

# Restoring Nature in Agricultural Landscapes

*Farmers' Preferences for Policy Design and Collective Agri-Environmental Schemes to Achieve 25% Semi-Natural Habitat*

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## LUCSUS

Lund University Centre for  
Sustainability Studies



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## **Abstract**

20-25% of semi-natural habitat per square-kilometre is required for the provision of local Nature's Contributions to People. Farmers are key actors in reversing the severe habitat deficits in agricultural regions. Conceptually anchored in the Safe and Just Earth System Boundary Framework and the Tripartite Framework for Mitigation Pathways, this thesis combines a systematic literature review on how design features influence farmers' uptake of habitat-enhancing policies with an interview-based study on collective agri-environmental schemes in Castilla-La Mancha, Spain. Results show that farmers value advisory services, hybrid schemes and flexibility, while avoiding long-term commitments - which conflicts with the multiannual commitments required for creating diverse habitat. Lacking knowledge and social cohesion limit the potential of collective schemes in Castilla-La Mancha, but barriers can be partly addressed by policy design involving intermediaries, independent payment structures and regular meetings. Despite these barriers, collective approaches could bring broader societal benefits in the context of depopulation.

## **Keywords**

Agri-environmental Policy, Collective Approaches, Farmers' Decision-making, Biodiversity, Policy Design Features, Social Capital

## **Word Count**

11,881

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## 1. Introduction

Living nature, and the benefits that people derive from it, has been declining at alarming rates over the past decades (IPBES, 2019). Nature's Contributions to People (hereafter NCPs) describe the diverse set of contributions that arise from the interactions between people and nature (Pascual et al., 2017), such as water, climate and nutrient cycle regulation, pollination, pest control and recreation (Mohamed et al., 2024). That this decline of nature poses a serious threat to humanity is reflected in Safe and Just Earth System Boundaries framework (hereafter ESBs), which defines thresholds that ensure the stability of the planet while protecting humans from significant harm (Rockström et al., 2023).

Two out of eight ESBs are related to the biosphere (Rockström et al., 2023). While the global biosphere boundary defines that 50-60% of global terrestrial surface must be covered by largely intact natural areas, the local biosphere boundary (hereafter local biosphere ESB) acknowledges the importance of spatial distribution of habitat for securing multiple local NCPs. This boundary defines a minimum of 20-25% diverse semi-natural habitat within each square-kilometre of human-modified land as necessary, a threshold that two-thirds of lands worldwide fail to meet (Mohamed et al., 2024). Semi-natural habitats (hereafter habitat) are defined as *“an ecosystem with most of its processes and biodiversity intact, though altered by human activity in strength or abundance relative to the natural state”* (IPBES, 2019, p. 1050), and encompass elements such as hedgerows, grassy and floral strips, trees, terraces and small water bodies (Mohamed et al., 2024).

Agricultural regions exhibit some of the largest habitat deficits (Mohamed et al., 2024), while the ongoing agricultural intensification remains a major driver for biodiversity loss and the degradation of NCPs (Pereira et al., 2025). This is particularly concerning since many local NCPs, such as pollination (Feuerbacher et al., 2025), natural pest control (Klinnert et al., 2024), water quality control (Wuijts et al., 2021) and soil erosion (Efthimiou, 2025), are particularly important in agricultural landscapes.

As a response, public policies targeting habitat decline in agriculture were developed to reverse this trend, though with limited success. In the EU, this is reflected in the *greening* of the Common Agricultural Policy (hereafter CAP) (Sotte & Arcuri, 2025; Sotte & Vergamini, 2025) in line with the ambition to cover at least 10% of agricultural area with high-diversity landscape features set out in the European Biodiversity Strategy for 2030 (Sotte & Vergamini, 2025, pp. 225–226). However, research shows that at present, nearly 40% of the CAP budget is misspent, much of which is actively counteracting biodiversity and climate

goals (Scown et al., 2020). Moreover, several studies have failed to identify a positive effect of CAP schemes on the ecological status of farmland (Ait Sidhoum et al., 2023; Baráth et al., 2024).

Among multiple factors, the lack of environmental benefits of existing EU public policies (hereafter policies) has been attributed to low farmers' uptake of voluntary schemes (Alliance Environnement., 2020). Past research on the uptake of agri-environmental policies has highlighted the importance of both farm and farmer characteristics, such as age, farm size, full- or part-time farming, and education (Paulus et al., 2022; Pavlis et al., 2016; Wool et al., 2023; Zieliński et al., 2023). In addition, farmers' satisfaction with policy design, defined as the features specifying what farmers are required to do where, under which temporal, spatial or procedural conditions, and with which payoffs (Siddiki, 2020), has been identified as a key determinant for the uptake of agri-environmental policies more broadly (Canessa et al., 2024; Will et al., 2025). However, a synthesis of the currently fragmented evidence on how policies specifically aimed at increasing habitat on farmland should be designed from the farmers' perspectives is still lacking.

Moreover, a lack of landscape-scale targeting and coordination in existing policies was identified as a key barrier to achieving environmental benefits (Concepcion et al., 2020). Given that the average EU farm size was 17 hectares in 2020 (Eurostat, 2023), achieving the local biosphere ESB requires coordination among farmers to reach the necessary spatial configuration (Mohamed et al., 2024). To enhance landscape-scale coordination, collective agri-environmental schemes (hereafter collective schemes), which are policies designed to *"incentivize groups of farmers to engage in coordinated action towards a common environmental objective that can be delivered at landscape scales"* (Sander et al., 2024, p. 103255), have been proposed. These policies were found to have the potential to increase participation, connectivity and spatial coordination and thereby enhance environmental benefits (R. Huber et al., 2021; Kelemen et al., 2023; Kuhfuss et al., 2022; Nguyen et al., 2022; Zavalloni & Bareille, 2026).

As a result, since 2014, Member States have been able to offer farmers the option of applying for agri-environmental schemes collectively as a group (Regulation (EU) No 1305/2013, 2013). However, despite their implementation in some countries such as the Netherlands and Ireland, many Member States, including Spain, have not yet integrated them in their national policy (Nadeu et al., 2023). Despite the promising results of collective schemes demonstrated in other contexts, exploring the potential of such collective approaches requires careful attention to the specific socio-ecological context of farmers' communities and therefore requires case-by-case considerations (Moroder et al., 2025).

Thus, to close these research gaps, this thesis aims to answer the following research questions (RQ):

**RQ1:** According to literature, what design features influence farmers' uptake of public policies to conserve or create semi-natural habitat on agricultural land in the EU?

**RQ2:** How do farmers and experts assess the potential of collective agri-environmental schemes for increasing semi-natural habitat in Castilla-La Mancha, Spain?

**RQ3:** How should collective agri-environmental schemes be designed to increase farmers' participation in Castilla-La Mancha, Spain?

RQ1 is addressed through a systematic literature review, with the aim of providing guidance for EU policymakers to improve policy design in order to increase uptake of policies for increasing habitat. RQ2 and RQ3 are examined through interviews conducted with farmers and experts from Castilla-La Mancha, Spain. This region is among the most intensely farmed regions in the EU (Eurostat, 2026) and exhibits severe deficits in habitat availability (Mohamed et al., 2024). At the same time, the region has a high prevalence of agricultural cooperatives (del Real Sánchez-Flor et al., 2026), creating conditions that seem promising for further farmer collaboration. Nevertheless, collective schemes so far remained unexplored in this context.

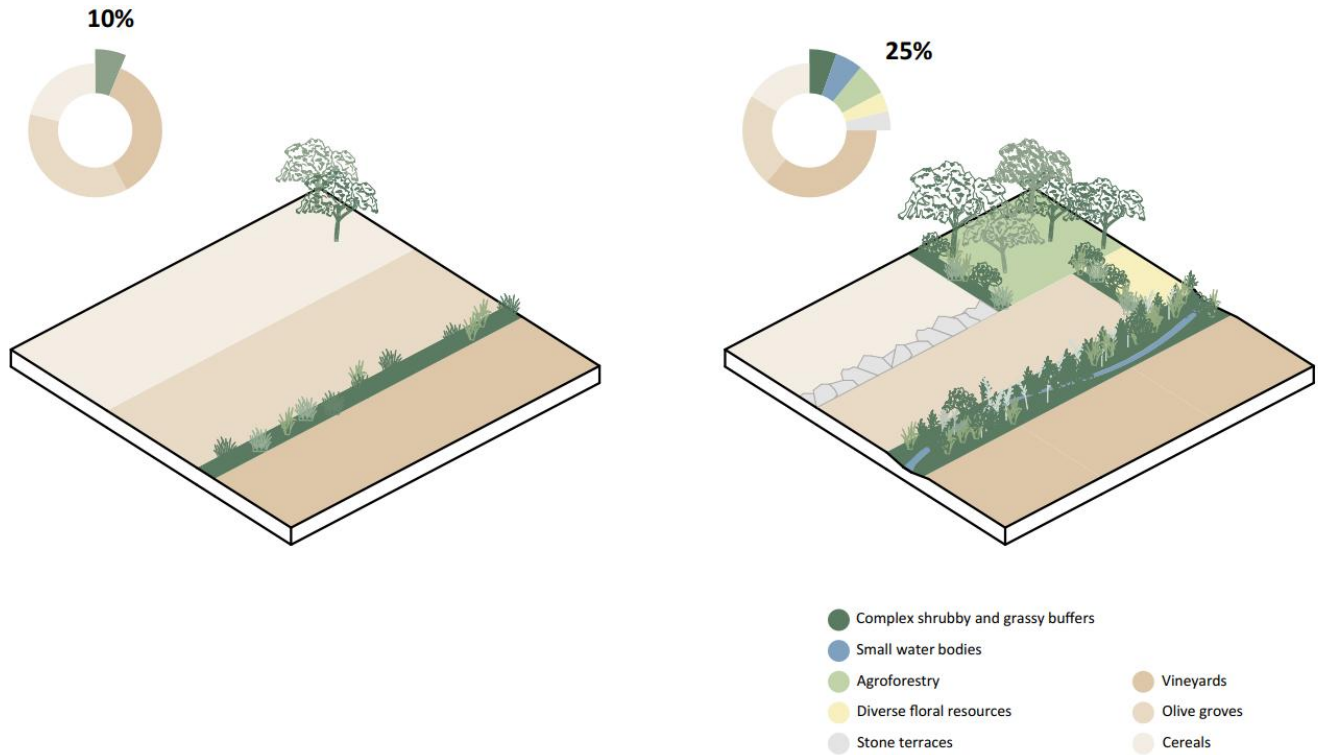
## 2. Methods

### 2.1. Conceptual Foundation

This thesis is written as part of the project “*Unbreaking the Planet: Evidence-Based Pathways to Restore Safe and Just Earth System Boundaries*”, and thus aims to explore policy pathways to reach the local biosphere ESB (Rockström et al., 2023) of reaching 20-25% of diverse semi-natural habitat including native species per square-kilometre (Mohamed et al., 2024).

The local biosphere ESB has been identified by Mohamed et al. (2024) through a systematic literature review on the minimum levels of habitat required to ensure biosphere functional integrity. Functional integrity is defined as “*the capacity of the ecosystem to contribute to biosphere processes and to sustain multiple NCP provision through the presence of ecologically functional communities of species*” (Mohamed et al., 2024, p. 60). This study evaluates functional integrity through three dimensions: quantity, quality and spatial configuration of habitat in the landscape. **Habitat quantity** refers to the amount of habitat in the landscape, identified as a minimum of 20-25% of the area. **Habitat quality** concerns the ability of a habitat to host and maintain species essential for ecological functions and services. With structure and composition of habitat being the key determinants of habitat quality, this is reflected in the emphasis on diverse semi-natural habitat. Finally, the **spatial configuration of habitat** is crucial to ensure landscape connectivity and the distribution of NCP providing organisms, as reflected in the per-square-kilometre distribution requirement. In this context, effective NCP provision depends both on proximity to habitat, for example for mobile NCP-providing species such as pollinators, and on habitat location, for example for water quality regulation in riparian zones.

Together, these three dimensions underpin the biosphere’s capacity to sustain the provision of local NCPs (Mohamed et al., 2024). Consequently, agricultural landscapes require transformations across all three dimensions, as schematically illustrated in Figure 1.



**Figure 1:** Schematic representation of the transition required to reach the local biosphere ESB. Reflects habitat quantity, quality and spatial configuration. Figure created by the author with the support of a designer, based on explanations by Mohamed et al. (2024).

The potential and feasibility of policy pathways can be assessed across several dimensions. The Tripartite Framework on the Feasibility of Mitigation Pathways (Nielsen et al., 2020) informed the focus of this thesis on farmers' uptake of policies. According to this framework, the mitigation potential of a policy is shaped by three dimensions: Technical potential, initiative feasibility and behavioral plasticity.

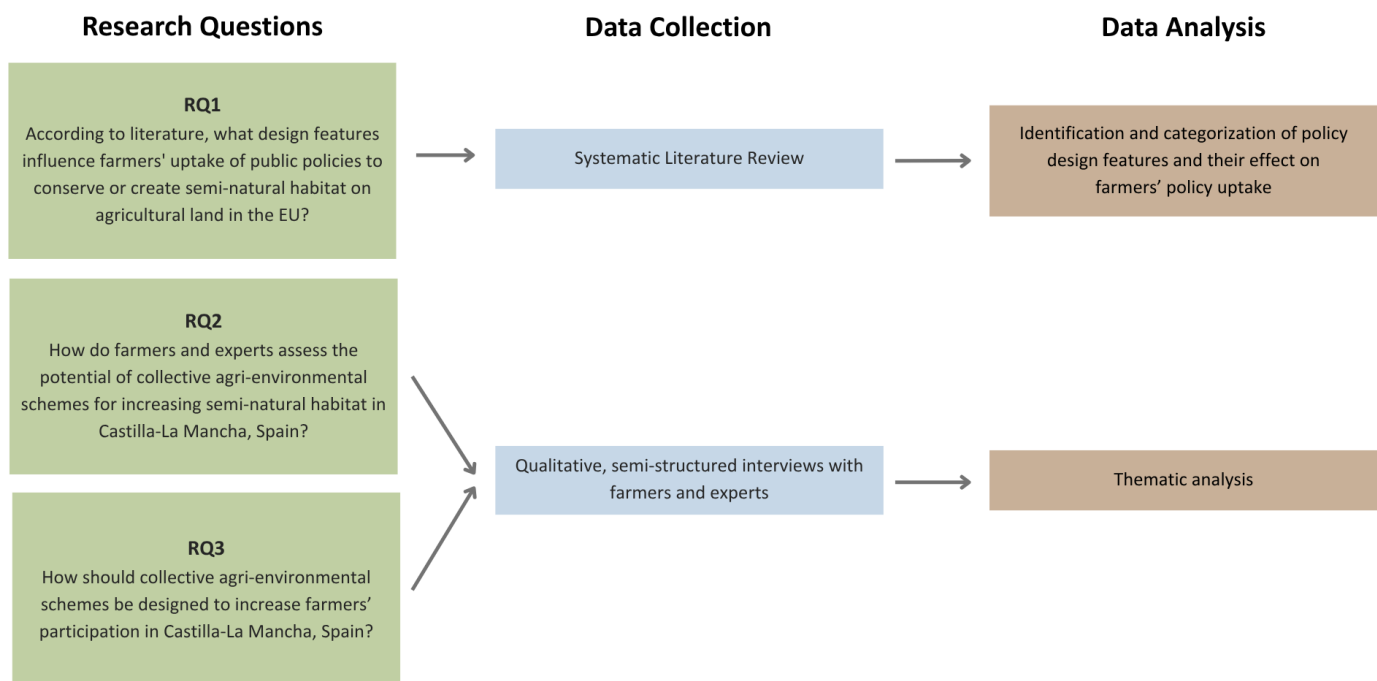
**Technical potential** refers to the reduction of the driver that would result if an initiative fully achieved its objective. In this study, it relates to the potential of a landscape with 20-25% of habitat per square-kilometre for sustaining local NCPs, as outlined in Mohamed et al. (2024). **Initiative feasibility** concerns the *"likelihood that a change agent will adopt and then implement a mitigation initiative"* (Nielsen et al., 2020, p. 326). In this context, this refers, for example, to the likelihood that public authorities would offer collective schemes for the creation of habitats to farmers. Finally, **behavioral plasticity** refers to the *"extent to which the target of a mitigation initiative responds to it as intended"* (2020, p. 326). In this study, this dimension captures whether farmers adopt and implement policies aimed at increasing habitat on their lands.

This thesis focusses specifically on behavioral plasticity, emphasizing the role of farmers’ decision-making on the success of policies. However, these insights may also inform initiative feasibility, as support from affected groups can influence the likelihood of policy adoption and implementation (Nielsen et al., 2020).

## 2.2. Research Design

The research design, outlined in Figure 2, combines the identification and categorization of policy design features and their effect on farmers’ policy uptake from a systematic literature review (RQ1) with a thematic analysis of qualitative, semi-structured interviews with farmers and experts from Castilla-La Mancha (RQ2, RQ3).

By using this approach, I combine existing empirical evidence on design features affecting uptake with new empirical insights into the potential and preferred design of collective schemes within a specific context. While the results can inform policymakers more broadly, context needs to be considered for the insights provided from exploring the case of Castilla-La Mancha (Moroder et al., 2025).



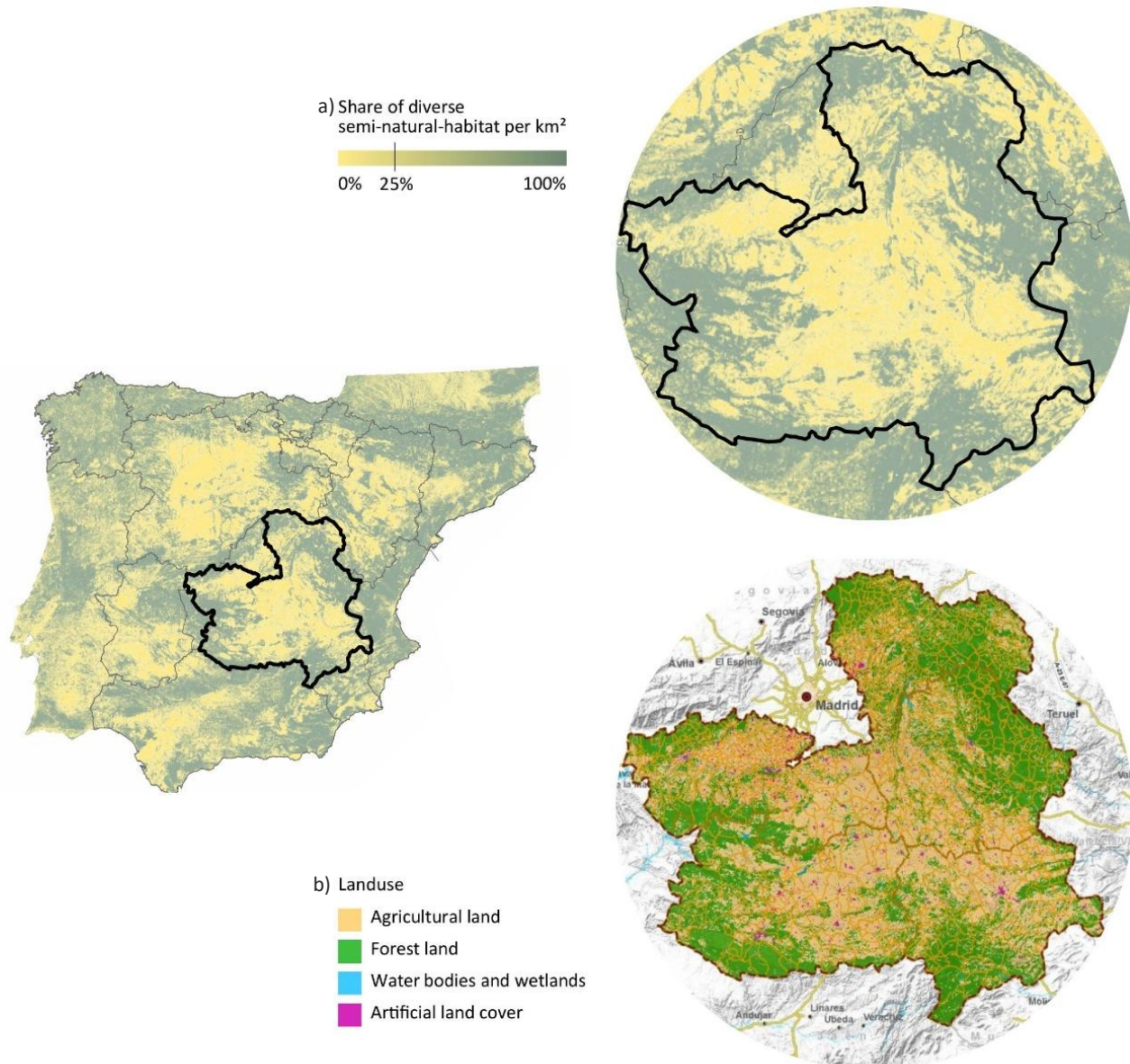
**Figure 2:** Visual representation of the research design. Depicts data collection and analysis used for answering each RQ (Figure created by the author).

### **2.3. Case Description**

Castilla-La Mancha is an autonomous region located in central Spain with 2.13 million inhabitants (INE, 2026). With 75% of all municipalities with a total of 406.331 inhabitants facing extreme or intense risk of depopulation, this region is experiencing one of the highest levels of rural depopulation, driven by an aging population, low birth rates and outmigration (Comisionado para el Reto Demográfico, n.d.; Meneses et al., 2025; Pulido Fernández et al., 2022). The region is Spain's fourth-largest agricultural producer in economic terms (Eurostat, 2026). Approximately half of the region's territory is covered by agricultural land and the sector employs more than 300,000 people (European Commission, 2024). Agricultural production is dominated by barley, vineyards and olive groves (European Commission, 2024). In recent decades, the region has undergone further agricultural intensification, exemplified by the expansion of irrigated agriculture (Arbonès et al., 2024) and a 10 % increase in farm size between 2020 and 2023 (INE, 2025). As depicted in Figure 3, Castilla-La Mancha is among the Spanish regions with particularly low shares of habitat per square-kilometre (Mohamed et al., 2024). Many agricultural areas in the region have far less than 5% of habitat, underscoring the severe extent of habitat deficits (see Figure 2a).

As previous research has shown, collective schemes tend to work better in contexts with a collaborative tradition and culture (Bazzan et al., 2023; Wunder et al., 2025). In Castilla-La Mancha, agricultural cooperatives are highly prevalent, with at least one agri-food cooperative in 32.3% of all municipalities (del Real Sánchez-Flor et al., 2026). These cooperatives account for 43.2% of the region's agricultural production and involve more than 158,600 members (del Real Sánchez-Flor et al., 2026). In addition, Castilla-La Mancha hosts one of the few documented successful examples of collective groundwater management in the EU (Hoogesteger et al., 2025). The Irrigation Community of the La Mancha Oriental aquifer had around 10,000 farmer members in 2023 (Hoogesteger et al., 2025).

This case thus represents an increasingly intensive agricultural region with very limited remaining habitat, while facing the societal challenge of rural depopulation. This context highlights the urgent need for strong policy responses to habitat loss, while the broad engagement in cooperative structures may provide a promising foundation for the implementation of collective schemes.



**Figure 3:** Map of Spain and Castilla-La Mancha. Depicts a) the share of diverse semi-natural habitat per square-kilometre, and b) the spatial distribution of agricultural land, forest land, water bodies and wetlands, and artificial land cover. Figure created by the author based on a) habitat data derived from Martins Migueis Garcia (2025) and by b) integrating a screenshot from Centro Cartográfico de Castilla-La Mancha (2015).

## 2.4. Data Collection

### 2.4.1. Systematic Literature Review

A systematic literature review of peer-reviewed scientific articles was carried out to answer RQ1. By using this method, explicit procedures are adopted to avoid biases and to ensure a transparent and replicable research process (Bryman, 2012, p. 102).

First, a scoping review was conducted using *Web of Science* and *Scopus* and by applying and testing different variations of search terms. The aim was to get an overview of the literature and to prepare a set of search terms (Appendix A) and inclusion criteria (Table 1).

Second, a systematic collection of peer-reviewed articles was conducted using this combination of search terms on *Web of Science*. The final set of search terms targeted articles conducted in the EU that combine policy instruments aimed at increasing habitat types outlined in Mohamed et al. (2024) in agricultural landscapes with insights on farmers' preferences or uptake. In the first screening stage, abstracts were reviewed to identify whether articles meet the inclusion criteria. This process reduced the number of articles from N = 228 to N = 78 for further eligibility evaluation.

| Inclusion Criteria |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| a)                 | Time period: be published between 01. January 2014 and 24. March 2026. This period was chosen due to the stronger environmental focus of the CAP from 2014 (Sotte & Arcuri, 2025, p. 173).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| b)                 | Public policy focus: contain a public policy instrument, such as economic instruments, regulatory instruments, cooperative instruments or informational instruments (Böcher, 2012)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| c)                 | Policy design focus: must explore different policy design features of the policy instrument. Policy design in this context is defined as the content of policies on the micro-level, thus focusing on features defining what farmers are required to do where, under which temporal, spatial or procedural conditions and with which payoffs (Siddiki, 2020)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| d)                 | Conservation focus: explore the aim of protecting or creating landscape elements considered (semi-)natural habitat, as listed in Table 1 in Supplemental Information 1 of Mohamed et al. (2024), included in Appendix B. These include: <ul style="list-style-type: none"> <li>• Diverse floral resources: floral strips, flowering ground cover, floral field margins, ...</li> <li>• Complex diverse semi-natural habitat: mix of different elements including pasture, grassland, patches of forest, shrublands, complex hedgerows, prairie strips, diverse field margins, shrubby and grassy buffers, small water bodies, diverse ground cover, ...</li> <li>• Complex diverse natural habitat: natural buffer, forest, habitat fragments in mosaic landscapes, field margins and vegetation cover, ...</li> <li>• Woody elements: silvoarable alleys, agroforestry, woody corridors, hedgerows, trees canopy cover, woody buffer, ...</li> <li>• Grassy elements: patches of grassland, diverse semi-natural pasture, ...</li> <li>• Forest: forest cover, forest edges associated with fallow or hedges, forest corridors, forested buffer, ...</li> </ul> |
| e)                 | Farmer focused: Contain empirical evidence on farmers' perceptions, or uptake of the policy instrument in relation to the policy design features                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

**Table 1:** Inclusion criteria. These inclusion criteria were developed based on an initial literature review on public policy for increasing habitat on farmland, and the scoping review of the systematic literature review (Table created by the author).

In the final step, results sections of these articles were reviewed to further to determine whether articles fully meet the inclusion criteria and thus contribute to answering the research question, which led to the exclusion decisions outlined in Table 2.

| Exclusion Criteria                                                                                                              |
|---------------------------------------------------------------------------------------------------------------------------------|
| Article are excluded if:                                                                                                        |
| a) Study explores only perceptions of and attitudes towards the type of landscape element rather than the policy design feature |
| b) Study focuses on how different policy design features influence the ecological impact of policy implementation               |
| c) Study solely focuses on policy uptake without considering policy design                                                      |
| d) The sample consists predominantly of non-farmers                                                                             |

**Table 2:** Exemplification for reasons for the exclusion of articles. Developed based on the review of studies contained after the application of the inclusion criteria and applied in the final stage of study selection (Table created by the author).

This procedure further reduced the number of articles to  $N = 8$ . Despite the large number of articles identified in the initial literature search, it is common for only a small subset to remain in the final sample. For example, in a systematic review on factors determining farmers' participation in agri-environmental policies more broadly, Canessa et al. (2024) retained a final sample of 33 from an initial pool of 431 articles. Additionally, 3 studies were retained from the initial scoping review and one additional study was identified through forward snowballing (Wohlin et al., 2022), which all meet the inclusion criteria. While including these studies may have reduced the replicability of the systematic literature review process, I decided to prioritize the comprehensiveness and depth of the results.

#### **2.4.2. *Semi-Structured Qualitative Interviews***

To study the potential of collective schemes for Castilla-La Mancha (RQ2) and farmers' preferences for policy design (RQ3), I conducted semi-structured interviews with farmers and experts. This method was noted as fruitful in past studies covering farmers' attitudes on collective and individual schemes, as it ensures that important topics are covered while leaving the space for interviewees to express their personal opinions, ideas and logical reasoning (Sander et al., 2024).

Interviews were conducted in English or Spanish with local farmers (9 farmers from 7 farms), nature conservationists (2), and representatives of the local government of Castilla-La Mancha (4 representatives from 2 ministries) in February and March 2026 (Table 3). While this thesis generally applied purposive sampling to capture a broad set of perspectives without aiming for a representative sample, snowball sampling was integrated to reach additional farmers (Bryman, 2012, pp. 418, 424). This was decided because farmers in this region were pointed out to me as a hard-to-reach population by scientists in background interviews. All interviews were conducted in person in Castilla-La Mancha, except for one online interview conducted via Zoom.

The final sample consisted of farmers from four organic or permaculture farms and from three conventional farms (Table 3). While there is no available data on the prevalence of permaculture farms in Castilla-La Mancha, 9% of all agricultural holdings are certified organic (INE, 2023b, 2023a). Both organic and permaculture farmers are therefore most likely overrepresented in this sample. Moreover, the average farm size in this sample is 138.8 ha, which is substantially larger than the average of 41.33 ha in Castilla-La Mancha (INE, 2023a).

| Interviews                                                        | Farming system | Farm size | Number of Interview Partners | Interviewees                                                                                     | Location  |
|-------------------------------------------------------------------|----------------|-----------|------------------------------|--------------------------------------------------------------------------------------------------|-----------|
| Nature Conservation Organization 1                                |                |           | 1                            | Nature Conservationist 1 (NC1)                                                                   | in person |
| Regional Ministry for Sustainable Development                     |                |           | 2                            | Sustainability Ministry Representative 1 (SM1)<br>Sustainability Ministry Representative 2 (SM2) | in person |
| Nature Conservation Organization 2                                |                |           | 1                            | Nature Conservationist 2 (NC2)                                                                   | online    |
| Farm A                                                            | Permaculture   | 1.5 ha    | 2                            | Farmer 1 (F1)<br>Farmer 2 (F2)                                                                   | in person |
| Farm B                                                            | Conventional   | 35 ha     | 1                            | Farmer 3 (F3)                                                                                    | in person |
| Farm C                                                            | Permaculture   | 25 ha     | 1                            | Farmer 4 (F4)                                                                                    | in person |
| Farm D                                                            | Organic        | 260 ha    | 1                            | Farmer 5 (F5)                                                                                    | in person |
| Farm E                                                            | Organic        | 150 ha    | 1                            | Farmer 6 (F6)                                                                                    | in person |
| Farm F                                                            | Conventional   | 200 ha    | 1                            | Farmer 7 (F7)                                                                                    | in person |
| Farm G                                                            | Conventional   | 300 ha    | 2                            | Farmer 8 (F8)<br>Farmer 9 (F9)                                                                   | in person |
| Regional Ministry of Agriculture, Livestock and Rural Development |                |           | 2                            | Agricultural Ministry Representative 1 (AM1)<br>Agricultural Ministry Representative 2 (AM2)     | online    |

**Table 3:** Overview of interviews and interviewees. Specifies farming system, farm size, number of interview partners and location (Table created by author based on information provided by interviewees)

The farmer interviews consisted of two parts: the first part related to this research and the second part was conducted by fellow LUMES student Valerie Leonhartsberger on the use of groundwater for irrigation. We were both present throughout both parts of the interview. Interviews with farmers, covering these two parts, lasted between 40 minutes and 2 hours and 20 minutes. Interviews with the nature conservationists and ministry representatives were conducted individually and lasted between 50 minutes and 1 hour and 13 minutes. Nature Conservationist 2 and the ministry representatives received the interview questions beforehand, while they were not sent out in advance to the other interview partners.

The interview guide was developed inspired by multiple relevant factors for the potential and design of collective schemes found in past studies (Canessa et al., 2024; R. Huber et al., 2021; Kelemen et al., 2023;

Reichenspurner et al., 2024; Sander et al., 2024; van Dijk et al., 2015). For each guiding question, follow-up questions were prepared to be asked where relevant. The interview guide for farmers (Appendix C) consisted of four main blocks of questions: 1) environmental awareness and current habitat on the farm, 2) current and past uptake of agri-environmental policy, 3) assessment of the potential of collective schemes and policy design features, 4) the state of collaboration and advice. Additionally, all farmers were asked to fill out a data sheet with information on socio-demographic characteristics of the farmer and the farm structure (Appendix D). Blocks 1), 2), 4) and the data sheets were mainly used for contextualization of the interviewee's responses. The expert interviews consisted of one block of questions that was specific to their past experiences in conservation projects, the development and implementation of agri-environmental policies, or their experiences working with farmers in the region. Finally, similarly to the farmers, they were asked block 3) on collective schemes and policy design preferences. All expert interview guides can be found in Appendix E.

Block 3) started by an introduction of the local biosphere ESB to explain the importance of spatial configuration and quantity of habitat, showing the share of habitat in the square-kilometre in which the farmers and their neighbours are located (Appendix F). This had the aim of connecting the abstract problem of habitat deficits to their immediate surroundings and to visualize the importance of coordination with others to achieve the ESB. An introduction on collective schemes and questions on the general opinion on collaborating with other farmers on creating habitat followed. Finally, four design features of collective schemes were discussed. The design elements were presented to the interviewees by using four sets of cards with multiple options each (Appendix G). This approach had the aim to make collective schemes less abstract to the interviewees, given that collective schemes do not exist in Spain yet. Interviewees were asked on the advantages and disadvantages for each option, and which option they preferred overall. These cards were presented in all interviews except the first, conducted with Nature Conservationist 1. This first interview served as a pilot interview, and the design element cards had not yet been developed. Despite this difference, the interview was still considered relevant and was therefore included in the analysis.

The four design features and their respective options were developed based on existing collective schemes in other countries and proposals made in scientific literature, as summarized in Table 4. For **Governance**, the *Environmental Cooperative* option is based on the system in place in the Netherlands, where farmers must apply jointly for agri-environment-climate measures through environmental cooperatives since 2016 (Reichenspurner et al., 2024). *Farmers + public administrator* is inspired by the

schemes introduced in Alsace, France, to preserve the European hamster population, where the collective of farmers is supported by a public administrator from the chamber of agriculture (Limbach & Rozan, 2023). Finally, *Farmers* denotes the option of a full self-governance without the support of an intermediary organization. While no real-life application of a self-governance is known, it has been discussed in past studies (D'Alberto et al., 2024; Moroder et al., 2025).

**Incentive structure** aims to capture the tensions between practice-based schemes and result-based schemes. While practice-based schemes, where farmers are compensated for implementing pre-defined practices, is the most common form for agri-environmental schemes in the EU (Canessa et al., 2023), result-based schemes compensate farmers based on delivering verifiable results while giving farmers greater flexibility in how to achieve them given their farming context (Herzon et al., 2018). Result-based schemes have the potential to be more cost-efficient by directing resources directly at the desired outcomes (Kasari-Toussaint et al., 2026), incentivizing innovation and adaptive management by farmers (Pe'er et al., 2022) and thus leading to greater ecological benefits (Pe'er et al., 2022; Simoncini et al., 2019). However, farmers' acceptance of result-based schemes has been mixed, particularly since relying on achieving the required outcomes involves greater risk for farmers (Block et al., 2024; Gars et al., 2024; Wunder et al., 2025). In the case of the local biosphere ESB (Mohamed et al., 2024), the defined target is not linked to ecological objectives. It is assumed achieving the specified quantity, quality and spatial distribution of habitat will be sufficient for the ecological outcomes of the provision of multiple, local NCPs to follow (Mohamed et al., 2024). As a result, a clear dichotomy between result-, and practice-based approaches in terms of ecological objectives does not apply in this context. To nevertheless facilitate discussion with participants about differences between a predefined habitat type and more flexible choices of habitat types, two options were created. *Create a specific landscape element* captures habitat quality by specifying a combination of habitat types, and *reach a target* predefines habitat quantity as a target while allowing flexibility in the choice of habitat types.

In collective schemes, farmers can work collaboratively by maintaining dialogue, or coordinatively when working in isolation towards the same objective (Prager, 2015). For the feature **Collaboration**, the option *no organized meetings* reflects a merely coordinative approach, while *regular meetings* reflects a collaborative approach by enabling mutual learning while simultaneously offering space for professional advice. Regular meetings are in place for many cooperative schemes in the Netherlands (Bazzan et al., 2023) and in Alsace, France (Reichenspurner et al., 2024).

| Design Feature                                                                                           | Options                                            | Description                                                                                                                                                                                                                                                                                                               | Source/Implementation                                                                                                                                                                     |
|----------------------------------------------------------------------------------------------------------|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Governance<br>          | Environmental cooperative                          | A new Environmental Cooperative develops a coordinated plan for the whole landscape and employs technical advisors that the farmers can ask for advice. It offers different 'management packages' that farmers can choose from. Farmers sign a contract directly with the Environmental Cooperative.                      | Netherlands (Bazzan et al., 2023)                                                                                                                                                         |
|                                                                                                          | Farmers + public administrator                     | At least three farmers from the same municipality form a collective. Members can choose who is allowed to join. Farmers, together with an assigned public administrator, coordinate types of landscape elements and their locations. The public administrator provides support with the joint application and management. | Alsace, France (Limbach & Rozan, 2023)                                                                                                                                                    |
|                                                                                                          | Farmers                                            | At least three farmers from the same municipality form a collective. Members can choose who is allowed to join. Farmers coordinate types of landscape elements and their locations. They send a joint application to the public authority. Farmers manage the contract themselves.                                        | Inspired by D'Alberto et al. (2024) and Moroder et al. (2025)                                                                                                                             |
| Incentive Structure<br> | Create specific landscape element                  | To receive the subsidy, farmers need to connect pre-defined landscape elements across their farms, e.g. buffer zones, with at least X% woody, at least X% grassy, and at least X% floral elements.                                                                                                                        | Friesland, Netherlands (Bazzan et al., 2023)<br>Prevalent incentive structure in EU (Niskanen et al., 2021)<br>Adapted to reflect habitat quality in biosphere ESB (Mohamed et al., 2024) |
|                                                                                                          | Reach a target                                     | To receive the subsidy, the farmers need to reach ecological targets, e.g. increasing share of favourable habitat by X%, freely choosing multiple landscape elements from pre-defined list.                                                                                                                               | Netherlands (1998-2009) (van Dijk et al., 2015)<br>Burren Aran, Ireland (Tscharntke et al., 2025)<br>Adapted to reflect biosphere ESB (Mohamed et al., 2024)                              |
| Collaboration<br>     | Regular meetings                                   | Meetings with participating farmers are organized regularly to discuss management problems, share experiences and ask questions.                                                                                                                                                                                          | Netherlands, (Bazzan et al., 2023; Reichenspurner et al., 2024)<br>Alsace, France (Limbach & Rozan, 2023)                                                                                 |
|                                                                                                          | No organized meetings                              | There are no regular meetings with participating farmers.                                                                                                                                                                                                                                                                 | Inspired by Prager (2015)                                                                                                                                                                 |
| Payment<br>           | Self-determined distribution of collective payment | The collective receives a payment based on the total number of hectares created/protected across all participating farms. The members agree among themselves how to divide the payment.                                                                                                                                   | England (Franks & Emery, 2013)                                                                                                                                                            |
|                                                                                                          | Threshold Payment                                  | Participating farmers receive a per hectare payment, but only if a collective target is reached, e.g. X% of favourable habitat across all participating farms. Payment distribution is based on the hectare of protected/created habitat per farm.                                                                        | Alsace, France (Limbach & Rozan, 2023)                                                                                                                                                    |
|                                                                                                          | Agglomeration Bonus                                | All participating farmers receive a payment per hectare of conserved area on their land. In addition, farmers receive a bonus payment if their conserved land is located next to conserved land managed by other participating farmers.                                                                                   | Switzerland (R. Huber et al., 2021; Krämer & Wätzold, 2018)                                                                                                                               |
|                                                                                                          | Threshold Bonus                                    | All participating farmers receive a payment per hectare of conserved area on their land. In addition, farmers receive a bonus if a collective target is reached, e.g. X% of favourable habitat across all participating farms.                                                                                            | USA, Australia, Mexico (Nguyen et al., 2022)                                                                                                                                              |

**Table 4:** Design elements of collective schemes discussed in the interviews. Includes a description of each option and real-world applications where applicable (Table created by author based on the 14 listed sources).

Finally, the **Payment** feature includes two payment options and two bonus options. The option self-determined distribution of collective payment is least common but reflects what was applied in some cases in England (Franks & Emery, 2013). A Threshold payment is implemented in Alsace, France (Limbach

& Rozan, 2023), and means that farmers get remunerated per hectare but conditional on a collective target to be achieved. Agglomeration Bonus is a bonus payment on top of a hectare-based payment if the conserved land is spatially connected with land protected by neighbours (Krämer & Wätzold, 2018; Nguyen et al., 2022). This has been implemented to promote coordination and spatial connectivity in a scheme in Switzerland in 2001 (Krämer & Wätzold, 2018; Nguyen et al., 2022). Finally, a threshold bonus is a bonus on top of a hectare-based payment if a certain level of participation or spatial connectivity is collectively achieved (Nguyen et al., 2022). While this has not been applied in the EU, there are examples from the US, Mexico and Australia (Nguyen et al., 2022).

### **2.4.3. Data Management**

Upon signing an informed consent sheet, which contained information about the study and data handling (Appendix H), all interviews were recorded on a mobile device. These recordings were stored anonymously on a password-protected OneDrive folder and transcribed using SoundTypeAI. After manually reviewing the automated transcripts, the Spanish transcripts were translated using DeepL. All transcripts were then imported into Nvivo 15 for coding and analysis. All software used in this process is GDPR-compliant. Identifying information was removed, and quotes used in this paper are attributed only by role and interviewee number to ensure confidentiality.

## **2.5. Data Analysis**

### **2.5.1. Identification and Classification of Policy Design Features**

In the first step, all identified studies were classified regarding geographical context, habitat type, policy instrument, method, and explored policy design feature. In the context of this study, policy design is understood as the content of policies on the micro-level, thus focusing on features defining what farmers are required to do where, under which temporal, spatial or procedural conditions and with which payoffs (Siddiki, 2020). All policy design features found to influence policy uptake, or considered by the author to enhance policy design satisfaction and thereby potentially increase uptake (Canessa et al., 2023; Will et al., 2025), were included. To allow for a higher level of abstraction, design features that are highly specific to particular types of habitat, such as precise mowing dates in semi-natural grasslands, were excluded from the analysis. Moreover, design features that are related to the level of payment were excluded, since the level of costs and thus the required remuneration varies greatly across habitat types.

In the second step, the effect direction for each policy design feature was recorded. I refrained from including any findings from tables that were not interpreted by the authors in writing to avoid any misinterpretation. In addition, effect sizes reported in quantitative studies were recorded. For qualitative studies, the corresponding text indicating the importance of the design feature for influencing policy uptake or scheme satisfaction was noted.

In the third step, effect sizes were categorized as low, medium or high based on the interpretation provided by the respective authors. In cases where no explicit interpretation on the effect size was given, the categorization was derived by comparing the reported effect size to other design features within the same study. This categorization is used to assess the importance of each design feature in influencing farmers' willingness to participate in the policy.

In the last step, the results were visualised on a graph, depicting the effect direction, effect size, sample size and the respective habitat type explored in each study. It has to be noted that the effect sizes are depicted schematically. Their exact position on the graph does not convey quantitative meaning but rather indicates belonging to the categorical group (low, medium, high).

### **2.5.2. *Thematic Analysis***

The farmers' interviews were analysed following the approach to thematic analysis outlined in Naeem et al., (2023), combining inductive and deductive coding. After an initial familiarization with the data, codes for the questioned policy design features were deductively assigned to the farmer interviews while all other meaning relevant to the RQs was inductively coded by assigning keywords to relevant quotes. From that, a Codebook (Appendix I) was reiteratively developed within the first rounds of coding and was then applied to all the material (Naeem et al., 2023). The codes were then combined to themes to identify patterned meanings (Naeem et al., 2023), which was conducted using paper and whiteboard for both RQ2 and RQ3. Finally, the interpretation of these themes in relation to the research question was then structured into a conceptual model, which is described and visualized in the results section (Naeem et al., 2023).

Since this thesis follows a farmer-centred approach, expert interviews were treated as a complement. After transcription and translation of the expert interviews, the key codes and themes identified in the farmer interviews were subsequently explored in the expert interviews rather than following the same analytical procedure outlined above. In this way, the expert interviews served to provide broader contextualization without shifting the focus away from farmers' perceptions.

### 3. Results

#### 3.1. Policy Design Elements influencing Farmers' Policy Uptake (RQ1)

The studies analysed in the systematic literature review explored a range of agri-environmental policies, the majority of which are directly derived from policy instruments set out in the CAP. The CAP has significantly driven agricultural intensification in the EU and thus contributed to the loss of habitat in the past decades (Simoncini et al., 2019). As a response, the CAP has increasingly integrated environmental objectives, most notably with the *greening* of the CAP 2014-2020 (Sotte & Arcuri, 2025), and the most recent CAP reform in 2023 (Sotte & Vergamini, 2025). The current CAP consists of three main policy instruments related to habitats, namely *Enhanced Conditionality* including standards to ensure good environmental conditions, *Eco-schemes*, and *Agri-environment-climate Measures*. For the latter two, the farming practices under each policy instrument farmers can choose from for each policy instrument are subject to the decision of the member states (EU CAP Network, 2024). The habitat-relevant options for each CAP instrument are summarized in Table 5 below.

| Policy instrument                               | Pillar                                       | Description                                                                                                                                                                                                                                                                                               | Financial support | Habitat-relevant practices                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------------------------------|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Enhanced Conditionality</b>                  | Pillar I (fully EU-funded)                   | To receive EU income support, farmers must comply with: <ul style="list-style-type: none"> <li>Statutory management requirements (SMRs)</li> <li>Good agricultural and environmental conditions (GAECs)</li> </ul>                                                                                        | No                | Mandatory for all members states to implement, among others: <ul style="list-style-type: none"> <li>GAEC 2: protect wetlands and peatlands</li> <li>GAEC 8: maintain non-productive areas and landscape features, and ensure the retention of landscape features through, for example, a ban on cutting hedges and trees during the bird breeding and rearing season (formerly ecological focus area)</li> <li>GAEC 9: protect environmentally-sensitive permanent grasslands in Natura 2000 sites</li> </ul>                                                      |
| <b>Eco-schemes</b>                              | Pillar I (fully EU-funded)                   | Annual, or multiannual, voluntary commitments that go beyond Enhanced Conditionality. Compensated by hectare based on a) costs induced and income forgone; or as b) fixed top-up payments. At least 25% of budget for direct payments must be allocated to eco-schemes.                                   | Yes               | Selection of option subject to member states' decision and there is no closed mandatory list set out in CAP. Habitat-relevant options may include, among others: <ul style="list-style-type: none"> <li>Mixed species/diverse sward of permanent grassland for biodiversity purposes (pollination, birds, game feedstocks)</li> <li>Establishment and maintenance of landscape features above conditionality</li> <li>Semi-natural habitat creation and enhancement</li> <li>Establishment and maintenance of high- biodiversity silvo-pastoral systems</li> </ul> |
| <b>Agri-environment-climate Measures (AECM)</b> | Pillar II (co-funded by EU and member state) | Multiannual, voluntary commitments that go beyond Enhanced Conditionality. Compensated by hectare based on costs induced and income forgone. At least 35% of funds on rural development must be allocated to measures supporting climate, biodiversity, environmental and animal welfare, including AECM. | Yes               | <ul style="list-style-type: none"> <li>Land lying fallow with species composition for biodiversity purposes (pollination, birds, game feedstocks, etc.)</li> <li>Shepherding on open spaces and between permanent crops, transhumance and common grazing</li> <li>Extensive use of permanent grassland</li> <li>Rewetting wetlands/peatlands, paludiculture</li> <li>Buffer strips with management practices and without pesticide</li> <li>Cover crop between tree rows on permanent crops - orchards, vineyards, olive trees - above conditionality</li> </ul>   |

**Table 5:** Summary of policy instruments under CAP 2023-2027. Includes options aimed at increasing semi-natural habitat in agricultural landscapes. The selection of habitat-relevant options was made based on the relevant landscape-elements identified in Mohamed et al. (2024). Table created by author based on European Commission (n.d.-a, n.d.-b), Regulation (EU) 2021/2115 (2026), and EU CAP Network (2024).

Since extended conditionality is mandatory while both eco-schemes and agri-environment-climate measures are voluntary, it is not surprising that all but one of the analysed papers focus specifically on farmers' preferences on the design of these voluntary instruments. One qualitative study (Mitrová et al., 2025), examines policy design preferences without focusing on a specific instrument, but clearly links the study to the debate on policy development under the CAP. As a result, the findings of this synthesis can best guide the development of voluntary CAP instruments, while also offering insights that may be transferable to other policy types.

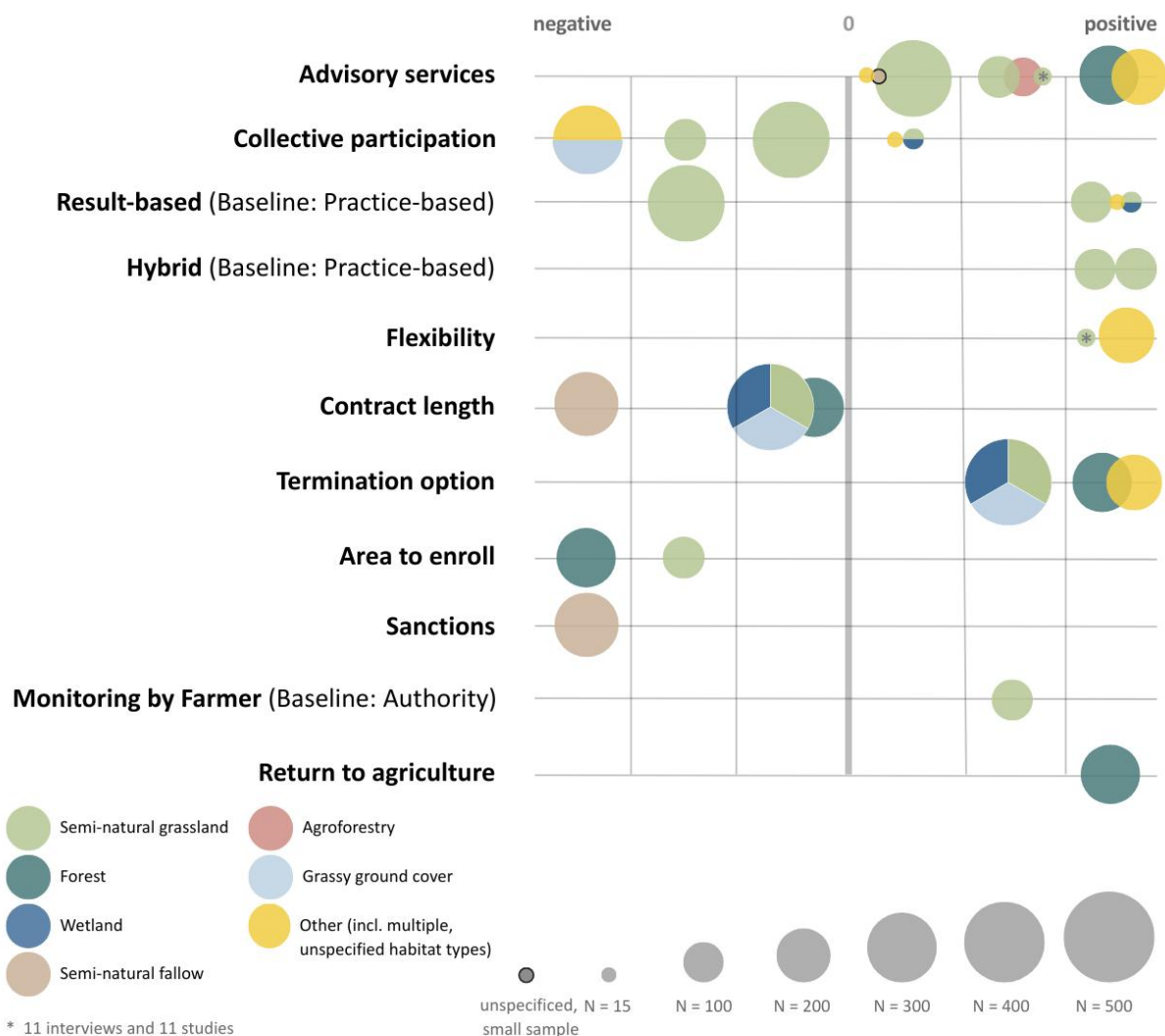
A full overview of the 14 identified design elements including their definitions in the respective studies and the targeted habitat types, is provided in Table 6. The analysed literature covers a broad range of geographical contexts and methods, an overview of which can be found in Appendix J.

| Policy design features   | Definition in studies                                                                                                                                                                                                | Habitat type                                                                                                                                                                                                                            | References                     |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| Advisory services        | Include advisory services in the contract                                                                                                                                                                            | Semi-natural grassland (extensive grasslands)                                                                                                                                                                                           | Schulze et al. (2026)          |
|                          | Possibility to seek advice from inspectors                                                                                                                                                                           | Semi-natural grassland (semi-natural pastures)                                                                                                                                                                                          | Opdenbosch et al. (2024)       |
|                          | Complementing scheme with advice or education campaigns                                                                                                                                                              | Semi-natural fallow (lapwing plot)                                                                                                                                                                                                      | Buschmann et al. (2023)        |
|                          | Include technical advice by rangers to plant and manage landscape element throughout the duration of the contract                                                                                                    | Forest                                                                                                                                                                                                                                  | Lienhoop & Brouwer (2015)      |
|                          | Integrate simple, inspiring training and peer learning                                                                                                                                                               | Other (habitats supported by agri-environmental schemes to enhance natural environment)                                                                                                                                                 | Glass et al. (2026)            |
|                          | Integrate public advisory services                                                                                                                                                                                   | Agroforestry                                                                                                                                                                                                                            | Mitrová et al. (2025)          |
|                          | The presence of an external technician for advice                                                                                                                                                                    | Other (traditional, non-mechanised and rainfed sloping and mountainous olive production systems, classified as High Nature Value Farmland)                                                                                              | Rocamora-Montiel et al. (2014) |
|                          | Technical support and advisory services for farmers about best management practices of farming systems using permanent grasslands                                                                                    | Semi-natural grassland (grassland restoration)                                                                                                                                                                                          | Ben-Othmen & Ostapchuk (2023)  |
| Collective participation | Group of at least five farmers from the same municipality, collective freely created with those whom they trust the most; upon non-compliance by one member, all other farmers in the collective are being monitored | Other (Cover crops and habitat types under ecological focus areas, including landscape features, terraces, buffer strips, land lying fallow, afforested areas, agroforestry areas, areas covered by catch crops and winter green cover) | Villanueva et al. (2015)       |
|                          | Option to involve partners in the contract and implement measure cooperatively; to involve an intermediary between the farmers and the government                                                                    | Semi-natural grassland (extensive grasslands)                                                                                                                                                                                           | Schulze et al. (2026)          |
|                          | Local and group schemes, ideally embedded within familiar networks                                                                                                                                                   | Other (habitats supported by agri-environmental schemes to enhance natural environment)                                                                                                                                                 | Glass et al. (2026)            |
|                          | Group arrangement of practices to reach a common objective, at least 3 farmers                                                                                                                                       | Wetland, semi-natural grassland (pasture)                                                                                                                                                                                               | Hardy et al. (2020)            |

|                              |                                                                                                                                                                                                                                                                                    |                                                                                                                                            |                                |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| <b>Result-based schemes</b>  | Reward farmers based on achieved environmental outcomes (outcome variable not specified)                                                                                                                                                                                           | Semi-natural grassland (extensive grasslands)                                                                                              | Schulze et al. (2026)          |
|                              | Linking payments to measurable environmental outcomes such as indicator species or habitat quality                                                                                                                                                                                 | Diverse (habitats under agri-environmental schemes to enhance natural environment)                                                         | Glass et al. (2026)            |
|                              | Farmers must demonstrate positive ecological results measured based on different indicators, such as the presence of plant species, breeding success of farmland birds or reduction of pollutants in soils or watersheds)                                                          | Semi-natural grassland (extensive grassland)                                                                                               | Canessa et al. (2023)          |
|                              | Financial retribution based on achieving the common biodiversity indicators, in this case number of birds                                                                                                                                                                          | Wetland, semi-natural grassland (pasture)                                                                                                  | Hardy et al. (2020)            |
| <b>Hybrid schemes</b>        | Compensation splitted between a guaranteed element and a top-up payment upon delivery of the desired outcome                                                                                                                                                                       | Semi-natural grassland (extensive grassland)                                                                                               | Canessa et al. (2023)          |
|                              | Hybrid scheme to increase habitat connectivity. Farmers are requested to enrol at least 4 ha of their farmland in grassland conservation. These must be located on the same parcel (e.g., in one piece) to benefit from €250/ha/year in addition to the yearly (baseline) payment. | Semi-natural grassland (grassland restoration)                                                                                             | Ben-Othmen & Ostapchuk (2023)  |
| <b>Flexibility</b>           | Farmers seek flexibility that would allow for reaching compromises when inspections are carried out in situations where farmers do not want to choose between prioritizing animal welfare or risking sanctions for neglecting semi-natural pastures.                               | Semi-natural grassland (semi-natural pastures)                                                                                             | Opdenbosch et al. (2024)       |
|                              | Flexibility in the management of the orchards regarding the working dates                                                                                                                                                                                                          | Other (traditional, non-mechanised and rainfed sloping and mountainous olive production systems, classified as High Nature Value Farmland) | Rocamora-Montiel et al. (2014) |
| <b>Contract length</b>       | Contract duration (1 or 5 years)                                                                                                                                                                                                                                                   | Semi-natural fallow (lapwing plot)                                                                                                         | Buschmann et al. (2023)        |
|                              | Contract duration (1,2,3,5,10 or 20 years)                                                                                                                                                                                                                                         | Semi-natural grassland, grassy ground cover, wetland                                                                                       | Czajkowski et al., (2021)      |
|                              | Period in which forest grows on land (10, 25 or 50 years)                                                                                                                                                                                                                          | Forest                                                                                                                                     | Lienhoop & Brouwer (2015)      |
| <b>Termination option</b>    | Possibility to terminate the contract without requirement to pay back the acquired subsidies                                                                                                                                                                                       | Semi-natural grassland, grassy ground cover, wetland                                                                                       | Czajkowski et al., (2021)      |
|                              | Possibility to terminate the contract at any time                                                                                                                                                                                                                                  | Forest                                                                                                                                     | Lienhoop & Brouwer (2015)      |
|                              | Possibility of leaving the association of the TMC at any time without being penalised                                                                                                                                                                                              | Other (traditional, non-mechanised and rainfed sloping and mountainous olive production systems, classified as High Nature Value Farmland) | Rocamora-Montiel et al. (2014) |
| <b>Area to enrol</b>         | The size of the afforestation area expressed as percentage of farmland (5,10,25 or 50% of farmland)                                                                                                                                                                                | Forest                                                                                                                                     | Lienhoop & Brouwer (2015)      |
|                              | The percentage of farmland to be enrolled by the farmer in grassland restoration                                                                                                                                                                                                   | Semi-natural grassland (grassland restoration)                                                                                             | Ben-Othmen & Ostapchuk (2023)  |
| <b>Sanctions</b>             | Level of sanctions in case of an infringement to the contract rules: low (7% of remuneration) or high (7% of remuneration plus 3% of the farm's direct payments)                                                                                                                   | Semi-natural fallow (lapwing plot)                                                                                                         | Buschmann et al. (2023)        |
| <b>Monitoring by Farmer</b>  | Obligation for the farmer to record and report the information to the authority every year, or annual field visits by authority                                                                                                                                                    | Semi-natural grassland (extensive grassland)                                                                                               | Canessa et al. (2023)          |
| <b>Return to agriculture</b> | The opportunity to return to agriculture at the end of the contract                                                                                                                                                                                                                | Forest                                                                                                                                     | Lienhoop & Brouwer (2015)      |

**Table 6:** Overview of examined policy design features. Includes definitions in respective studies and targeted habitat types (Table created by author based on the 12 listed references).

The results of the systematic literature review are depicted in Figure 4. The results show a positive effect of integrating advisory services, hybrid-schemes, flexibility in inspection and management, the option to terminate the contract at any time without sanctions, monitoring by farmers and the possibility to return to agriculture after the end of the policy duration. A clear negative effect was found for contract length, minimum area to enrol and the level of sanctions for non-compliance, while results for collective participation and result-based schemes are mixed.



**Figure 4:** Farmers policy design preferences in policies aiming at increasing habitat. Each circle represents one study. The x-axis indicates the direction of effects, and the bubble size reflects the number of participants of the respective study, unless indicated differently by a footnote. The bubble colour represents the type of habitat investigated in the respective study (Figure created by author, based on results from the systematic literature review).

Among all design features, there is the strongest and most consistent evidence supporting a positive effect of integrating **advisory services**. Eight studies, exploring a wide range of habitat types, show a low to high positive effect of integrating advisory services on policy uptake.

Moreover, the findings clearly indicate that farmers prefer policy design that avoids long-term commitments, which highlights farmers' identity as agricultural producers over that of environmental service providers. Three large studies in the sample support that **longer contracts** are viewed negatively by farmers. Above that, the **option to terminate** the contract at any time and the **opportunity to return to agricultural** on the land once the contract has ended, is also appreciated by farmers, as demonstrated in three and one large studies, respectively. The negative effect of **area to enrol** found in two studies highlights the importance of low entry barriers to avoid discouraging participation.

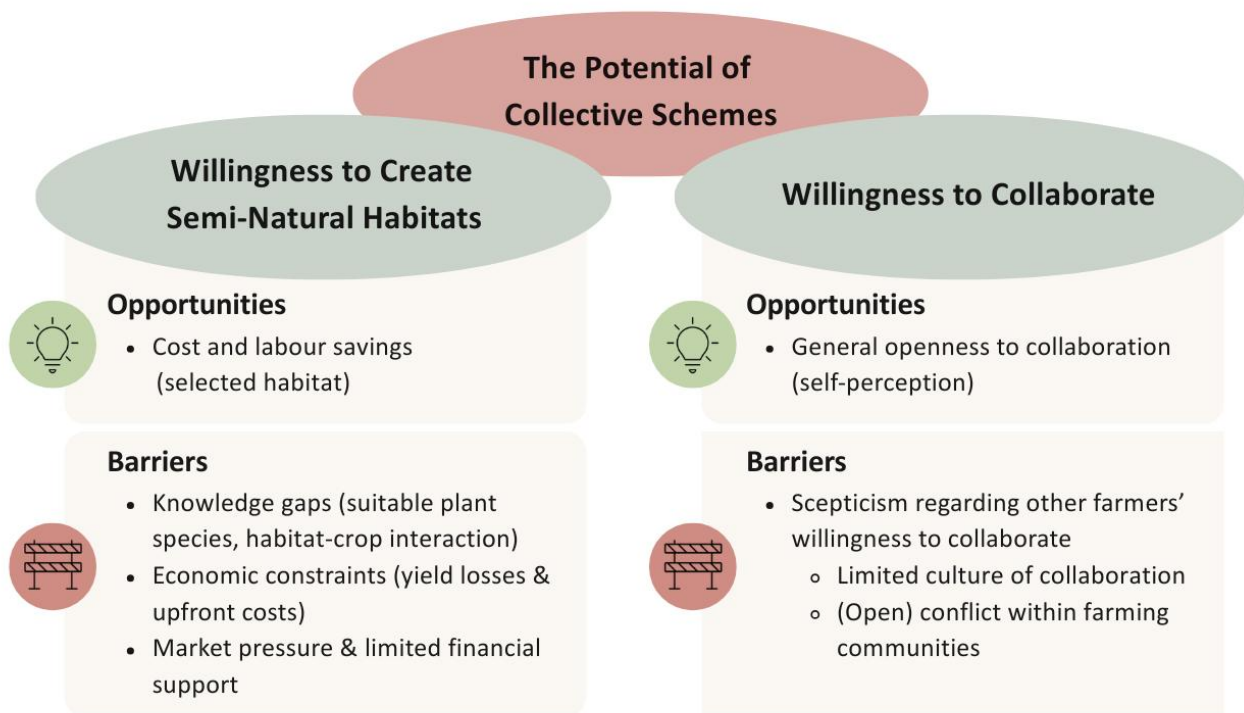
The evidence on **collective approaches** for implementing habitat is mixed, which may partly be explained by differences in study methodology. Three quantitative studies report negative perceptions of collective schemes, whereas two qualitative studies find a weak positive effect. This divergence may result from the fact that in the quantitative studies participants were only asked on their perception of a single configuration of collective schemes, while the qualitative studies explored a greater variety and captured more nuanced farmer perceptions.

While practice-based schemes are prevailing in the EU (Niskanen et al., 2021), result-based schemes offer the potential to increase ecological effectiveness (Pe'er et al., 2022; Simoncini et al., 2019). Hybrid schemes combine both approaches by supplementing a guaranteed payment with a top-up payment upon delivery of a desired outcome (Canessa et al., 2023). While one large quantitative study finds a moderately negative perception of **result-based schemes** by farmers, two qualitative and one quantitative study show high support by farmers. Interestingly, 3 out of 4 studies at least partly focus on semi-natural grasslands, suggesting that this variation in findings cannot be attributed to the habitat type alone. Finally, two quantitative studies explored **hybrid schemes**, finding that this design element is perceived as strongly favourable by farmers.

This support for result- and hybrid schemes may also reflect a broader wish for flexibility found in two studies. **Flexibility** in this context encompasses accommodating understanding for unforeseen conflicts between farming activities and conservation during monitoring, and flexibility in the management of the habitat. This aspect might also explain why farmers prefer carrying out **monitoring themselves** rather than being monitored by public authorities.

### 3.2. The Potential of Collective Schemes for Castilla-La Mancha (RQ2)

The thematic analysis of the interviews revealed that two key dimensions shape the potential of collective schemes in Castilla-La Mancha: 1) farmers' willingness to create habitat on their fields, and 2) their willingness to collaborate with other farmers for creating habitat (Figure 5). Knowledge gaps on the implementation of habitat in fields and economic costs paired with price pressure on international markets and limited public financial support are significant barriers to the willingness to implement habitat, while positive experiences and cost savings of selected habitats can create opportunities. While the general openness to collaborate by the interviewed farmers is promising, doubts on the willingness of other farmers resulting from lacking social cohesion constitutes a significant barrier to introducing collective schemes in Castilla-La Mancha.



**Figure 5:** Overview of opportunities and barriers to the potential of collective schemes in Castilla-La Mancha (Figure created by author, based on results from thematic content analysis of semi-structured interviews with farmers).

### **3.2.1. Creating Habitat in Agricultural Lands**

The interviews clearly revealed that it is essential to consider the general willingness to implement habitat on farmland when exploring the potential of collective schemes. This constitutes a significant dimension regardless of the policy design.

#### **a. Lack of Knowledge**

A recurring theme across the interviews is lack of knowledge about the interaction between habitat and crops, and which habitat types can be established under the climatic conditions of Castilla-La Mancha. Farmer 3 explains that he is “*experimenting*” with cover crops in his almond fields, as it remains unclear whether they compete almond tree growth and negatively affect yields. Similarly, Farmer 5 acknowledges that he made mistakes in the timing of planting groundcover, which slowed the growth of his olive trees. Due to this uncertainty, some farmers completely reject integrating habitat (F7), or perceive them as a risk to yields given limited water for irrigation and lacking financial support:

*“Yes, planting anything is a threat to the crops - we’re worried about this. Supporting two crops is very difficult without any kind of help.”* (Farmer 9)

Overall, there appears to be a lack of accessible advice and practical knowledge on how habitat can be integrated into specific farming systems to generate ecological benefits while minimizing yield losses. This issue is also highlighted by the three permaculture farmers in the sample (F1, F2, F4), who note that their approach to farming is often misunderstood by other farmers. They highlight the importance of successful examples for wider habitat implementation and see their farms as places where other farmers can learn:

*“At first, [...] probably they couldn’t understand. But later, day by day, and by speaking with me, I will show them. [...] With this kind of demonstration land, they can see that they can do it.”* (Farmer 4)

#### **b. Economic Constraints**

Economic constraints emerged as a central theme in nearly all interviews, with all but one farmer referring to them in some way. Farmers’ expectations regarding the economic impacts of habitat, and the upfront costs associated with establishing and maintaining new habitat, strongly influence whether they can envision participating in agri-environmental schemes.

The interviews showed that decisions on habitat implementation are primarily driven by economic considerations for conventional farmers (F3, F7, F9, F8). Farmer 7 argues that while integrating more habitats would be *“the ideal”*, she considers it to be economically unfeasible. Farmer 9, who has implemented ground cover and flower strips on parts of his land, emphasizes the potential yield losses associated with further expanding habitat. He argues that current government support is insufficient to compensate for these losses, making further habitat expansion unattractive:

*“The main thing is the economy [...] Whether it benefits the environment, whether it benefits wildlife [...] we don’t care.”* (F9)

For conventional Farmer 3, economic reasoning also dominates, although in a different way. In the case of ground cover, he supports the measure primarily because of the cost savings it provides rather than its ecological benefits:

*“Leaving plant cover is a cost-saving for me, because I don’t use diesel, I don’t use a tractor, I don’t spend labour hours for ploughing.”* (F3)

While this suggests that some habitat types can align with farmers’ economic objectives, it also highlights the difficulty of creating a diverse landscape mosaic that also includes less economically beneficial elements.

That the economic paradigm of maximizing productivity and profits, combined with insufficient financial support for habitat creation, has contributed to the decline of natural habitats and now hinders transition is pointed out by 4 permaculture and organic farmers (F1, F2, F4, F6). Farmer 1 and 2 emphasize the burden of high upfront costs for specialized equipment needed to establish habitat, while Farmer 4 and 5 highlight the connection of this issue with the globalized economic system:

*“Because if grain, soybean, and wine production comes in with production costs that aren’t comparable to European production costs, well, here we have no choice but to practice intensive agriculture to try to adjust costs and be competitive—and that intensive agriculture isn’t compatible with biodiversity. It’s not compatible.”* (Farmer 6)

Thus, price pressure pushes farmers to maximise land use and increase productivity, often at the expense of habitats on farmlands, while existing financial support for habitat creation and maintenance remains

insufficient to offset these pressures. Consequently, six farmers stressed the need for higher funding to make habitat implementation a viable option for more farmers.

### **3.2.2. Collaborating for Creating Habitats**

Regarding the second dimension, farmers expressed their attitudes towards collaborating with other farmers to establish habitat, as well as their perception of whether others in their community would be open to such collaboration.

Overall support for collaboration was high among the interviewed farmers: seven out of nine were open to the general idea of collaboration to increase habitat, including all five organic and permaculture farmers (F1, F2, F4, F5, F6) and two conventional farmers (F8, F9). These two conventional farmers stated that they are open for collaboration as long as it is profitable. Only two farmers (F3, F7) rejected collaborating with other farmers for habitat creation.

Despite their own openness to collaboration, most farmers expressed scepticism about the willingness of others to collaborate. Four of the seven farmers who were personally open to collaboration (F5, F6, F8, F9) considered it as difficult to convince other farmers in their community. Farmer 6 argues that broader participation would require a shift in the economic and social paradigm from individualism to collectivism, and only two interviewees (F1, F2) think that farmers in their community generally *“don’t mind the collaborative and hanging out together”* (F1). All farmers questioning the openness of others to collaboration link it to a *“lack of cooperative spirit”* (F6), highlight *“mistrust among people”* (F9) in their farming communities, or referred to instances of open, and even physical conflict (F4).

Following this line of argument, the two conventional farmers in the sample (F3 & F7) who were themselves not open to collaboration, connected this to the lack of social cohesion in their area:

*“We usually don’t get along. [...] And I don’t want to know anything about you, or you, or anything. Just... no. [...] We don’t have a culture of collectivism.”* (F3)

Notably, farmers were rarely able to provide explicit explanations for the perceived lack of collectivism and social cohesion. For example, Farmer 7 described collaboration as unimaginable in her local community:

*“You just can’t. Not here in this area. You can’t. Whether it’s because of the mindset, or just custom - I don’t know.” (F7).*

### **3.2.3. Insights from Experts**

Nature Conservationist 1 highlights the lack of adequate, proactive advisory services providing knowledge on suitable habitats, while the agricultural ministry representatives argue that they provide sufficient advice through meetings with advisors and farmer representatives when new schemes and programs are launched. However, Nature Conservationist 1 claims that existing advice from public authorities and farmer unions focuses on conventional farming practices and administrative procedures, rather than approaching farmers proactively and promoting a more *“exhaustive way of thinking about farming”*.

Similarly to the farmers, experts emphasized that economic reasoning dominate most farmers’ decision-making over environmental ambitions, which is important to consider:

*“[...] You have to understand that the [...] the majority of farmers want to be productive and to produce food or feel that they are useful for people, not only for birds or nature.” (NC1)*

Both nature conservationists and sustainability ministry representatives therefore argue that a language of resource efficiency and productivity should be employed for habitat promotion to highlight the economic benefits to farmers:

*“Because they see that without pollinators, or without field margins that stop the erosion or [without] a green cover that keeps the organic matter of the soil - they are all the time reducing the productivity of the land and have to put more fertilizers, more pesticides [and] work more in the farm.” (NC1)*

Another issue raised by agricultural ministry representatives and nature conservationist 1 is that multiannual contracts pose a major barrier to participation, as farming and agricultural markets operate largely in annual cycles. This is in stark contrast with the long-term commitments required to create certain habitat types, particularly woody elements that require three to four years of irrigation to bring ecological benefits (NC2). As a result of this divergence in time frames, multiannual commitments for

habitats are often not profitable in the short term, highlighting the need for financial support to bridge this gap (NC1).

Beyond the economic constraints, farmers' general scepticism towards other actors and farmers was echoed in all expert interviews. Agricultural ministry representatives pointed out that when reading the option to apply in groups in the CAP, it was very difficult for them to imagine farmers in the region collaborating on such an issue:

*"I don't know if it's because we're Mediterranean, we're from southern Europe, we're very individualistic - I don't know."* (AM2)

Many experts contrasted this lack of collaborative spirit with the existence of many well-functioning agricultural or forestry cooperatives in the region. However, they pointed out that the motivation of farmers to join forces in agricultural cooperatives was always to create added value:

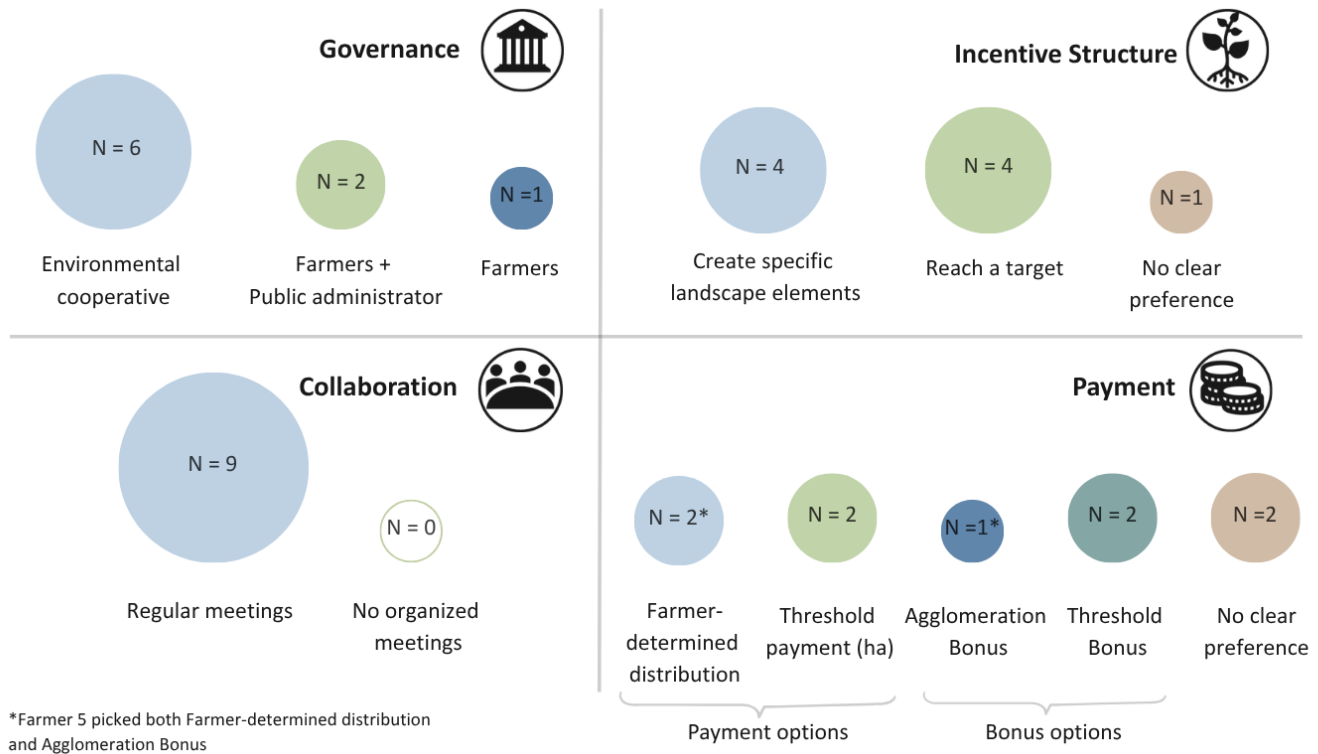
*"Practically every town has a cooperative—why? Because one day they decided to join forces—for what? To sell their products and try to exert a little market pressure."* (AM2)

As several experts pointed out, cooperatives therefore do not necessarily foster a broader sense of collaboration:

*"They are, even though they have organizations, at heart very individualistic in their work: 'I do what I want on my land.'"* (SM2)

### **3.3. Policy design Preferences for Collective Schemes (RQ3)**

The interviewed farmers have diverse views on policy design features for collective schemes, with clear preferences only emerging for Governance and Collaboration (Figure 6). For Governance, six out of nine farmers preferred an Environmental Cooperative for managing the collective scheme. For Collaboration, all farmers preferred having regular meetings over no meetings. I examined whether preferences varied by farmers' age, education, farm size and farming system, but no clear patterns emerged in this sample unless noted below.



**Figure 6:** Representation of farmers' top-picks for each policy design feature. The bubble size indicates the number of farmers who selected an option as their preferred choice within that design feature category (Figure created by author, based on results from thematic content analysis of interviews).

### 3.3.1. Governance



#### Environmental Cooperative

- A new Environmental Cooperative is set up.
- This organization develops a coordinated plan for the whole landscape and employs technical advisors that the farmers can ask for advice.
- It offers different 'management packages' that farmers can choose from.
- Farmers sign a contract directly with the Environmental Cooperative.



#### Farmers + Public Administrator

- At least three farmers from the same municipality form a collective.
- Members can choose who is allowed to join.
- Farmers, together with an assigned public administrator, coordinate types of landscape elements and their locations.
- The public administrator provides support with the joint application and management.



#### Farmers

- At least three farmers from the same municipality form a collective.
- Members can choose who is allowed to join.
- Farmers coordinate types of landscape elements and their locations. They send a joint application to the public authority.
- Farmers manage the contract themselves.

**Figure 7:** Policy design options for the feature Governance (Figure created by the author).

From the three options depicted in Figure 7, the interviews indicate a clear preference for governance arrangements involving an intermediary organization or facilitator over farmers' self-organization. Only Farmer 6 supported the latter option, wishing for close collaboration and arguing that with a small number of participants this option would make management and agreement easier. The limited support among the remaining farmers was linked back to low levels of social cohesion within their farming communities.

While *Environmental Cooperative* was the most supported option in this category, being the preferred option of six farmers (F2, F1, F5, F7, F8, F9), support was constrained by negative perceptions of existing agricultural cooperatives. Those favouring this option perceived it as the simplest and most convenient option for farmers if requirements are clearly defined (F2, F1, F5), or linked it to positive experiences with existing cooperatives they belong to (F8, F9). Reservations towards this option were primarily rooted in negative perceptions or experiences with existing agricultural cooperatives. Farmer 6 rejected the option because of a perceived lack of "*collaborative spirit*" (F6) within agricultural cooperatives, a view also shared by Farmer 3. Similarly, Farmer 4 argued that cooperatives tend to evolve into purely "*economic institutions*", a development he would also expect in the context of collective schemes.

Reservations toward the *Farmers + Public Administrator* option mainly reflected doubts about the capabilities of public administration, though some farmers also highlighted the importance of institutional support. Concerns included doubts about "*how involved they'll actually be*" (F5), insufficient problem understanding and knowledge on habitats (F4), and fears of potential corruption (F6). At the same time, several farmers (F8, F9, F3, F4) considered close collaboration with public administration beneficial, emphasizing that the support of the administration is always needed for an effective implementation of a policy.

One farmer also noted that a public administrator could act as a neutral entity mediating between potentially conflicting interests of participating farmers:

"[Then] there's a public entity that won't be aligned with either you or me. And that person will act as the mediator [...]" (Farmer 3).

### 3.3.2. Incentive Structure



#### Create specific landscape elements

To receive the subsidy, farmers need to connect pre-defined landscape elements across their farms, e.g. buffer zones, with at least X% woody, at least X% grassy, and at least X% floral elements.



#### Reach a target

To receive the subsidy, the farmers need to reach ecological targets, e.g. increasing share of favourable habitat by X%, freely choosing multiple landscape elements from pre-defined list.

**Figure 8:** Policy design options for the feature Incentive structure (Figure created by the author).

Linking to the debate on shifting from a practice-based to a result-based approach to lever ecological benefits, interesting results regarding the options displayed in Figure 8 arise in this study considering farming types. All but one permaculture or organic farmer (F2, F1, F4, F6) preferred the option of *creating specific landscape elements*, all arguing it would generate greater ecological benefits. This reflects the assumption that the prescribed practices laid out on the card, including habitat type with percentages of floral, grassy and woody elements to ensure habitat quality, are based on professional landscape-scale planning considering the ecological and climatic conditions:

*"I think 5 [Create specific landscape elements] is more comprehensive than 4 [Reach a target], because this one is more specific and here it mentions predefined landscape elements. We're already talking about something more thought out regarding that territory. Regarding those conditions."* (F6)

On the contrary, two conventional farmers in the sample (F3, F7) reject the option of *creating a specific landscape element* specifically for the prescription of habitat quality, arguing that they conflict with the climatic conditions in this region:

*"It looks good, but... [...] you have to plant flowers. Here, on this land? When May comes the ground is like this - [knocks on the table] there's nothing, nothing. So, if you have to tell a farmer to plant flowers, well, I'll tell you right here [points at head as to indicate that this is a stupid idea]."* (F3)

The *reach a target* option was preferred by four farmers, predominantly those practicing conventional farming, with the exception of Farmer 5. It was perceived as the best adaptable to the local farming context, offering farmers greater autonomy in deciding what to plant (F3), and as easy to implement for the farmer (F5). Two farmers (F7, F9) did not elaborate on their choice in detail. However, several participants perceived it as having similarities with existing eco-schemes. In Spain, for example, farmers

can top-up the mandatory 4% of farmland covered by non-productive areas set out in the enhanced conditionality (GAEC 8) to 7% by enrolling in an eco-scheme to receive higher payments (Nadeu et al., 2023). Thus, there is an analogy of reaching a certain percentage of habitat between the *reach a target* option and eco-schemes. This familiarity in policy design may be one reason for this stated preference.

### 3.3.3. Collaboration



#### Regular meetings

Meetings with participating farmers are organized regularly to discuss management problems, share experiences and ask questions.



#### No organized meetings

There are no regular meetings with participating farmers.

**Figure 9:** Policy design options for the feature Collaboration (Figure created by the author).

All farmers agreed that holding regular meetings is the clearly favoured option (Figure 9). Multiple farmers highlight the importance of regular meetings for facilitating learning and advice, both through sharing experiences with each other (F6, F7, F8, F9), and through advice and education by professionals (F1, F2, F3). Farmer 3 particularly highlights how regular meetings could also improve compliance with regulations and commitments:

*“They [Public authorities] should make us go periodically to remind us that we have to leave the buffer zone so the water doesn’t run off, to remind us not to spray herbicides [...] under the trees, to remind us of a whole bunch of things we forget.”* (Farmer 3)

At the same time, concerns emerged about how to ensure sufficient and long-term participation, highlighting the need for certain organizational structures to ensure that the meetings are productive. Farmer 5 raises concerns about whether people will attend the meetings:

*“I don’t know, it’s just hard for me to imagine that we’re actually going to get together, that’s the thing.”*

He argues that a facilitator and a clear agenda linked to farm management decisions, such as deciding what to implement, or reviewing and discussing the implementation of the scheme, is essential to ensure that farmers’ participation. This view was also shared by Farmer 1 and Farmer 2.

### 3.3.4. Payment Structure



#### Self-determined distribution of collective payment

- The collective receives a payment based on the total number of hectares created/protected across all participating farms.
- The members agree among themselves how to divide the payment.



#### Threshold Payment

- Participating farmers receive a per hectare payment, but only if a collective target is reached, e.g. X% of favourable habitat across all participating farms.
- Payment distribution is based on the hectare of protected/created habitat per farm.



#### Agglomeration Bonus

- All participating farmers receive a payment per hectare of conserved area on their land.
- In addition, farmers receive a bonus payment if their conserved land is located next to conserved land managed by other participating farmers.



#### Threshold Bonus

- All participating farmers receive a payment per hectare of conserved area on their land.
- In addition, farmers receive a bonus if a collective target is reached, e.g. X% of favourable habitat across all participating farms.

**Figure 10:** Policy design options for the feature Payment (Figure created by the author).

Responses showed no clear preference for either Bonus or Payment schemes (Figure 10) but revealed scepticism toward relying on other farmers for receiving remuneration. Two farmers decided not to answer this question (F7, F8), and one farmer did not indicate a preferred option (F2).

Several farmers (F1, F4, F5, F6) viewed the bonus options as an effective incentive for encouraging broader participation. Among these, the *Threshold Bonus* was preferred by multiple farmers (F1, F4, F5), mainly due to the larger number of potential participants in the collective and thus reducing dependence on immediate neighbours' interest in participating. Two conventional farmers in the sample (F3, F9) disliked all bonus options, either because they wanted independence from other farmers in general (F3), or they preferred relying on a small number of familiar farmers rather than depending solely on a neighbour or on a larger group (F9).

The *common payment with farmer-determined distribution* was strongly rejected by multiple farmers due to anticipated conflict in this scenario (F1, F3, F5) or to power imbalances within the farming community that could hinder fair outcomes (F2). In contrast, Farmer 6 and 9 favoured this option because it best reflects their preference for close collaboration (F6) or provides the greatest autonomy to the participating farmers (F9).

The *threshold payment* was seen as the “*closest one to check real action*” (F4), and an option that would allow the farmer to “*increase land if [it’s] worth it*” (F3). However, both Farmer 1 and 2 questioned whether farmers would initially commit large areas of farmland if payments entirely depend on achieving a collective goal. Instead, they propose a gradual transition from a bonus scheme to the threshold payment. In this way, more reluctant farmers would have the security of being paid for their individual practice while being encouraged to participate in the collective through the bonus component. Over time, as they observe the benefits of cooperation, they may become more willing to fully rely the achievement of a collective goal under the Threshold payment.

### **3.3.5.    *Insights from Experts***

The sustainability ministry representatives and nature conservationist 2 see leveraging the idea of *cooperatives* for creating habitat as the best option. However, the agricultural ministry is, linking it back to the fact that farmers in this region engage in cooperatives for marketing and adding value to their products, doubting this model, as farmers don’t see the economic benefit of creating habitat in a coordinated way yet. Moreover, both nature conservationist 2 and the sustainability ministry representatives question whether the *public administration* has the capacity to support schemes in a meaningful way across the whole region:

*“We’d have to find a public administrator who could dedicate that time to it, and I’m not sure we always have that option. [...] It might work well, but it would be almost anecdotal, I think.”* (SM2)

While the agricultural ministry representatives considered both incentive structure options as viable, nature conservationist 2 and sustainability ministry representatives agree that *Creating specific landscape elements* would yield greater diversity in implemented landscape elements and thus greater ecological benefits. They nevertheless expect less resistance by farmers to *Reaching a target*, as it allows them to pick those landscape elements that are easy to implement on their land while avoiding others, such as woody elements.

Moreover, all experts agree with the farmers on the importance of meetings to enable exchange of expertise and ensuring compliance, while pointing out that a clear agenda is key to sustain relevance of the meetings for the farmers:

*“There are many farmers who - if there aren’t regular meetings, if there isn’t communication with the administration - might end up slacking off. Thinking, ‘Well, I’ll just do this; they won’t catch me.’” (SM1)*

*“I think meetings are the best approach. But be careful: once meetings become routine and no new information is shared, they start to lose their impact. They start to lose their appeal.” (AM2)*

Regarding the payment options, the opinions of the experts varied. The agricultural ministry representatives clearly pointed out that all payment options face a challenge given the farmers’ preference for independence from others:

*“The thing is, when you think about it, given the way society works... No one is going to like the idea of their payment depending on their neighbour. I think that in the end we can adopt some common measures, but each person will receive an amount based on the size of their area.” (AM1)*

## **4. Discussion and Conclusion**

### **4.1. Summary of Main Findings**

Habitats are declining at an alarming rate (IPBES, 2019), with some of the largest deficits occurring in agricultural regions (Mohamed et al., 2024). At least 20-25% habitat per square-kilometre is necessary to ensure the provision of local NCPs (Mohamed et al., 2024). In the EU, policies have yet failed to deliver the intended results at a sufficient scale (Ait Sidhoum et al., 2023; Baráth et al., 2024), largely by current participation levels being too low to reach landscape-scale effects (Alliance Environnement., 2020) and because of the insufficient landscape-scale planning and spatial coordination (Concepcion et al., 2020).

The systematic literature review (RQ1) found that policy uptake could be increased by integrating advisory services, avoiding the obligation for long-term commitments, offering hybrid schemes, providing flexibility in monitoring and habitat implementation, as well as integrating self-monitoring. Exploring the potential of collective schemes for increasing habitat in Castilla-La Mancha specifically (RQ2) showed that despite general openness by the participants, significant barriers remain. These include limited available knowledge on suitable habitat types and implementation, lacking financial support to cover costs and yield losses, and low levels of social cohesion within farming communities. Examining preferences for the design of collective schemes (RQ3) revealed that involving intermediaries in scheme management, keeping payments largely independent of other farmers' actions, and facilitating advice and mutual learning through regular meetings can help mitigate these barriers and increase participation.

### **4.2. Integration of Findings in the Body of Literature**

#### **4.2.1. *Conflict between Habitats and Agricultural Markets***

This study highlights farmers' preference for short-term commitment that allow termination at any time and a return to agricultural production after the contract period, which stands in stark contrast to what is required for biodiversity recovery and the establishment a great variety of habitat types. Mohamed et al., (2024) emphasize that structurally diverse habitats combining floral, grassy, and woody elements are essential for the provision of local NCPs. However, as highlighted in the interviews, growing woody elements to an extent that they offer functional benefits to multiple local NCPs requires multiannual commitments. Consequently, this preference for short-term commitments may favour grassy and floral elements over woody ones, thereby being a limiting factor to structural complexity and overall habitat quality.

As indicated in the interviews, this short-term orientation of farmers can partly be explained by the annual logic of volatile agricultural markets. With the liberalization of agricultural markets, gradually substituting guaranteed prices with direct income support starting with the McSharry CAP reform in 1992 (Castellano-Álvarez et al., 2021), European farmers are increasingly exposed to highly volatile world prices and face greater market risks (Gohin & Zheng, 2020). Research shows that farmers in the EU respond to price volatility by adjusting their production structures (Vărzaru, 2026) and land use (Boere et al., 2015) to benefit from favourable price conditions and offset risks from negative price developments. As a result, committing to multiannual contracts for establishing habitat may restrict farmers' ability to adjust land use and can therefore be perceived as a risk to agricultural income.

The interviews further suggest that current financial support for habitat creation is insufficient to compensate farmers both for the costs and this reduced flexibility to adjust land use as a risk management strategy. Therefore, above trying to bridge this gap between long-term needs of biodiversity and short-term orientation of agricultural markets with adequate financial payments through agri-environmental schemes, employing tools that reduce price volatility and thus allow for stable land use could support habitat creation. Contract farming, which is an umbrella term for agreements between farmers and buyers that typically establish price, payment method, quantity and delivery date of the products (FAO, 2026), is widely implemented and offers greater income stability to farmers (Bellemare & Lim, 2018). However, evidence regarding its effects on environmental sustainability of farmlands is mixed (Dubbert et al., 2023; Ren et al., 2021; Ricome et al., 2016; Weituschat et al., 2023). To further lever the potential of contract farming for sustainable transitions, Van der Borgh & Milian Gómez (2024) propose redesigning it to establish long-term agreements based on balanced power relations that provide greater stability for farmers while explicitly integrating the public interest of soil, water and biodiversity conservation. Nevertheless, research on how novel contract farming designs for leveraging sustainable practice adoption in general, and for expanding habitats that require multiannual commitments specifically, remains limited (Weituschat et al., 2023) and requires further attention.

#### **4.2.2. *Collaboration for Habitat and the Role of Social Capital***

A lack of collaborative spirit and social cohesion was identified as a key barrier to collective schemes in Castilla-La Mancha, which is surprising given the region's existing structures of cooperation. The region has a high density of agricultural cooperatives (del Real Sánchez-Flor et al., 2026), as well as notable examples of collaborative groundwater governance (Hoogesteger et al., 2025). Following Putnam's Social

Capital Theory, these existing networks of cooperation suggest high levels of social capital, creating an enabling environment for future collaboration on other issues (Putnam, 1993). Social capital “*refers to connections among individuals – social networks and the norms of reciprocity and trustworthiness that arise from them*” (Putnam, 2000, p. 19), and enables community members to act effectively as a collective to reach common goals (Putnam, 2000, pp. 288–289). Thus, existing cooperative structures in Castilla-La Mancha would therefore be expected to support collective schemes, as social capital has been identified as an important factor for their success (J. M. Huber et al., 2025; Moroder et al., 2025). However, this expectation was strongly contradicted by the interviews, which revealed low collaborative spirit and social cohesion.

Literature on social capital in agricultural cooperatives provides a more nuanced picture and delivers explanations for this divergence. Although pre-existing social networks that fostered mutual knowledge and trust were central to emergence of agricultural cooperatives in Spain (Tapia, 2012), Deng et al. (2021) found that social capital within agricultural cooperatives tends to decrease over time. As cooperatives expand over time, member heterogeneity increases and maintaining social connections within larger member communities becomes more difficult, which leads to a gradual reduction in social capital (Deng et al., 2021; Nilsson et al., 2012). Consequently, cooperatives tend to move from a community of farming households with social ties into modern farming enterprise focused primarily on production activities (Deng et al., 2021). As social capital weakens, common property rights structures become increasingly inappropriate, leading some members to leave the cooperative and some cooperatives to adopt more individualistic income and ownership rights while still delivering economic benefits to the members (Deng et al., 2021). This loss in social capital and gradual transition towards an economic instrument is strongly echoed in the interviews, with multiple farmers regretting the lack of collaborative spirit within agricultural cooperatives and others describing them merely an economic tool.

The dominance of economic motives for participation in existing collective structures may also explain why interviewees considered it unlikely that many other farmers would be open to cooperate to create habitat. Economic benefits are a key driver for both joining and remaining in agricultural cooperatives (Deng et al., 2021; Nilsson et al., 2012; Tapia, 2012). However, interviewees questioned whether farmers perceive habitat loss as an economic threat or recognize the economic benefits from habitat creation, which may explain this scepticism. These findings underscore the importance of establishing holistic advisory services that emphasize the economic value of habitats and local NCP provision, a point also supported by both the systematic literature review and the case study.

Although low social capital constrains the potential of collective schemes in Castilla-La Mancha, Social Capital Theory also highlights the broader societal benefits that revitalizing collective approaches could generate. Castilla-La Mancha is among the Spanish regions most affected by rural depopulation and low population density (Carchano et al., 2021). In addition to an ageing population and low birth rates, depopulation has been linked to a lack of educational services, job opportunities, social services and infrastructure (Carchano et al., 2021). While structural transformations are clearly necessary, various studies on depopulation in rural Spain emphasize the importance of social capital for mitigating this trend and strengthening community resilience (Carlassare & García, 2024; Jaraíz-Arroyo et al., 2025; Valverde et al., 2025). Putnam highlights that societal quality is best if there is high social capital fostered through dense network of social relationships (Putnam, 2000, pp. 18–19). In this regard, collective schemes for environmental objectives have been shown to foster social capital in other contexts (Barghusen et al., 2022; Luz, 2024; Prager, 2015), which highlights the broader societal benefits collective schemes could bring to Castilla-La Mancha. From this perspective, the potential of collective schemes is simultaneously constrained by low social capital, while also offering the opportunity to foster social capital and, in turn, enhance societal quality (Putnam, 2000, pp. 18–19).

#### ***4.2.3. Supporting Participation through Policy Design in the Context of Low Social Capital***

Given that collective schemes are constrained by, but also offer opportunities for, social capital, the study reveals how policy design can strengthen their potential by supporting policy uptake. Respondents generally favoured options that minimize dependency on other farmers, reflecting the limited social cohesion and lack of trust. Farmers tended to prefer involving an intermediary organization, such as an environmental cooperative or a public administrator, to fully or partly manage the scheme and thereby reducing perceived risks and anticipated conflict associated with farmers' self-governance. Moreover, the findings suggest that farmers are more likely to participate when the majority of the payment is independent of the actions of other members.

The strong support for integrating regular meetings presents an important opportunity to improve scheme design satisfaction while facilitating advisory services and fostering social capital. Regular meetings were viewed as an opportunity both to provide farmers with professional advice and to promote mutual learning among farmers. Moreover, both Prager (2015) and Barghusen et al. (2022) emphasize that social capital depends on opportunities for farmers to meet, work together and maintain dialogue

rather than working in isolation. Therefore, the high interest in regular meetings, combined with their impression that such opportunities for exchange are currently insufficient, suggests a willingness to foster social connections and thus social capital, creating a potential for contributing to broader societal benefits in the region.

Taken together, the preferences expressed by the study participants broadly align with the collective scheme design implemented in the Netherlands. Since 2016, farmers applying for agri-environment-climate measures are required to join regional collectives that develop and coordinate actions on the regional level, and act as an intermediary among farmers, and between farmers and public authorities (Reichenspurner et al., 2024). However, farmers remain individually responsible for implementing measures on their land and, depending on the conditions of the respective cooperative, are remunerated individually either through results-based, practice-based or hybrid payment models (Bazzan et al., 2023; Reichenspurner et al., 2024). To ensure social capital formation, many collectives organize regular meetings to maintain dialogue and facilitate knowledge exchange (Bazzan et al., 2023; Reichenspurner et al., 2024).

### **4.3. Policy Implications**

The results, together with their discussion in relation to relevant literature and theory, highlight the levers for achieving 25% of habitat per square-kilometre in agricultural landscapes (Mohamed et al., 2024) and the need for action on multiple fronts. The following policy implications emerge for actors at different scales to support the creation of habitat in Castilla-La Mancha and beyond:

- At the national and EU level, support the uptake of policies for habitat creation by integrating advisory services, hybrid payment models and sufficient flexibility in monitoring and management without compromising ecological benefits (RQ1).
- At the national and EU level, research for novel, long-term contract farming designs should be supported to reduce farmers' exposure to high price volatility on agricultural markets and thereby enable long-term sustainability commitments for the creation of habitats (RQ2; Van der Borgh & Milian Gómez, 2024).
- At the national and EU level, greater funding should be allocated to habitat creation measures, irrespective of the specific scheme design (RQ1).

- At the Spanish national level, efforts should be directed towards creating an enabling policy environment for collective schemes and supporting pilot-projects to assess whether social capital is sufficient for their effectiveness while further evaluating their potential for generating broader societal benefits (RQ2). These schemes should involve intermediary organizations, such as environmental cooperatives or public administrators, employ payment structures that are largely independent of other farmers' implementation, and entail regular meetings with a clear agenda, facilitation and provision of suitable advice, while still allowing space for mutual learning and the development of social capital (RQ3; Barghusen et al., 2022; Luz, 2024; Prager, 2015).
- At the regional level, proactive advisory services should be developed, which adopt a holistic view of farming and recognize farmers' primary identity as economic actors. They should provide context-specific recommendations on suitable and ecologically beneficial habitat types, as well as information on interactions between plant species and crops to minimize yield losses (RQ1, RQ2).

#### **4.4. Limitations and Positionality**

This study has several limitations that should be considered when interpreting the findings. The systematic literature review isolated individual policy design features, although in reality preferences often depend on combinations of features (Anougmar et al., 2025). As a result, the study simplifies the complexity of farmers' decision-making processes.

Moreover, despite contacting a broad range of farmers and stakeholders, response rates were generally low. The sample likely overrepresents farmers with a stronger interest in ecological sustainability and collaboration. To partly address this limitation, experts with extensive experience working with farmers in Castilla-La Mancha were included to provide broader contextualization. Furthermore, the transferability of findings on collective schemes is limited, as farmers' openness to collaboration strongly depends on the socio-ecological context (Moroder et al., 2025)

My positionality and language skills may have influenced both interview data collection and the interpretation. Although I grew up in a rural community in Austria and have farmers in my family, I had no prior professional experience in the agriculture sector prior to conducting this thesis. Furthermore, I have no personal or professional connection to Spain, which may have limited my ability to interpret locally embedded perspectives, cultural nuances, and agricultural practices within the study region. To mitigate these limitations, I conducted three background interviews prior to field work to develop a better

understanding for the regional context with conservation experts from Castilla-La Mancha and an agricultural sociologist with research experience in Spain. Most interviews were conducted in Spanish, and although I have an intermediate (B1) level of proficiency, language barriers may occasionally have affected the depth of the data and limited follow-up questions. Nevertheless, conducting interviews in Spanish was considered preferable, as it allowed participants to communicate more naturally and comfortably.

#### **4.5. Future Research**

The heterogeneity in farmers' preferences and the influence of farm and farmer characteristics on policy uptake is broadly recognized (Paulus et al., 2022; Pavlis et al., 2016; Wool et al., 2023; Zieliński et al., 2023). While I initially aimed to address how farm and farmer characteristics shape farmers' preferences for policy design features, insufficient evidence was available for conducting a systematic literature review. This highlights the need for future research on the heterogeneity of farmers' policy design preferences.

Moreover, while quantitative studies can provide more representative findings on farmers' attitudes towards collective schemes, existing quantitative studies mostly explored one design configuration of collective schemes (e.g. Schulze et al., 2026; Villanueva et al., 2015). This thesis demonstrates the importance of policy design for the overall potential of collective schemes, indicating the need for quantitative research on a broader set of policy design features.

This thesis focussed on the behavioural response of farmers to policy instruments in relation to their policy design (Nielsen et al., 2020). However, expert interviews highlighted that the willingness of public authorities to offer policies is equally important and complex, as also emphasized by the initiative feasibility dimension in the Tripartite Framework on Mitigation Pathways (Nielsen et al., 2020). Further research should focus specifically on this aspect and explore how perceived acceptance by farmers influences the behaviour of public authorities.

#### **4.6. Concluding Remarks**

This study synthesizes evidence of policy design features that can enhance uptake of policies aimed at increasing habitat in agricultural landscapes, and explores the potential and design preferences for collective schemes in Castilla-La Mancha. The systematic literature review shows that farmers value

advisory services and hybrid-schemes, and prefer flexibility and avoiding long-term commitments, which stands in conflict with the multi-annual commitments required for the creation of diverse habitat.

This study shows that this tension between farmers' short-term orientation and the long-term commitments required for biodiversity conservation is driven by their need to respond to volatile agricultural markets on an annual basis, suggesting that reducing farmers' exposure to this volatility through innovative tools could support habitat creation.

While the potential of collective schemes in Castilla-La Mancha is constrained by low social capital despite existing structures of cooperation, they could contribute to broader societal benefits once implemented. Collective schemes involving intermediaries in scheme management, payments largely independent of other farmers' actions, and regularly organized meetings have the greatest potential to enhance both participation and societal benefits in Castilla-La Mancha.

Beyond providing guidance to policymakers in the EU and Spain, this thesis contributes to sustainability science by enhancing research on the viability of policy pathways to achieving 20-25% of semi-natural habitat per square-kilometre in agricultural landscapes (Rockström et al., 2023). This thesis emphasizes the importance of integrating localized perceptions in policy design, while considering the interactions of the ecological dimensions and the broader economic and societal structures.

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## 6. Appendix

### Appendix A. Search terms for the systematic literature review in Web of Science

| Date                  | Landscape element, derived from Supplemental Information 1, Table 1, from Mohamed et al. (2024)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Policy type                                                                                                     | Policy instrument                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Farmers' behaviour                                                                                                       | Agricultural Landscape                | Geographical context                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 01.01.2014-24.03.2026 | "floral resources" OR "floral strip*" OR "flower* strip*" OR "orchard*" OR "wildflower strip*" OR "field margin*" OR "herbaceous strip*" OR "seminatural habitat" OR "semi-natural habitat" OR "patches of forest" OR "seminatural grassland" OR "semi-natural grassland" OR "shrubland" OR "hedgerow*" OR "prairie strip*" OR "native plant*" OR "introduced plant*" OR "native tree*" OR "introduced tree*" OR "field border" OR "wildflower areas" OR "vegetation cover" OR "forest edge*" OR "forest* area" OR "small water bodies" OR "woody buffer*" OR "shrubby buffer*" OR "grassy buffer*" OR "wetland" OR "ground cover" OR "natural habitat" OR "natural buffer" OR "native forest*" OR "shrub*" OR "natural forest" OR "mosaic landscape*" OR "vegetation cover" OR "woody elements" OR "Silvoarable" OR agroforestry OR "field fragmentation" OR "hedgerow*" OR "canopy cover" OR "woody element" OR "semi-natural pasture" OR "seminatural pasture" OR "forest cover" OR "seminatural fallow" OR "semi-natural fallow" OR "forest patch*" OR "forest* buffer" OR "buffer strip" OR "cover crop" | initiative* OR regulation* OR standard* OR tax* OR incentive* OR polic* OR measure* OR instrument* OR practice* | "agri-environment*" OR "agri-environment-climate" OR "ecological focus area*" OR EFA* OR "eco-scheme*" OR ecoscheme* OR "payment* for ecosystem service*" OR PES OR "conservation easement*" OR "conservation covenant*" OR "biodiversity offset*" OR "habitat offset*" OR "land retirement" OR "set-aside" OR "stewardship scheme*" OR "Natura 2000" OR "water framework directive" OR CAP OR "Common Agricultural Policy" OR conditionalit* OR GEAC OR AECM* OR AEM* | uptake OR implementation OR participation OR adopt* OR enrolment OR compliance OR preference* OR behaviour* OR decision* | agricultur* OR "arable land" OR farm* | "European Union" OR Europe OR EU OR European OR Austria OR Belgium OR Bulgaria OR Croatia OR Cyprus OR "Czech Republic" OR Denmark OR Estonia OR Finland OR France OR Germany OR Greece OR Hungary OR Ireland OR Italy OR Latvia OR Lithuania OR Luxembourg OR Malta OR Netherlands OR Poland OR Portugal OR Romania OR Slovakia OR Slovenia OR Spain OR Sweden OR "United Kingdom" OR UK |

## Appendix B. Landscape elements considered to constitute (semi-)natural habitat.

From Mohamed et al. (2024), Supplemental Information 1, Table 1.

| Landscape elements categories | Included landscapes elements' description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Diverse floral resources      | Floral stripes and patches within orchards, rich diverse native and wildflower floral strips, flowering ground cover, diverse floral field margins, native and non native flowering herbaceous strips adjacent fields.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Complex diverse SNH           | mixed of different elements: small patches of forest , pasture, grassland, shrubland surrounding, complex hedgerows with grassy elements or woody and rich floral understory species, prairie strips, diverse rich field margins with higher native and introduced plants and trees, diverse field border species, agri-environment schemes(e.g., wildflower strips/areas, grassy field margins, organic farming), vegetation cover in inter-row, mixed plantation, heterogeneous diverse SNH, forest edges, green spaces and domestic gardens, zoos, diverse urban parks, public parks, castle parks, disaggregated forested area, small water bodies, open lawns and trees, zoned woody, shrubby and grassy buffers, wetland, diverse ground cover. |
| Complex diverse NH            | Diverse natural species, heterogenous natural buffer, native forested, shrubs, grassy buffer, natural forest, diverse native natural habitat fragments in mosaic landscapes, old natural field margins, natural heterogeneous vegetation cover, vegetation cover with diverse native deep rooted species with more reinforcing effect and low surcharge, natural young trees                                                                                                                                                                                                                                                                                                                                                                          |
| Woody elements                | Silvoarable alleys, agroforestry, narrow woodland corridors, woody corridors that fragment fields, woody vegetation margins, hedgerows, trees canopy cover, street trees, native shrubland, hardwood buffer, native diverse woody buffer.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Grassy elements               | patches of grassland surrounding, diverse SN pasture and field border, diverse rich patches of urban meadow                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Forest                        | forest cover surrounding, forest edges associated with fallow or hedges, forest patches surrounding, forest corridors, diverse forested native and non native buffer, deep rooted natural forest species                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

## Appendix C: Semi-structured interview guide for farmers

| Interview Guide (English Version)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Block 0: Introduction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                 |
| <p>Thank you for taking the time to contribute to my research project. In this interview, I would like to learn about your personal experiences with policies aimed at increasing SNH on your farm, as well as your personal opinion on collective agri-environmental schemes.</p> <p>This document provides detailed information about the study and explains how the information you share will be handled.</p> <p>With your permission, I would like to record this interview. The recording will only be used for data analysis and will not be published or used for any other purpose. All personal information will be anonymized. You are free to withdraw from the study at any point during the interview, and if you feel uncomfortable answering any question, we can simply skip it.</p> <p>The interview will take approximately 30 minutes.</p> <p>To begin, I will ask you about SNH on your farm and any related policies you have participated in. After that, we will discuss these innovative collective agri-environmental schemes and how you think they should be designed.</p> <p>Before we get started, do you have any questions?</p> <p><b>[Questions are skipped when they have been addressed earlier]</b></p> |                                                                                                                                                                                                                                                                                 |
| Block 1: Environmental Awareness & Impact on the farm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                 |
| <p>In the past decades, semi-natural habitats — such as hedgerows, grass and flower strips between fields, agroforestry, patches of bushes and trees, terraces, semi-natural grasslands and pastures, and small water bodies — have decreased significantly in Castilla-La Mancha.</p> <p>However, these areas are very important because they help nature provide key benefits for both people and agriculture. For example, they support pollinators, help control pests and diseases naturally, prevent soil erosion, and contribute to maintaining good water quality.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                 |
| Guiding Question                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Sub-questions                                                                                                                                                                                                                                                                   |
| How - would you say - is the situation of semi-natural habitats in your area?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <p>To what extent do you see this development as problem on your farm?</p> <p>Which threat do you see in the loss of SNH?</p>                                                                                                                                                   |
| Can you tell me about what you do in your farm to incorporate/protect semi-natural habitats?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Do you have [insert landscape element from list] on your farm?                                                                                                                                                                                                                  |
| Block 2: Current & past agri-environmental policy uptake                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                 |
| Guiding Question                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Sub-questions                                                                                                                                                                                                                                                                   |
| We have talked now how you have protected or established different landscape elements on your farm. Have you participated in any schemes or other interventions for these measures/planting these landscape elements?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <p>[Yes]</p> <ul style="list-style-type: none"> <li>- In which kinds of AES were/are you enrolled?</li> <li>- What were the main reasons for enrolling in these schemes?</li> <li>- What difficulties did you encounter when enrolling in these schemes?</li> </ul> <p>[No]</p> |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>- What has prevented you from enrolling in any scheme/policy so far?</li> </ul> <p>[Discontinued]</p> <ul style="list-style-type: none"> <li>- Questions from [Yes]</li> </ul> <p>Why have you decided not to continue the contract?</p>                                                                                                                                                                                                                                                                                      |
| <b>Block 3: Collective AES</b>                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <p>A study shows that at least 20-25% of area per each km<sup>2</sup> needs to be covered by such elements to make sure that nature can work properly (Mohamed et al., 2024). This target is not met in most agricultural regions in the world. [show map]</p> <p>Your farm and your neighbours are located in this km<sup>2</sup>. Here there is [X] % of SNH, so to meet this target it would require an increase of XXX ha of seminatural landscape elements.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| From your personal point of view, what do you think would be necessary to achieve this goal?                                                                                                                                                                                                                                                                                                                                                                         | <p>How can this be achieved in the best way for you personally?</p> <p>Who would you like to be involved in this process?</p>                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <p>I understand – thanks for sharing this with me! Now I am interested in your views on one specific type of policy. They are called collective agri-environmental schemes. These are schemes where several farmers from the same area cooperate to collectively implement semi-natural habitat across multiple farms.</p>                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| In general terms, what do you think about that idea? Would it make sense to participate in such scheme?                                                                                                                                                                                                                                                                                                                                                              | <p>In general, do you think it would be the right thing to do as a farmer to collaborate to protect habitats? Why/why not?</p> <p>In general, do you think it makes sense for farmers to participate in such schemes? Why/why not?</p> <p>Would it make sense for your farm to participate in such scheme? Why/why not?</p>                                                                                                                                                                                                                                          |
| I now want to show you four different ways these collective schemes can be designed. [show cards]                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Can you tell me which one of them sounds most appealing to you to reach the goal of 20-25% habitat per km <sup>2</sup> ?                                                                                                                                                                                                                                                                                                                                             | <p>Why? What do you like about that scheme?</p> <p>What do you think about the other options?</p> <p><b>What benefits and drawbacks do you see in these options for your work?</b></p> <p>[Do you think that collective schemes could give you more flexibility in what to implement and in making it more suitable to your farm?]</p> <p>[Do you think it is risky to participate in these collective schemes?]</p> <p><b>[These schemes allow farmer members to exchange their experiences and knowledge in these meetings, what do you think about this?]</b></p> |
| Compared to individual AES, would you need higher payment to participate in collective schemes?                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Compared to "conventional" AES, do you think that that benefits to the environment would be less or more or the same?                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| We have now discussed all the different design options. If it were designed in the                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

|                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| way you found best, would you want to participate in such a program?                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                        |
| What do you think other farmers in your community would think about collective schemes?                                                                                                                                                                                                                                                                                           | Do you think your neighbour's opinion influence whether you would participate? Do you think whether you neighbours or other farmers you know would participate or not would influence your decision to participate?                                                                                                                                                                                    |
| <b>Block 4: Network, trust and "good farmer"</b>                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Guiding Question</b>                                                                                                                                                                                                                                                                                                                                                           | <b>Sub-questions</b>                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Finally, can you describe to what extent you have any experience in cooperation with other farmers?</b><br><br>[list of examples if needed]                                                                                                                                                                                                                                    | Are you a member of an agricultural cooperative, a farmer's union, or any other type of organization of farmers working together?<br><br>Are you working together with any other farmer in your neighbourhood? If so, on which matter?<br><br>Do you consider cooperation as important for your work?<br><br>[If no]<br><br>Are there specific reasons why you are not cooperating with other farmers? |
| <b>If you need advice about your business, who do you typically turn to?</b>                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                        |
| [ideally not asked to keep it as open as possible]<br><br>[Would you say that you trust the government in Spain? Would you say that you trust the government in Castilla-La Mancha? Would you say that you trust the EU? Would you say that you trust cooperatives? Would you say that you trust conservation organizations? Would you say you trust other farmers? Why/why not?] |                                                                                                                                                                                                                                                                                                                                                                                                        |
| What does "good farmer" mean to you?                                                                                                                                                                                                                                                                                                                                              | [ideally not asked to keep it as open as possible]<br><br>What do you connect with that term? How do "good farmers work"?                                                                                                                                                                                                                                                                              |
| <b>Block 5: Final reflection questions and wrap up</b>                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>We have discussed many different options how and already talked about your opinions on them. Finally, I want to ask you:</b>                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                        |
| Do you have any final thoughts on collective AES that we have not covered yet?                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Thank you, these were all the questions I've had! Thank you again very much for your time! If you have any further questions about the study, please feel free to contact me under the phone number or email you can find on the consent sheet. I wish you all the best and have a nice day!</b>                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                        |

## Appendix D. Data sheet on farm and farmer characteristics

### Data Sheet (English Version)

#### Demographic data:

Gender: ☐ female ☐ male ☐ other

Year of birth: \_\_\_\_\_

Since when are you the farm manager? Since \_\_\_\_\_ (calendar year) ☐ I am not the farm manager

#### Which level of agricultural training do you have?

☐ Practical experience only ☐ Basic agricultural training ☐ Full agricultural training (at least 2 years of continued training at the university or other institute of higher education specialised in agriculture or associated fields)

#### What is your highest level of completed education?

☐ Compulsory schooling ☐ Bachelor / Undergraduate  
☐ High school ☐ Master  
☐ Vocational training ☐ Postgraduate / doctorate degree

#### Farm structural data 2026:

How big is your farm (Utilized agricultural area)? \_\_\_\_\_ ha

How much land do you lease? \_\_\_\_\_ ha

What kind of crops do you cultivate? (Approximate ha per crop)

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#### How many of the following animals did you rear on your farm in 2026?

Cows: \_\_\_\_\_ pieces  
Bovine for slaughtering  
(calves, bulls, etc): \_\_\_\_\_ pieces  
Pigs: \_\_\_\_\_ pieces  
Poultry: \_\_\_\_\_ pieces  
Sheep and goats: \_\_\_\_\_ pieces  
Beehives: \_\_\_\_\_ pieces  
Other: \_\_\_\_\_ pieces

Are you a full-time farmer? ☐ Yes ☐ No, I work in another job \_\_\_\_\_ hours/week on average

Is your farm certified as an organic farm? ☐ Yes ☐ No, I am farming conventionally

How many people work on your farm year-round (including you)? Please indicate the number: \_\_\_\_\_

How many people additionally work on your farm seasonally? Please indicate the number: \_\_\_\_\_

Are you a currently a member of any of the following types of organizations? (multiple answers possible)

☐ Agricultural cooperative ☐ Farmers union ☐ Environmental or nature conservation organization ☐ Groundwater user association

## **Appendix E. Semi-structured interview guides for experts**

### **Nature Conservationist 1 [background/pilot interview]:**

1. As I understand [her organization] is also working directly in the field and with farmers. What is your experience with collaborating with farmers to create or protect habitats?
2. What are the main reasons why farmers participate and what are the main reasons why they don't?
3. Do you think there is a general awareness among farmers that creating/maintaining habitats is needed?
4. Would you say that farmers see it as their role to improve the state of habitat in agricultural landscapes?
5. Collective agri-environmental schemes require trust: from your impression, is there trust between farmers, and between farmers and your organisation? And towards government organisations?
6. From your perspective, as someone working for [her organization], would you see your organisation having any role in such a scheme? Do you think your organisation could/would benefit from that?
7. From your impression, what are the main points that currently hinder meaningful participation from farmers in agri-environmental schemes?
8. The current CAP allows farmers to apply as a group, but the Spanish government chose not to include it in its strategic plan. Do you have any insight into why this was decided?
9. Show these policy design options [back then, the final cards were not developed yet]: from your perspective, what are the greatest opportunities/barriers associated with each of these options

#### **Admin questions:**

1. What is the name of the agency that is currently administering/managing agri-environmental schemes/eco-schemes in Castilla-la Mancha? Who is doing the monitoring? What is the role of Comarcas?
2. From your perspective and with your long experience of also tracking the reduction and destruction of habitats, which landscape elements are most deteriorated and why? What would you say are the most "valuable" or "important" landscape elements in Castilla-la Mancha?

[Questions about further contacts]

### **Nature Conservationist 2:**

#### **A. Learning from past projects:**

In my research, I am particularly interested in the maintenance and protection of (semi-)natural landscape elements on agricultural land (e.g., hedgerows; woody, floral, or grassy strips; small water bodies; agroforestry and dispersed trees; (semi-)natural grasslands; flowery and grassy ground cover; semi-natural fallow). I understand that your organization has worked with farmers to increase or maintain such habitats in several past projects, most notably in [project].

1. Could you briefly summarize your specific role in this project?
2. Have you also been involved in other projects aimed at increasing landscape elements, particularly outside protected areas?
3. From your experience, did you get the impression that farmers perceived the degradation of landscape elements as a problem?
4. How difficult is it to engage farmers in these types of projects?
5. Do you get the sense that farmers see caring for the natural environment as part of their role?
6. Based on your experience, which aspects do farmers consider most important when deciding whether to participate in a project or adopt an agri-environmental scheme?
7. As coordinator at [his organisation], what do you see as the main challenge in these projects?
8. In your experience, which landscape elements are the easiest for farmers to implement, and which are the most challenging?

[Block 3 from semi-structured interview guide for farmers – Appendix C]

### **Regional Ministry for Sustainable Development:**

#### **A. Organizational Background Information [answered in written form prior to the interview]**

I read through the competencies of the [department] and know that you [role]. In my research, I am particularly interested in the maintenance/protection of (semi-)natural landscape elements (e.g. hedgerows; woody, floral or grassy strips; small water bodies; agroforestry & dispersed trees; (semi-)natural grasslands; flowery and grassy ground cover, semi-natural fallow) on agricultural land.

1. Does developing schemes and programs for increasing (semi-)natural landscape elements on agricultural land generally fall under the competence of the [department]? To what extent is this competence shared with the Consejería de Agricultura, Ganadería y Desarrollo Rural?

I already requested a comprehensive list of all eco-schemes (Pillar 1) and agri-environment-climate commitments (Pillar 2) that farmers in Castilla-La Mancha could apply for in 2026 from the Consejería de Agricultura, Ganadería y Desarrollo Rural, but have not received any answer.

2. Is it possible from your side to provide me with such a list?

I read in the [plan developed by the department] also that you planned to promote the protection/creating of several (semi-)natural habitats, e.g. natural/permanent pastures, extensive grazing, herbaceous vegetation borders around agricultural plots, promotion of traditional fallow management, renaturation of riverbanks, ...

3. For which of these elements does an agri-environmental scheme exist?

#### **B. Learning from past programs:**

*Participation and mutual learning*

4. Your [past project]. I know that this scheme was designed involving multiple stakeholders, such as farmers and farmer representatives.
  - a. To what extent is this common in the development of AES schemes or eco-schemes in Castilla-La Mancha?
  - b. How was this participation organised? Could every farmer [area] participate and how did the farmers respond to this opportunity?
  - c. How did you as Direccion perceive this process?
  - d. These schemes are part of a larger plan [area]. Is there also a forum or are meetings arranged where farmers can share their experiences?

*Problem Awareness*

5. Did you get the impression that farmers were seeing the degradation of the landscape as a problem? How hard was it to get farmers involved in the AES?

*Design aspects of the AES*

6. During the participatory processes, what were aspects that the farmers highlighted as important for the design of the AES?
7. What were the main challenges from your side in the design process and the implementation? Did farmers comply with the requirements? And if not, what were the main issues?
8. From your experience, which were the easiest, and which the hardest landscape elements or agri-environmental schemes for farmers to implement?

[Block 3 from semi-structured interview guide for farmers – Appendix C]

**Regional Ministry of Agriculture, Livestock and Rural Development:**

A. Organizational Background Information [answered in written form prior to the interview]

In my research, I am particularly interested in the maintenance/protection of (semi-)natural landscape elements (e.g. hedgerows; woody, floral or grassy strips; small water bodies; agroforestry & dispersed trees; (semi-)natural grasslands; flowery and grassy ground cover, semi-natural fallow) on agricultural land.

1. For which of these landscape elements does an eco-scheme (Pillar 1) or agri-environmental-climate-commitments (Pillar 2) exist?
2. Would it be possible from your side to provide me of a full list of eco-schemes (Pillar 1) and agri-environmental-climate-commitments (Pillar 2) that farmers in CLM could apply for in 2026?
3. Would it be possible to provide me with data on the uptake of these policies, e.g. how many farmers applied, how many hectares are enrolled in each of these eco-schemes and agri-environmental-climate-commitments?

B. Learning from experience:

4. Your Viceconsejera is responsible for designing agri-environmental schemes for CLM. To what extent are farmers/farmer associations consulted when it comes to the design of these

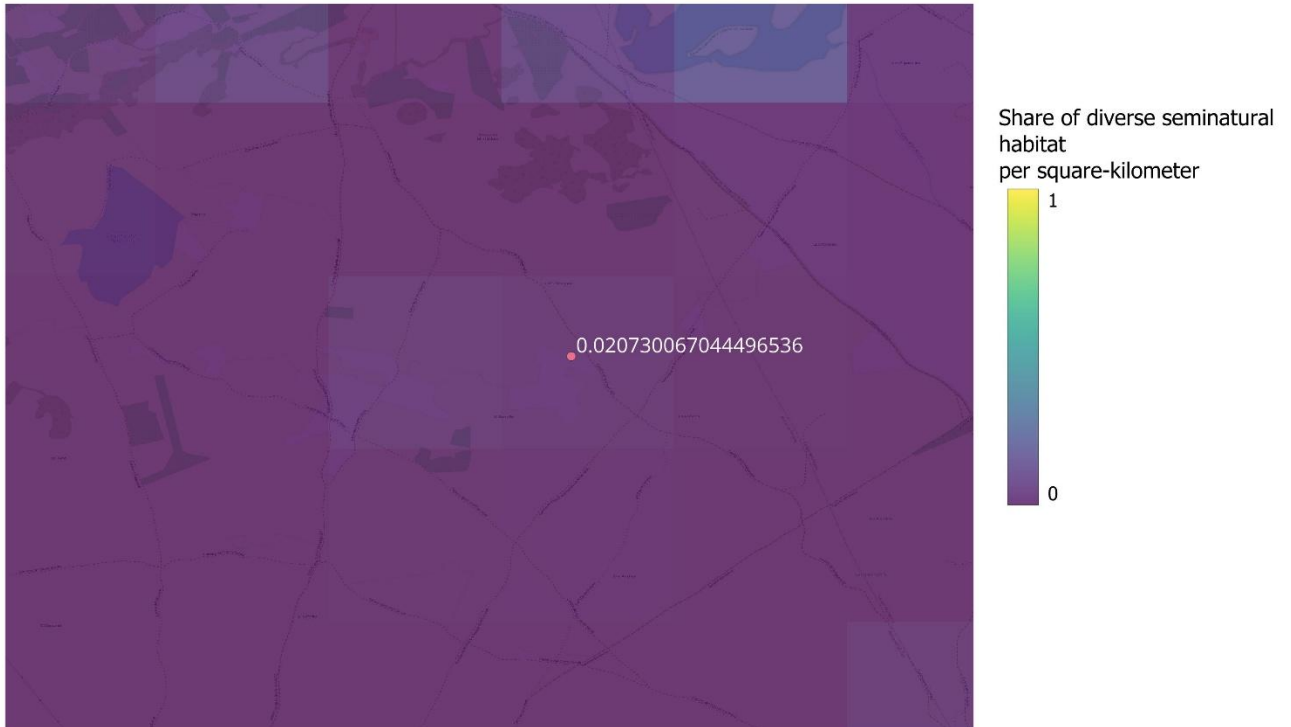
schemes? What are the aspects that are highlighted as important by farmers/farmer representatives for the design of AES?

5. Through your work you get the impression that farmers were seeing the degradation of the landscape as a problem? Is it challenging to get farmers involved in agri-environmental schemes?
6. What were the main challenges from the perspective of your institution in the design of agri-environmental schemes and their implementation? Are farmers complying with the requirements? And if not, what are the main issues?
7. From your experience, which are the easiest, and which the hardest landscape elements or agri-environmental schemes for farmers to implement?

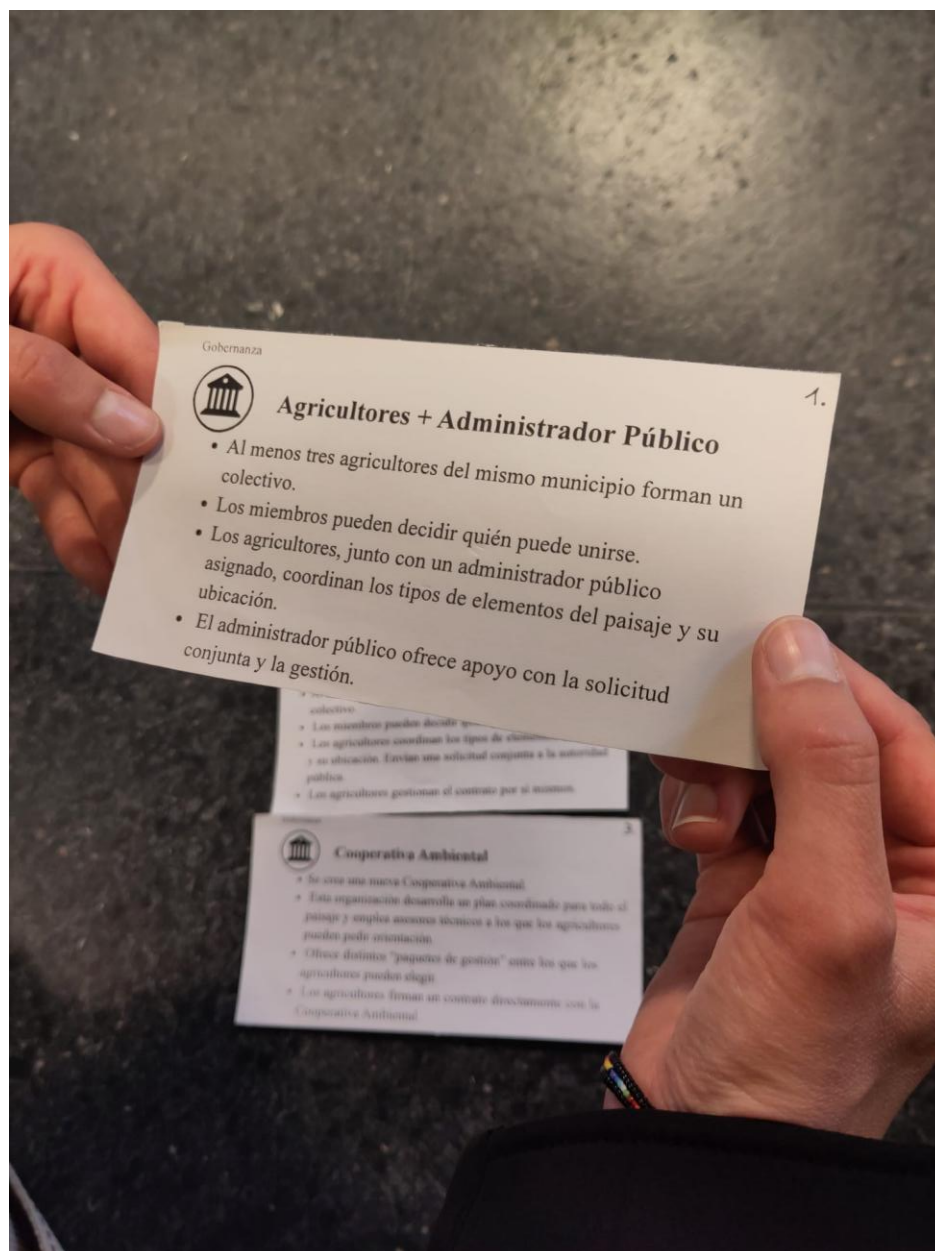
[Block 3 from semi-structured interview guide for farmers – Appendix C]

**Appendix F. Example map, illustrating the share of diverse semi-natural habitat per square-kilometre surrounding interviewees' farms.**

## Example Farm



**Appendix G. Presentation of options for each policy design feature during the interviews.**  
**Picture from farmer sorting cards in an interview.**



## Appendix H. Informed consent sheet signed by all interview partners.



### Informed Consent Sheet (English version)

Exploring the Potential of Collective Agri-Environmental Schemes for Castilla-La Mancha

Researcher: Katharina Mair

Research Project: *Unbreaking the Planet: Evidence-Based Pathways to Restore Safe and Just Earth System Boundaries*

### Dear Participant,

You're invited to take part in an interview for a master thesis project exploring the potential of collective agri-environmental schemes to increase complex and diverse semi-natural habitat in rural Castilla-La Mancha, as well as how these schemes should be designed to increase farmers' participation. The interview will take approximately 45 minutes.

The risks associated with this study are minimal and are not expected to be greater than those experienced in daily life. Participation in this study is completely voluntary, and you have the right to withdraw your participation until 15 April 2026. You may also refuse to answer any particular question. You will not receive any monetary compensation for your participation.

This study complies with the General Data Protection Regulation (GDPR). The interview will be recorded on a mobile device and stored there until 31 Mai 2026. The recording is only to facilitate the transcription process and data analysis. The interview data will become the property of the researcher, and will be anonymized and stored password protected on OneDrive for 2 years. Only the researcher and the project team will have access to the raw data. The results of this study may be published in academic journals, policy papers, books, or online. All personal information will be anonymized in any published or shared data resulting from the study.

### Consent:

In signing this form, I agree to be interviewed in the context of the aforementioned master's thesis. I consent to being recorded during the interview and understand and agree to the processing and storage of the data.

**Date:**..... **Place:** ..... **Signature:**.....

If you have questions about your rights as a study participant or are dissatisfied at any time with any aspect of this study, you may contact:

Name: Katharina Mair

Email: XXX

Phone Number/WhatsApp: XXX

## **Appendix I: Codebook applied in the analysis of farmer interviews.**

### **Coding Scheme**

The following section provides a description of each code and a corresponding example.

#### **01 Attitudes to collaboration**

##### **01.1 Openness to collaboration (self) (inductive)**

|                   |                                                                                                                                                                                                                                                                                                                               |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Definition</b> | Personal openness to the idea of collective schemes or collaborating with other farmers.                                                                                                                                                                                                                                      |
| <b>Example</b>    | “That [concept of collective schemes] would be awesome. Both for the social aspect of collaborating and for obviously like the benefit of the landscape, you know.” (Farmer 2)<br>“Well, I think it’s great; I think it’s great because it has an element that must be part of the new era, which is cooperation.” (Farmer 6) |

##### **01.2 Openness to collaboration (others) (inductive)**

|                   |                                                                                                                                           |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Definition</b> | Anticipated openness of other farmers in their community to the idea of collective schemes or collaborating with others for creating SNH. |
| <b>Example</b>    | Yeah they definitely don't mind the collaborative and the hanging out together, so that's an easy part.” (Farmer 1)                       |

##### **01.3 Low openness to collaboration (self) (inductive)**

|                   |                                                                                                                                          |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Definition</b> | Personal unwillingness to collaborate with other farmers, or no openness to the general idea of collective schemes                       |
| <b>Example</b>    | [after explanation of collective schemes and asked on general interest in cooperating with neighbours of other farmers] “No.” (Farmer 7) |

##### **01.4 Low openness to collaboration (others) (inductive)**

|                   |                                                                                                                                             |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Definition</b> | Anticipated unwillingness or hesitance of other farmers to collaborate with other farmers or towards the general idea of collective schemes |
| <b>Examples</b>   | [after being asked if other farmers would be open to the idea of collective schemes] “Some. Not many” (Farmer 7)                            |

##### **01.3 Participation after choosing design elements (deductive)**

|                   |                                                                                                                                 |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------|
| <b>Definition</b> | Participant stating that their openness to participate in scheme after defining preferred design elements                       |
| <b>Examples</b>   | “Of course I would like to choose it, because the subsidies the ecoscheme currently they are not adapt to my level.” (Farmer 4) |

## 02 Design Elements (deductive)

Codes were assigned to each of the following design features to identify what participants were talking about. These codes were then combined with Codes 03, 04, 05, 07, 08, 10.

|              |                                                    |
|--------------|----------------------------------------------------|
| <b>02.1</b>  | Environmental Cooperative                          |
| <b>02.2</b>  | Farmers + Public Administrator                     |
| <b>02.3</b>  | Farmers                                            |
| <b>02.4</b>  | Create Specific Landscape Element                  |
| <b>02.5</b>  | Reach a target                                     |
| <b>02.6</b>  | Regular meetings                                   |
| <b>02.7</b>  | No organized meetings                              |
| <b>02.8</b>  | Self-determined distribution of collective payment |
| <b>02.9</b>  | Threshold Payment                                  |
| <b>02.10</b> | Agglomeration Bonus                                |
| <b>02.11</b> | Threshold Bonus                                    |

## 03 Top-pick (deductive)

|                   |                                                                                                                                                 |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Definition</b> | Design Element chosen by participant as best option for the respective design feature (governance, incentive structure, collaboration, payment) |
| <b>Examples</b>   | "Of course, number 6 [Regular meetings, #6]. Of course, this one." (Farmer 3)                                                                   |

## 04 Community (inductive)

### 04.1 Negative Perception of Cooperation and Mutual Learning

|                   |                                                                                                                                                                                                                                                                                                                                                               |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Definition</b> | Participant reflecting on negative perceptions of cooperation, community and mutual learning in their farming community, or conflicts in their farming community                                                                                                                                                                                              |
| <b>Examples</b>   | [after being asked if participant is open to the idea of cooperating with other farmers] "That's not possible. [...] You can't. You just can't. Not here in this area. You can't. Whether it's because of the mindset or just custom, I don't know." (Farmer 7)<br>"And I don't want to know anything about you, or you, or anything. Just... no." (Farmer 7) |

### 04.1 Positive Perception of Cooperation and Mutual Learning

|                   |                                                                                                                                                                             |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Definition</b> | Participant reflecting on positive perceptions of cooperation, community and mutual learning in their farming community                                                     |
| <b>Examples</b>   | "Everyone talks about what's going well for them, what isn't going well, what they've done, and what they've stopped doing. So we're up to date on all of this." (Farmer 8) |

## 05 Semi-natural habitat (inductive)

### 05.1 Ecological conflicts and climatic challenges

|                   |                                                                                                                                                                                                    |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Definition</b> | Farmers reflecting on actual or assumed ecological conflicts between crops and habitat, or on challenges with habitat arising from the climatic conditions in Castilla-La Mancha.                  |
| <b>Examples</b>   | "It looks good, but... Floral elements: you have to plant flowers. Here, on this land, when May comes, the ground is like this—there's nothing, nothing. [knocks on the wooden table]." (Farmer 3) |

### 05.2 Lack of knowledge

|                   |                                                                                                                                                                                                                                                                                                               |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Definition</b> | Farmers expressing a perceived lack of knowledge about the implementation and effects of habitat, both for themselves and other actors.                                                                                                                                                                       |
| <b>Examples</b>   | "Well, I'm going to start with this one, Farmers Public Administration. I think that will be so strong. Yeah, the combination. But the thing is, public administrator doesn't have the knowledge they should, I don't know what they have to do, but they are not prepared for all this changing." (Farmer 4) |

### 05.3 Problem Awareness and Openness to Improve

|                   |                                                                                                                                                                                                                                      |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Definition</b> | Participant reflecting on the state of habitat in their region and considering it a worrying situation, or openness to work on improving the situation with adequate incentives or enablers.                                         |
| <b>Examples</b>   | "If there's some kind of aid, we won't refuse to do what they tell us, whatever they deem appropriate, but we need help because, in the end, we have to feed our families." (Farmer 8)<br>"Right now they're very scarce" (Farmer_9) |

### 05.4 Low Problem Awareness

|                   |                                                                                                                                                                          |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Definition</b> | Participant reflecting on the state of habitat in their region and considering it as non-concerning or inevitable. No openness to contribute to improving the situation. |
| <b>Examples</b>   | "The soil erodes, but of course, that happens all over the world. If we want to eat bread. And muffins and things like that. It has to be that way." (Farmer 3)          |

## 06 Economy (inductive)

### 06.1 Broader Economic and Political System

|                   |                                                                                                                                                                                                                                                                                                                                 |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Definition</b> | Participant refer to broader economic or political systems or paradigms.                                                                                                                                                                                                                                                        |
| <b>Examples</b>   | “Because if grain, soybean, and wine production comes in with production costs that aren’t comparable to European production costs, well, here we have no choice but to practice intensive agriculture to try to adjust costs and be competitive—and that intensive agriculture isn’t compatible with biodiversity.” (Farmer 6) |

### 06.2 Economic Profitability of the Farm

|                   |                                                                                                                                                                                                                            |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Definition</b> | Participants pointing to the importance of economic profitability and the conflict of this objective with creating SNH                                                                                                     |
| <b>Examples</b>   | “The main thing is the economy. For us, that’s the main thing. Whether it benefits the environment, whether it benefits wildlife, whether it benefits... We don’t care. [...] But we have to feed our families. (Farmer 8) |

## 07 Positive (inductive)

### 07.1 Easiest, convenient option for farmer

|                   |                                                                                                                                                                                                                                   |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Definition</b> | Participants view option as easiest to implement, or as the most convenient option for the farmer.                                                                                                                                |
| <b>Examples</b>   | “Yeah, I also think like the X amount of woody, X amount of floral, like it gives them a more, almost like a checklist to achieve everything in it. And it's, I think, more easy to understand what needs to be done.” (Farmer 2) |

### 07.2 Increases ecological benefits

|                   |                                                                                                                                        |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| <b>Definition</b> | Participants accredit positive ecological effects to policy design option.                                                             |
| <b>Examples</b>   | “That there, I think, gives them more of a variety of things to do in order to help on the bigger scale of things as well.” (Farmer 2) |

## 08 Negative (inductive)

### 08.1 Negative or lacking experience

|                   |                                                                                                                                                                                   |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Definition</b> | Participants reflect on negative past experiences or lacking experience with an arrangement, design feature, institution or habitat.                                              |
| <b>Examples</b>   | “That would be great, but given the experience with the cooperatives that currently exist and are around here, I’m a little afraid it might turn out like this again.” (Farmer 6) |

## 08.2 Reduces Ecological Benefits

|                   |                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Definition</b> | Farmers anticipate that option yields low ecological benefits.                                                                                                                                                                                                                                                                                                           |
| <b>Examples</b>   | “When they decide what to do, in the end it’s going to be a compromise. As soon as they can’t agree on something, they’ll settle for the lowest common denominator. So, maybe, if we wanted to plant shrub hedges up to a meter tall, well, if just one person says no, we won’t end up with smaller hedges. I don’t know, something like that, for example.” (Farmer 5) |

## 09 Individual vs Collective Schemes (financial) (deductive)

|                   |                                                                                                                                                                                                                         |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Definition</b> | Participants reflect on whether they would require higher compensation for enrolling in a collective scheme compared to an individual scheme.                                                                           |
| <b>Examples</b>   | “No, if we’re going to plant hedges that we aren’t currently planting, then we’d need more money for the hedges. But then... whether it’s a collective or individual effort... there wouldn’t be a problem.” (Farmer 5) |

## 10 Wishes (inductive)

### 10.1 Learning from each other

|                   |                                                                                               |
|-------------------|-----------------------------------------------------------------------------------------------|
| <b>Definition</b> | Participants express a wish for more mutual learning within the farming community.            |
| <b>Examples</b>   | “Yes, it needs to be done; it’s very important. This should exist, but it doesn’t” (Farmer 3) |

### 10.2 Higher financial support (general)

|                   |                                                                                                                                                                   |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Definition</b> | Farmer express a general need for higher compensation to implement habitat on their farmland, or to reach habitat implementation at scale necessary more broadly. |
| <b>Examples</b>   | “Mainly, what’s needed is financial aid.” (Farmer 8)                                                                                                              |

### 10.3 Independence

|                   |                                                                                                                                                        |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Definition</b> | Farmer express a wish for independence or autonomy, or state that this wish is restricted though a policy design option.                               |
| <b>Examples</b>   | “Okay, it’s clear how payment B works, but the fact that it doesn’t depend solely on you collecting it—no, that doesn’t sit right with me.” (Farmer 5) |

## Appendix J: Overview of studies analysed in the systematic literature review

| Source                         | Geographical context           | Policy instrument                                                   | Method                                               |
|--------------------------------|--------------------------------|---------------------------------------------------------------------|------------------------------------------------------|
| Opdenbosch et al. (2024)       | Sweden                         | Agri-environment-climate measure                                    | Semi-structured interviews                           |
| Glass et al. (2026)            | Northern Ireland               | Agri-environmental scheme                                           | Semi-structured interviews                           |
| Villanueva et al. (2015)       | Southern Spain                 | Ecological Focus Area, Agri-environmental scheme                    | Choice experiment                                    |
| Buschmann et al. (2023)        | Germany                        | Agri-environmental scheme                                           | Discrete Choice Experiment                           |
| Lienhoop & Brouwer (2015)      | Saxony, Germany                | Agri-environmental scheme                                           | Choice experiment and qualitative interviews         |
| Czajkowski et al. (2021)       | Biebrza Marshes, Poland        | Agri-environmental scheme                                           | Stated Preference Method                             |
| Hardy et al. (2020)            | Marais Poitevin region, France | Agri-environmental scheme                                           | Ethnographic fieldwork, Role-playing game experiment |
| Mitrová et al. (2025)          | Slovakia                       | NA                                                                  | Qualitative, multi-actor case study                  |
| Schulze et al. (2026)          | Germany                        | Agri-environmental scheme                                           | Discrete Choice Experiment                           |
| Ben-Othmen & Ostapchuk (2023)  | Northwestern France            | Grassland restoration contract (agri-environment-climate measure)   | Discrete Choice Experiment                           |
| Canessa et al. (2023)          | Germany                        | Agri-environment-climate measure                                    | Discrete Choice Experiment                           |
| Rocamora-Montiel et al. (2014) | Andalusia, Spain               | Territorial management contracts (agri-environment-climate measure) | Quantitative analysis of survey data                 |