resilience and adaptability of the FC model.

The environmental initiatives in the FRAMEwork project varied in focus and detail, ranging from improving the diversity of plants, birds, pollinators and use of biocontrol to planting hedgerows and protecting soil health, and even conserving specific species such as the red-legged partridge (*Alectoris rufa*) and barn owl (*Tyto alba*) (Table 1). Different biodiversity-friendly farming activities have the potential to yield varying biodiversity improvements, with large-scale land-use changes likely resulting in the greatest overall impact on farmland biodiversity (Table 4). However, through the FC bottom-up process, it was vital that the FC selected their own goals. The facilitators discovered that the farmers first had to be sensitised to their farm biodiversity before they presented the farmers with various measures that could be implemented (e.g. the introduction of wildflower margins and other semi-natural habitats, bird and bat boxes, and testing of changes to crop management). Using their first-hand experience and knowledge, the facilitators advised and supported the farmers to identify appropriate measures, encouraging peer-to-peer learning throughout the process and found that farmers implemented larger scale, higher impacting measures as the project continued and their confidence increased. As the work of the FCs' progressed, attention was turned to ways in which the actions could be monitored and evaluated, and to look for potential funding sources to support their activities.

Funding for the FC and/or facilitator is a vital element of the FC approach. In most cases, funding for a facilitator for each FC was provided through the FRAMEwork project. Although there is now a 'Facilitation Fund' in England (Natural England, 2023), some English FCs remain self-funded, with each farmer contributing a small amount per ha into a 'pot' which pays for a part-time facilitator. As part of providing advice and aiding the FC in their biodiversity targets, the facilitator can apply to other funding bodies to help provide financial aid towards biodiversity-sensitive actions. It is essential that both national and local governments in all European countries provide clear guidance on how farmers can apply for these funding opportunities to accelerate farmland biodiversity improvements, and that EU officials consider introducing a Facilitation Fund initiative across Europe through the CAP.

TABLE 1 Farmer Cluster locations and details.

Location	Main crops/ livestock	No. of farms	Range of farm sizes (ha)	Total area of cluster (ha)	Cluster structure	Lead presence	Facilitator presence	Main biodiversity focus	Habitat improvements	Funding sources for activities
Austria, Burgenland	Arable crops/ cattle, poultry	11	15–500	2870	Dispersed	No lead farmer	Yes (Aliyeh Saleh, FRAMEwork funded)	Farmland birds, pollinators, vegetation	Sowing new flower margins	FRAMEwork project only
Austria, Mostviertel	Permanent grassland, cattle, sheep and goats, cereal crops	12	16–60	300	Dispersed	No lead farmer	Yes (Daniela Ablinger, FRAMEwork funded)	Grassland plant diversity	Sowing of species-rich meadows and flower margins, planting hedges	FRAMEwork project only
Czech Republic, Velké Hostèrádky	Arable crops, vineyards, vegetables, fruit	9	3–1271	2822	Partially dispersed	Lead farmer present	Yes (FRAMEwork funded)	Birds (for pest control), pollinators (via wildflower strips and habitat creation), soil health (via cover crops and crop rotations)	Putting up kestrel boxes and sowing new flower margins, planting trees and shrubs	FRAMEwork project, government funding (for organic production), self-funded (for bird boxes)
England, Cranborne Chase	Arable crops, cattle, sheep	22	92–1300	10,000	Adjoined	Lead farmer present and 'steering group'	Yes (Clare Scott, FRAMEwork funded)	Farmland birds, aquatic invertebrates	Planting new hedgerows; adding nest boxes for barn owls and swifts; sowing a new network of pollen and nectar flower strips	FRAMEwork project, government funding and environmental charity grants
Estonia, Kanepi kihlkund	Arable crops	10	300–600	3170	Adjoined	Lead farmer present	Yes (FRAMEwork funded)	Wild pollinators, native plants (*Trollius europaeus*, *Primula farinosa*)	Planting globe flowers and trialling new seed mixes	FRAMEwork project only
France, Basse-Durance	Apple, pear orchards	9	25–175	1759	Adjoined	No lead farmer	Yes—for first 16 months (FRAMEwork and agricultural producer group funded)	Pest natural enemies, birds (insectivores, raptors), bats, arthropod predators (spiders, butterflies, earwigs, hoverflies) and Hymenoptera parasitoids	Putting up bat boxes and bird nesting boxes; sowing flower strips	FRAMEwork project only
Italy, Val Graziosa	Olive groves	15	<1–12	54	Adjoined	No lead farmer—Cluster divided into two subgroups	Yes (FRAMEwork funded)	Bees, butterflies, birds, and non-chemical control for the olive fruit fly, soil biological quality and flowering species	Changing the mowing regime and the use of pomace for Soil Quality	FRAMEwork project only

(Continues)

TABLE 1 (Continued)

Location	Main crops/ livestock	No. of farms	Range of farm sizes (ha)	Total area of cluster (ha)	Cluster structure	Lead presence	Facilitator presence	Main biodiversity focus	Habitat improvements	Funding sources for activities
Luxembourg, Born	Apple, pear orchards	8	10–200	480	Partially dispersed	Lead farmer present—aided by local stakeholder and local project partner	Yes (Youri Martin, FRAMEwork funded)	Farmland birds, wild pollinators, vegetation	Re-planting of dead trees, organic agriculture	FRAMEwork project and stakeholder
Netherlands, Zeeasterweg	Potato, Wheat, Onion, sugarbeet, Carrot, Bulbs	10	30–90	600	Adjoined	Lead farmer present and farmer association	Yes (BoerenNatuur Flevoland funded)	Natural enemies (flying and ground dwelling), pollinators, birds	Improving the agricultural and landscape schemes flower strips and bird fields, further transitioning to organic farming	FRAMEwork project, and both local and national government funding
Scotland, Buchan	Arable crops, cattle, sheep	7	80–364	2205	Partially dispersed	Lead farmer present	Yes (FRAMEwork funded)	Soil health, pollinators, birds	Sowing bird mixes, wildflower strips, using minimum tillage and cover cropping	FRAMEwork project and self-funded
Spain, Cazadores de Aguilar	Olive groves	11	<1–45	160	Partially dispersed	Lead farmer present and president of 'Aguilar's Hunting Association'	Yes (FRAMEwork funded)	Birds, pollinators and red-legged partridge	Encourage natural vegetations covers or sowing wildflower seed mixes in olive groves, making changes to mowing regimes	FRAMEwork project and external funding

Note: Details for each Farmer Cluster including the main crops and livestock; number of farms and sizes; the spatial structure of the Farmer Clusters described as either adjoined (mostly joined borders between farms), partially dispersed (some adjoining borders but the rest dispersed) or dispersed (few or no adjoined borders); lead farmer presence; facilitator (named) presence and their funding sources; their main biodiversity focus; examples of the habitat improvements made; and funding sources for biodiversity-friendly activities.

TABLE 2 Challenges faced when forming a Farmer Cluster (FC) across Europe, and potential solutions.

Administrative issues	Challenges	Potential solutions
• Identifying potential farmers/land managers.	• Identifying a lead farmer and/or enough local farmers to form a FC was a struggle throughout Europe.	• Using previous farmer contacts. • Contacting local farmer groups that are in the process of forming or are already established. • Advertising campaigns—placing adverts in local shops, newspapers, farmers magazines, etc. • Finding relationships between farmers and local economic and political stakeholders can help engage and incentivise farmers to join and participate in the FC. • Feedback incentives—assuring farmers that they would receive feedback in the form of biodiversity survey results or tailored information on biodiversity actions. • Financial incentives.
• Identifying a suitable facilitator.	• Selecting an appropriate facilitator is key as they need to become trusted by the FC, have knowledge of farming and/or agri-environment schemes in the local area and be able to bring the farmers together to collaborate—it can be a struggle to meet all these criteria. • Some FCs did not have facilitator continuity throughout the project.	(solutions to all issues of identifying a suitable facilitator) • Using a research institute appointed facilitator. • Using a local farm advisor or someone trusted by the farmers who will listen to their concerns and treat them as equals. • The FCs needed a strong (but not overpowering) lead farmer or steering group to ensure momentum, particularly where a facilitator was not employed long term.

TABLE 3 Challenges faced when managing a Farmer Cluster (FC) across Europe, and potential solutions.

Administrative issues	Challenges	Potential solutions
• Collaboration across the FC.	• COVID-19 resulted in delayed in-person meetings across Europe. • Farmers can be reluctant to collaborate and the FC slow to form connections between members—sometimes due to cultural history, structure of the FC (those more highly dispersed have greater distances to collaborate between) or time constraints to participate in FC activities. • Initiating biodiversity sensitive actions—the farmers can struggle to identify biodiversity goals or achieve the desired effect in more fragmented FC structures (e.g. habitat connectivity). • Knowledge gaps—farmers or a facilitator may have knowledge gaps in specific sustainable farming practices.	(solutions to all collaboration issues) • Regular communication via Teams/phone calls/emails to promote a sense of team building. • In-person meetings—consider gathering around a map of the area to identify each owners' land and shared boundaries (taking care to acknowledge and include those in more dispersed location). • Discussing shared environmental concerns can bring together FCs with more dispersed structures—water ways, pest control problems, locally declining species, endemic species, land features, etc. • Regular meetings or workshops—these build up communication and relationships between farmers, giving the group momentum as well as encourage training in new areas. • Training opportunities and the implementation of a knowledge sharing platform to provide shared skills and learning across the FC network. • Leveraging the expertise of FC members to provide training for other members—fosters skill development and strengthens connections (e.g. nature photography workshop led by a FC member).
• Funding	• Identifying funding sources to aid the FC in its biodiversity sensitive actions is difficult in most European countries.	• FCs can apply for specific government funded AES options that match certain FC activities. • FCs can apply for regional environmental funding schemes; or approach national environmental charities to fund specific activities in the FC. • Facilitators can attend relevant webinars and events around environmental management funding. • Identifying suitable economic stakeholders that might form a financial relationship with the FC. • Facilitators can form a network of advisors to discuss ideas around alternative funding routes (e.g. FRAMEwork facilitator network).

3.4 | Expanding Farmer Cluster activities and engaging local communities

While the focus of activities in FCs is on adapting management practices to become more biodiversity-friendly and supporting ecosystem services, several FCs in the United Kingdom have increased farmers' awareness as well as engaged local communities and volunteers in observing biodiversity. Overall, these activities align with farmer participation in agri-environmental research (van de Gevel et al., 2020) and current, farmer-focused citizen science

initiatives (cf. Billaud et al., 2021; Ruck et al., 2024; Stroud, 2019). Hence, engaging farmers and local communities using citizen science approaches became an integral part of the FRAMEwork FCs with the aim to raise local awareness about biodiversity and the types of observations farmers and communities could achieve themselves. Depending on the respective FC, the farmer-focused activities included one-off training and demo events (e.g. how to identify and observe earthworms, bumblebees or farmland birds), recurring observation and monitoring actions (e.g. opportunistic observations of grassland diversity using the iNaturalist platform) as well as longer term observation projects (e.g. wildlife monitoring in fruit orchards using camera traps or observing co-determined key species over multiple farming seasons). To engage local communities, so-called 'BioBlitzes' (Meeus et al., 2023) were organised, ranging from 10 to 300 participants (e.g. as part of the annual, global City Nature Challenge; Palma et al., 2024, or as part of a one-off, local farm event). Some of the main challenges associated with such activities are the lack of farmers' time and availability to engage, additional resources and skills required from facilitators, the accessibility of collected information as well as the establishment of lasting stakeholder relations to support activities in the longer term. Table 5 presents the challenges and possible solutions in more detail.

4 | DISCUSSION

Establishing 11 FCs across a diversity of European countries and farming systems provided an opportunity to gain experience and learn from one another. Different countries have distinct agricultural policies and support systems, which can complicate the implementation of a unified FC approach, as well as varying levels of willingness to participate due to a range of issues. This paper shares experiences to support mutual learning and expand collective and practical knowledge of FCs. It provides a useful practitioner tool to encourage the formation of FCs throughout Europe.

TABLE 4 Examples of different biodiversity-friendly farming practices and their potential impacts on biodiversity.

	Biodiversity-friendly farming practice			
Biodiversity level	**Wildflower margins**	**Quality hedgerows**	**Extensive grazing**	**Organic farming**
Targeted species/species groups	Strong positive effect on insect pollinators (Grass et al., 2016; Pérez-Sánchez et al., 2023)	Positive effect on arthropods, birds and small mammals (Kratschmer et al., 2024)	Strong positive effect on plants (Schneider & Hering, 2024)	Positive effect on birds, predatory insects, soil organisms and plants (Bengtsson et al., 2005)
Overall biodiversity	N/A	Positive effect overall (Kratschmer et al., 2024)	Positive effect overall (Schneider & Hering, 2024)	Positive effect overall (Gong et al., 2022)

TABLE 5 Challenges faced when expanding Farmer Cluster (FC) activities and potential solutions.

Administrative issues	Challenges	Potential solutions
• Time and resource availability.	• Both farmers and facilitators/facilitating teams are faced with time constraints and sometimes lack of relevant skills.	• Different types of activities can be offered and tailored to the level of motivation of farmers, for example, starting with one-off activities which can grow into more integrated and longer term observation actions. Farmers with different levels of interest/time can take different roles in the activities. • Facilitators, ideally when applying for funding, need to allocate dedicated resources to develop and support such activities, including training and capacity building in citizen science practices. This can be supported by relevant resources (e.g. via Recodo) or forming collaborations with likeminded organisations who can potentially offer these skills/resources.
• Data access.	• Planning of data collection activities and access to data can surface implicit perceptions of vulnerability among farming communities, especially regarding protected species, or negative environmental impacts of agricultural practice (e.g. effects of field run-off on river water quality).	• Citizen science tools offer different ways to deal with data privacy, for example, allowing the use of hidden coordinates of observations or sharing coordinates only with certain people. Understanding these options allows farmers' needs to be tailored to while ensuring data can still be collected and used in the most effective way. • The perceived vulnerability related to data collection and fear of what the data may reveal can prompt open and honest conversations and enable discussions about the opportunities and added value of more and better information/data.
• Sustained community engagement and offers.	• Sustaining local community engagement over time by organising recurring activities can be too much to handle for a FC or facilitator.	• Forming working relationship with (local) initiatives with similar aims can alleviate the burden and lead to a stronger local network, where responsibilities, ownership and benefits of community activities are shared.

Evidence continues to highlight the significance of considering farmland biodiversity at the landscape scale (Brusse et al., 2024), the importance of managing the landscape collectively to achieve this (Martel et al., 2019) and farmers' preferences and willingness to enrol in a variety of biodiversity-friendly schemes (D'Alberto et al., 2024). FCs provide a strategy to tackle biodiversity restoration, as well as on targeted species, at this scale, while also offering flexibility in the absence of top-down constraints. Furthermore, the typical 2–3-year period for implementing and observing the effects of biodiversity interventions is often inadequate for a comprehensive before-after analysis. Ecological processes and biodiversity responses can take much longer to manifest, making short-term evaluations potentially misleading. Forming a FC, utilising the expertise of a facilitator, and involving the local community not only provides an opportunity to gather a baseline biodiversity level of the landscape, but also design and implement a long-term biodiversity monitoring programme, allowing for an accurate assessment of the changing biodiversity over time. Europe has a multitude of different farming systems and landscapes, all of which could benefit from this flexible and adaptable approach at tackling farmland biodiversity declines.

Additionally, FCs not only encourage communication between farmers within regions, but also promote collaboration and a sense of unity between farming communities across Europe. Recodo (IIASA, 2024), developed by the FRAMEwork project, provides a platform in which all FCs can showcase themselves and their activities via an FC profile, as well as access resources for FC management, including FC guidelines and an online facilitator training course.

With the EU's 'Nature Restoration Regulation' requiring the agricultural ecosystems of member states to see improvements in either the grassland butterfly index, organic carbon soil stock or high-diversity landscape features by 2030 (Council of the European Union & European Parliament, 2024), Europe could benefit from the FC approach to biodiversity restoration. Encouraging farmers to work collaboratively across the landscape but allowing them to select and implement their own biodiversity initiatives may offer a solution to meet government targets without removing control from the farmers. A scheme in which funding is provided through a 'Facilitation Fund' as in England (Natural England, 2023) could be of great benefit to Europe. Each nation could adopt the described FC model, and although some biodiversity goals might be similar across Europe, the biodiversity-friendly initiatives will vary not just nationally, but locally, in order to achieve these. Therefore, a government-funded facilitator would be an asset to any future FCs and we greatly encourage European policy makers to consider these suggestions.

AUTHOR CONTRIBUTIONS

Our study brings together authors from eight European countries, including scientists based in the country where the study was carried out. Authors that investigated the Farmer Clusters were engaged early on with the research and study design to ensure that the diverse sets of perspectives they represent were considered from the onset. Whenever relevant, the literature published by scientists from the region was cited; efforts were made to consider relevant work published in the local language. Niamh M. McHugh and Graham S. Begg conceived the idea; Niamh M. McHugh, Graham S. Begg and John M. Holland designed the methodology; Graham S. Begg, Gerid Hager, Iris C. Bohnet, John M. Holland, François Warlop and Niamh M. McHugh were involved in funding acquisition; and Graham S. Begg handled project administration. Aliyeh Salehi, Gillian Banks, Youri Martin, Riina Kaasik, Gonzalo Varas, François Warlop, Daniela Ablinger and Martine Schoone all conducted the investigation. Rachel N. Nichols led the writing of the manuscript; Graham S. Begg, Gerid Hager and Niamh M. McHugh were involved in writing the original draft; and Aliyeh Salehi, Gillian Banks, Youri Martin, Riina Kaasik, Iris C. Bohnet, John M. Holland, Gonzalo Varas and François Warlop reviewed and edited the manuscript. Alon Zuta did the visualisation. All authors gave final approval for publication.

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CONFLICT OF INTEREST STATEMENT

All authors declare they have no conflicts of interest.

PEER REVIEW

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DATA AVAILABILITY STATEMENT

The authors confirm that the data supporting the findings of this study are available within the article; no data will be archived.

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REFERENCES

Agricultural and Rural Convention (ARC). (2021). France: Collective Farming, Community and Connection. https://www.arc2020.eu/france-collective-farming-community-and-connection/

Batary, P., Dicks, L. V., Kleijn, D., & Sutherland, W. J. (2015). The role of agri-environment schemes in conservation and environmental management. *Conservation Biology*, *29*, 1006–1016. https://doi.org/10.1111/cobi.12536

Bengtsson, J., Ahnström, J., & Weibull, A. C. (2005). The effects of organic agriculture on biodiversity and abundance: A meta-analysis. *Journal of Applied Ecology*, *42*(2), 261–269. https://doi.org/10.1111/j.1365-2664.2005.01005.x

Billaud, O., Vermeersch, R.-L., & Porcher, E. (2021). Citizen science involving farmers as a means to document temporal trends in farmland biodiversity and relate them to agricultural practices. *Journal of Applied Ecology*, *58*(2), 261–273. https://doi.org/10.1111/1365-2664.13746

Brusse, T., Tougeron, K., Barbottin, A., Henckel, L., Dubois, F., Marrec, R., & Caro, G. (2024). Considering farming management at the landscape scale: Descriptors and trends on biodiversity. A review. *Agronomy for Sustainable Development*, *44*(3), 30. https://doi.org/10.1007/s13593-024-00966-4

Corncrake LIFE. (2024). *About the project*. https://www.corncrakelife.ie/about-the-project/

Council of the European Union, & European Parliament. (2024). Regulation (EU) 2024/1991 of the European parliament and of the council of 24 June 2024 on nature restoration and amending regulation (EU) 2022/869. Official Journal of the European Union, L series, 1–93. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L_202401991

D'Alberto, R., Targetti, S., Schaller, L., Bartolini, F., Eichhorn, T., Haltia, E., Harmanny, K., Le Gloux, F., Nikolov, D., Runge, T., Vergamini, D., & Viaggi, D. (2024). A European perspective on acceptability of innovative agri-environment-climate contract solutions. *Land Use Policy*, *141*, 107120. https://doi.org/10.1016/j.landusepol.2024.107120

Ewald, J. A., Potts, G. R., & Aebischer, N. J. (2012). Restoration of a wild grey partridge shoot: a major development in the Sussex study, UK. *Animal Biodiversity and Conservation*, *35*(2), 363–369. https://doi.org/10.32800/abc.2012.35.0363

Frangež, J., & Suske, W. (2019). *About result based payment*. https://www.rbpnetwork.eu/about/

Game and Wildlife Conservation Trust (GWCT). (2019). *Farmer Clusters—Landscape-scale, farmer-led conservation projects & groups*. https://www.farmerclusters.com/

Gong, S., Hodgson, J. A., Tscharntke, T., Liu, Y., van der Werf, W., Batáry, P., Knops, J. M., & Zou, Y. (2022). Biodiversity and yield trade-offs for organic farming. *Ecology Letters*, *25*(7), 1699–1710. https://doi.org/10.1111/ele.14017

Grass, I., Albrecht, J., Jauker, F., Diekötter, T., Warzecha, D., Wolters, V., & Farwig, N. (2016). Much more than bees—Wildflower plantings support highly diverse flower-visitor communities from complex to structurally simple agricultural landscapes. *Agriculture, Ecosystems & Environment*, *225*, 45–53. https://doi.org/10.1016/j.agee.2016.04.001

International Institute for Applied Systems Analysis (IIASA). (2024). *Recodo*: *The frontiers of farming and biodiversity*. https://recodo.io

Kleijn, D., Baquero, R. A., Clough, Y., Díaz, M., De Esteban, J., Fernández, F., Gabriel, D., Herzog, F., Holzschuh, A., Jöhl, R., & Knop, E. (2006). Mixed biodiversity benefits of agri-environment schemes in five European countries. *Ecology Letters*, *9*(3), 243–254. https://doi.org/10.1111/j.1461-0248.2005.00869.x

Kratschmer, S., Hauer, J., Zaller, J. G., Dürr, A., & Weninger, T. (2024). Hedgerow structural diversity is key to promoting biodiversity and ecosystem services: A systematic review of Central European studies. *Basic and Applied Ecology*, *78*, 28–38. https://doi.org/10.1016/j.baae.2024.04.010

Larkin, M., & Stanley, D. A. (2021). Impacts of management at a local and landscape scale on pollinators in semi-natural grasslands. *Journal of Applied Ecology*, *58*(11), 2505–2514. https://doi.org/10.1111/1365-2664.13990

Lawton, J. H., Brotherton, P. N. M., Brown, V. K., Elphick, C., Fitter, A. H., Forshaw, J., Haddow, R. W., Hilborner, S., Leafe, R. N., Mace, G. M., Southgate, M. P., Sutherland, W. J., Tew, T. E., Varley, J., & Wynne, G. R. (2010). Making space for nature: A review of England's wildlife sites and ecological networks. Report to Defra.

L'Insee and le Service de la Statistique et de la Prospective (SSP) du ministère de l'Agriculture et de la Souveraineté alimentaire. (2024). Transformations de l'agriculture et des consommations alimentaires. *Insee Références*, 1–143. https://www.insee.fr/fr/statistiques/7728901?sommaire=7728903

Martel, G., Aviron, S., Joannon, A., Lalechère, E., Roche, B., & Boussard, H. (2019). Impact of farming systems on agricultural landscapes and biodiversity: From plot to farm and landscape scales. *European Journal of Agronomy*, *107*, 53–62. https://doi.org/10.1016/j.eja.2017.07.014

McHugh, N. (2023). Managing A Farmer Cluster, 1–6. https://doi.org/10.5281/zenodo.13908066

Meeus, S., Silva-Rocha, I., Adriaens, T., Brown, P. M., Chartosia, N., Claramunt-López, B., Martinou, A. F., Pocock, M. J., Preda, C., Roy, H. E., & Tricarico, E. (2023). More than a bit of fun: The multiple outcomes of a bioblitz. *Bioscience*, *73*(3), 168–181. https://doi.org/10.1093/biosci/biac100

Natural England. (2013). *Higher level stewardship environmental stewardship handbook*. (4th ed.). https://publications.naturalengland.org.uk/publication/2827091

Natural England. (2023). *Agreement holder's guide*: *Facilitation Fund 2023*. https://www.gov.uk/government/publications/facilitation-fund-2023-countryside-stewardship/agreement-holders-guide-facilitation-fund-2023

Niskanen, O., Tienhaara, A., Haltia, E., & Pouta, E. (2021). Farmers' heterogeneous preferences towards results-based environmental policies. *Land Use Policy*, *102*, 105227. https://doi.org/10.1016/j.landusepol.2020.105227

Palma, E., Mata, L., Cohen, K., Evans, D., Gandy, B., Gaskell, N., Hatchman, H., Mezzetti, A., Neumann, D., O'Keefe, J., & Shaw, A. (2024). The city nature challenge: A global citizen science phenomenon contributing to biodiversity knowledge and informing local government practices. *Bioscience*, *74*(4), 290–299. https://doi.org/10.1093/biosci/biae012

Pérez-Sánchez, A. J., Schröder, B., Dauber, J., & Hellwig, N. (2023). Flower strip effectiveness for pollinating insects in agricultural landscapes depends on established contrast in habitat quality: A meta-analysis. *Ecological Solutions and Evidence*, *4*(3), e12261. https://doi.org/10.1002/2688-8319.12261

Potts, G. R. (2012). *Partridges. Countryside barometer. New naturalist library book 121*. Collins.

Prager, K. (2015). Agri-environmental collaboratives for landscape management in Europe. *Current Opinion in Environmental Sustainability*, *12*, 59–66. https://doi.org/10.1016/j.cosust.2014.10.009

Ruck, A., van der Wal, R., Hood, A. S. C., Mauchline, A. L., Potts, S. G., WallisDeVries, M. F., & Öckinger, E. (2024). Farmland biodiversity monitoring through citizen science: A review of existing approaches and future opportunities. *Ambio*, *53*, 257–275. https://doi.org/10.1007/s13280-023-01929-x

Rural Payments Agency. (2023). The 2024 round of Countryside Stewardship Facilitation Fund opens today—Rural payments. https://ruralpayments.blog.gov.uk/2023/10/23/the-2024-round-of-countryside-stewardship-facilitation-fund-opens-today/

Schneider, A. R., & Hering, D. (2024). Effects of extensive grazing and mowing compared to abandonment on the biodiversity of European grasslands: A meta-analysis. *Applied Vegetation Science*, *27*(4), e70003. https://doi.org/10.1111/avsc.70003

Stroud, J. L. (2019). Soil health pilot study in England: Outcomes from an on-farm earthworm survey. *PLoS One*, *14*, e0203909. https://doi.org/10.1371/journal.pone.0203909

Terwan, P., Deelen, J. G., Mulders, A., & Peeters, E. (2016). *The cooperative approach under the new Dutch agri-environment climate scheme*. Ministry of Economic Affairs. https://enrd.ec.europa.eu/sites/default/files/w12_collective-approach_nl.pdf

Thiermann, I., Silvius, B., Splinter, M., & Dries, L. (2023). Making bird numbers count: Would Dutch farmers accept a result-based meadow bird conservation scheme? *Ecological Economics*, *214*, 107999. https://doi.org/10.1016/j.ecolecon.2023.107999

Thompson, P., Dent, T., & Watts, S. (2015). *The game and wildlife conservation trust farmer cluster pilot project*, Final Report. Report to Natural England.

van de Gevel, J., van Etten, J., & Deterding, S. (2020). Citizen science breathes new life into participatory agricultural research. A Review. *Agronomy for Sustainable Development*, *40*(35), 1–17. https://doi.org/10.1007/s13593-020-00636-1

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