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How does the professionalisation of farmer collectives enable effective agri-environmental schemes? A fuzzy-set qualitative comparative analysis of 36 Dutch farmer collectives

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ABSTRACT

Agriculture is the main land use and one of the main drivers of biodiversity loss. In particular, intensive farming practices have contributed to biodiversity loss, which is why many governments have implemented agri-environmental schemes (AES). Farmer collaboration at landscape level is important to achieve effective AES. The Dutch government opted for such an approach and decided that only farmer collectives were entitled to take part in AES. In this paper, we evaluate 36 Dutch farmer collectives. Through the lens of professionalisation, we investigated which characteristics of professionalisation enable farmer collectives to work towards an effective AES in terms of collaboration at landscape level. We used spatial concentration of conservation measures as a measurement of an effective AES and, based on expert judgement, selected five characteristics of professionalisation that directly impact AES effectiveness. We applied a fuzzy-set Qualitative Comparative Analysis (fsQCA) in order to explore which of these characteristics singly or in combination contribute most to spatial concentration. We found that different combinations of characteristics of professionalisation enable farmer collectives to work towards spatial concentration. First, we found that working on the maintenance and development of qualifications of participants is for most farmer collectives important to work on more spatial concentration. Second, the combination of having a strategy for agrobiodiversity in combination with working on the qualifications of the field workers is important. And when the network capability or the presence and use of enabling systems are missing, the qualifications of the field workers is important. Based on our findings, we conclude that the qualifications of participants and fieldworkers (i.e., regional coordinator, ecologist and field officer) are the most important characteristics of professionalisation to contribute to spatial concentration at the moment.

1. Introduction

Agriculture is not only the main land use in Europe (ca. 40%) (European Commission, 2019) but also one of the main drivers of biodiversity loss. Intensive farming practices in particular have a substantial, negative impact on biodiversity within and outside agricultural landscapes (Tanentzap et al., 2015; IPBES, 2018, 2019). Currently the main policy instruments in Europe to encourage farmers to protect and enhance agrobiodiversity are agri-environmental schemes (AES) (Runhaar et al., 2017). AES encompass subsidies to farmers who implement conservation measures such as flower-rich field margins or protection of breeding farmland birds and have been implemented in 27 countries in Europe (European Commission, 2019). Coordination of conservation measures at landscape level is considered important for an effective AES, particularly for the protection of mobile species such as birds and to enable dispersion of protected species such as plants and insects (Angelstam et al., 2022; Boonstra et al., 2021; McMahon et al., 2020; Batáry et al., 2015). Coordination of conservation at landscape level requires collaboration between farmers. That is why in 2013 the EU decided to enable groups of farmers to be applicants and final beneficiaries of AES. The Dutch government even decided that only groups of farmers ('farmer collectives') could be beneficiaries of AES. This led to

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the establishment of 40 farmer collectives in the Netherlands in 2015 (Dik et al., 2022; Westerink et al., 2020).

One of the reasons why the Dutch government opted for a collective approach was to enhance the effectiveness of AES through farmer collectives by benefitting from local knowledge, social capital and collaboration between farmers and to facilitate the spatial coordination of conservation measures at landscape level (Bazzan et al., 2022a, 2023; Westerink et al., 2020). This means that an effective AES also depends on the functioning of these farmer collectives, or in other words on their degree of professionalisation (Dik et al., 2022). To analyse the degree of professionalisation, Dik et al. (2022) developed an assessment framework that distinguishes three categories of professionalisation: 1) organisational; 2) occupational and 3) systemic. Each category has distinctive characteristics (see Appendix A). Whether a more professional farmer collective actually achieves a more effective AES has not yet been studied. To help to fill this knowledge gap, this paper addresses the following research questions.

1.1. Which characteristics of professionalisation singly or in combination enable farmer collectives to work towards an effective AES?

To answer this research question, we used the program impact theory (Vaessen and Todd, 2008) and a fuzzy-set Qualitative Comparative Analysis (fsQCA) (Oana et al., 2021; Scheider and Wagemann, 2012). QCA allows researchers to analyse and understand the diverse combinations of characteristics for professionalisation (conditions) that lead to successful or unsuccessful outcomes in AES. By identifying the minimal combination of conditions that lead to the desired outcomes, QCA helps to uncover the key (combinations of) conditions necessary and/or sufficient for success. QCA is particularly suitable for intermediate-N research, which is the case in our sample of cases (38 farmer collectives). By considering the contextual nuances and specific interactions between factors, QCA can offer valuable insights into the effectiveness and impact of agri-environmental schemes, facilitating evidence-based decision-making and policy development in the agricultural and environmental sectors.

To do so we drew upon two existing datasets: the results of the assessment of the degree of professionalisation of 38 of the 40 Dutch farmer collectives (Dik et al., 2023) and the results of the interim evaluation of the effectiveness of AES in the Netherlands (Boonstra et al., 2021).

In the following sections we present the analytical framework, explain how we conducted the fsQCA and how it can be interpreted (Section 3). After describing our research design, we present the different configurations of professionalisation conducive to achieving AES effectiveness (Section 4). In the discussion we reflect on the results and methods, give recommendations for collective agri-environmental policy and the professionalisation of farmer collectives and suggest further research. (Section 5). In the conclusions (Section 6) we present the answers to the research question.

2. Analytical framework

Much research has been conducted on how to enhance the effectiveness of AES. One research approach has been to study the importance of collaboration in a group of farmers, the collective approach. Many scientists have confirmed the importance of a collective approach to increase the effectiveness of AES at landscape scale (de Snoo et al., 2013; Bruges, 2014; Prager, 2015; Runhaar et al., 2017; Westerink et al., 2017; Franks, 2019; Dik et al., 2022; Westerink et al., 2020). In this research we look at a specific part of this collective approach: the professionalisation of farmer collectives (Dik et al., 2022, 2023). Following the program impact theory (Vaessen and Todd, 2008), we consider that the professionalisation of farmer collectives will lead to the conservation and enhancement of (agro)biodiversity through the implementation of an effective AES (see Fig. 1). First, we describe the categories of professionalisation based on the assessment framework developed by Dik et al. (2022) and then we introduce what the outcome, an effective AES, entails.

2.1. Categories of professionalisation

Professionalisation is a concept from the sociology and management disciplines for analysing and improving organisations (Haapakorpi, 2012; Weggeman, 1992) or for improving volunteer organisations by making them more formal (Dowling et al., 2014). The assessment framework for professionalisation of farmers collectives developed by Dik et al. (2022) aims to be transparent about choosing and interpreting

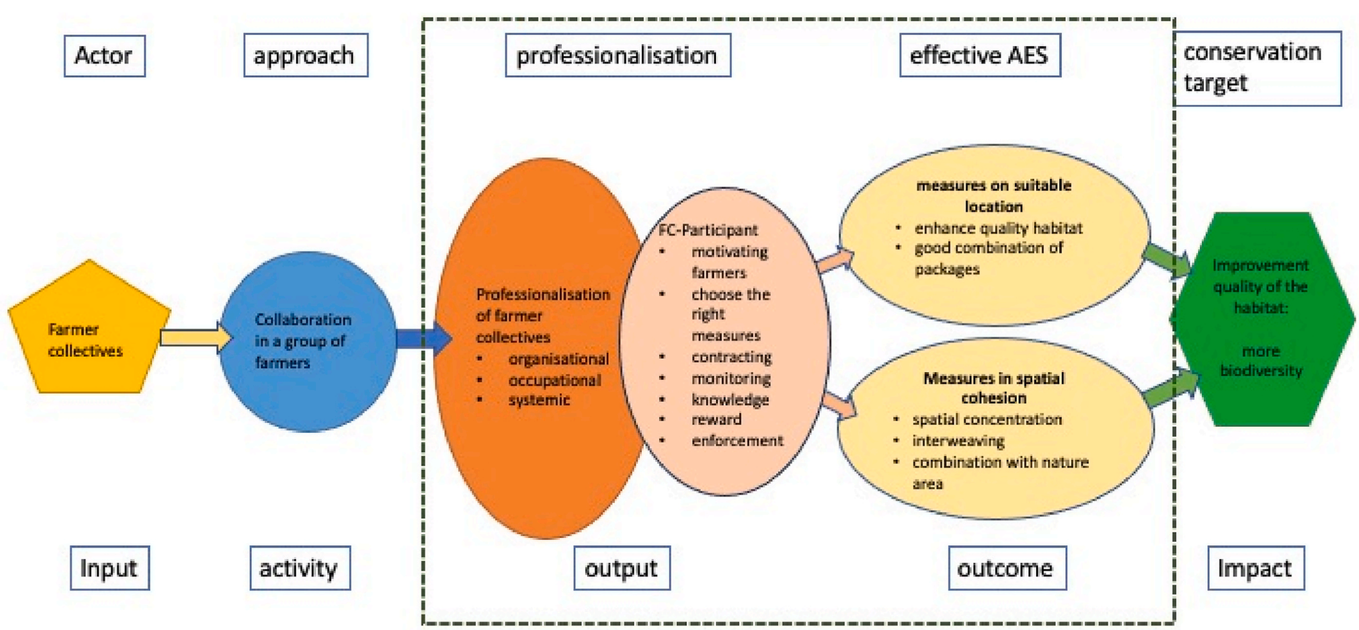

Fig. 1. Theoretical framework based on the program impact theory; dotted line encloses the focus of this paper Which characteristics of professionalisation singly or in combination enable farmer collectives to work towards an effective AES.

criteria, and for this purpose it distinguishes three categories of professionalisation (see Fig. 2). In 2019, this assessment framework was used to assess 38 Dutch farmer collectives in terms of their degree of professionalisation (Dik et al., 2020, 2023). For the explanation and operationalisation of this framework we refer to Dik et al. (2022). Based on this assessment framework we will define the conditions to be used in this research (see 3.3.1). The three categories of professionalisation are briefly explained below.

Organisational professionalisation: The category of organisational professionalisation is related to the internal organisation and concerns the organisation's strategy and internal systems (Dowling et al., 2014). The four characteristics of organisational professionalisation distinguished are a) the strategy translated into a strategic plan based on shared values, including the strategy on agrobiodiversity and what kind of collective is aspired to; b) the organisational structure, including the relationship between the board and executive organisation in terms of shared leadership and segregation of duties; c) the systems, rules and procedures for agrobiodiversity and the organisation needed to monitor and evaluate the agrobiodiversity and the performance of the organisation; and d) the learning culture required for becoming a better organisation.

Occupational professionalisation: Occupational professionalisation focuses on defining qualifications and how to maintain and develop the qualifications of persons active in farmer collectives (board, fieldworkers and participants) (Dowling et al., 2014; Dik et al., 2022).

Systemic professionalisation: This category of systemic professionalisation concerns how a farmer collective manages the external developments. The capabilities for coping with these external developments are network capability (build, maintain and use a network), capability for strategic policy-making (influencing the policy agenda) and the collective's entrepreneurial capability (innovate, build coalitions, exploit business opportunities and develop projects) (Laasonen and Kolehmainen, 2017; Dik et al., 2022).

2.2. An effective AES

An important impact of a collective approach is that collaboration in conservation measures will improve the habitat, which will lead to more biodiversity (Fig. 1). An effective AES therefore aims to create and maintain optimal ecological conditions in the habitats for a group of species that require different conservation measures. AES in the Netherlands focus on 68 species in the Birds and Habitat Directive (BHD) which depend on agricultural area (Boonstra et al., 2021). Whether AES will be effective depends on how farmer collectives make choices about which conservation measures to apply to which location based on the preconditions set by the province, the occurrence of species and the abiotic circumstances. In their Nature Management Plans, provinces set preconditions for the implementation of the AES, e.g., specifying the areas in which conservation measures may be carried out. The province also makes budget available that the collectives can draw on to pay AES participants for applying conservation measures. The requirements a collective must meet to be eligible for an AES subsidy are: 1) they must be a certified organisation; 2) they must submit a management plan detailing what conservation measures they want to take in their management area, at what cost. To determine this, they first have a pre-registration among the potential participants (Westerink et al., 2020).

When the collectives draw their management plan, they must also consider the abiotic and biotic circumstances such as occurrence of species, landscape diversity, soil and water structure and the intensity of agriculture in the area (Batáry et al., 2015; Angelstam et al., 2021; Marja et al., 2022). Thus, a collective has influence on the effectiveness of AES through the choices they make about conservation measures when contracting participants. The choices concern the type of measures applied at the suitable location (for example to which extent there is overlap between the distribution of species and the conservation measures) and the spatial coherence of measures (for example the size of the managed area and spatial concentration of measures) (Boonstra et al., 2021). In the interim evaluation of Dutch AES (Boonstra et al., 2021) the results of these choices in the various habitats of open grassland, open arable land and blue/green infrastructure were evaluated. In 3.3.2 we explain how we define an effective AES as the outcome of this research.

3. Research design

3.1. Method: fuzzy-set qualitative comparative analysis

To answer the research question of this paper we applied a fuzzy-set

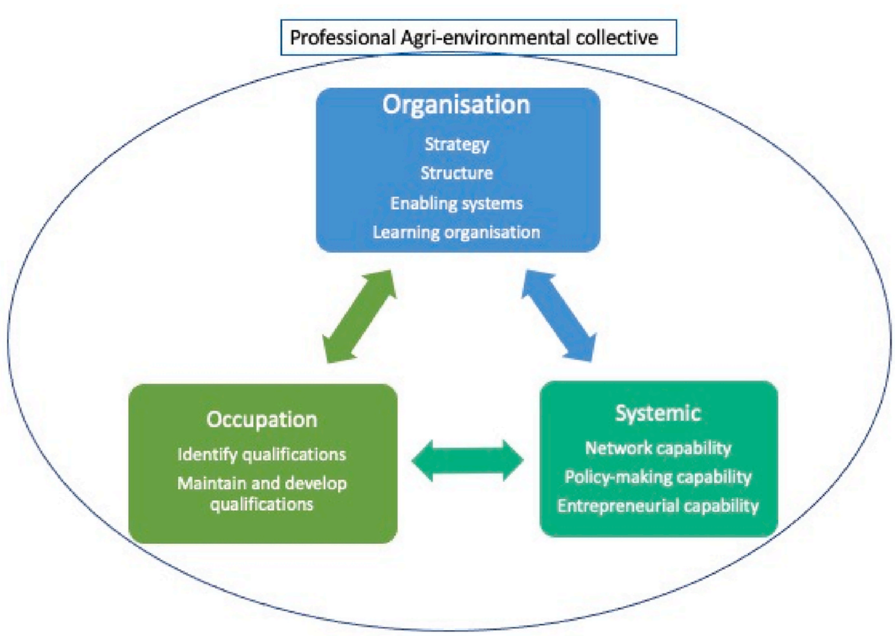

Fig. 2. Three categories of professionalisation of farmer collectives (Dik et al., 2022).

Qualitative Comparative Analysis (fsQCA). Qualitative Comparative Analysis (QCA) is a research method rooted in set theory and used in social sciences to analyse and understand complex relationships among variables. It aims to identify patterns and combinations of factors ("conditions" in QCA terminology) that lead to a particular outcome by examining multiple cases. In our research, *cases* are formed by the farmer collectives, *conditions* are the characteristics of professionalisation and the *outcome* is AES effectiveness measured in terms of spatial concentration of conservation measures. In Qualitative Comparative Analysis (QCA), the approach to analyse conditions involves two key aspects. First, conditions are examined both individually, looking at their importance one by one, and collectively, considering how different conditions combine or configure together. Second, QCA assesses the relative significance of these configurations, making a distinction between *sufficiency* and *necessity*. Sufficiency means that a specific combination of conditions is enough to produce a certain outcome, while necessity signifies that a particular condition must be present for the outcome to occur. Specifically, it uses set theory and Boolean algebra to rigorously analyse the presence or absence of specific conditions or combinations of conditions when an outcome occurs or does not occur.

Additionally, QCA introduces the concept of "fuzzy sets" to accommodate the inherent uncertainty and gradations often present in empirical data. This feature acknowledges that conditions and outcomes may not always exhibit binary states of presence or absence. Instead, they can possess varying degrees of membership in a set. In other words, it quantifies the extent to which a case exhibits the characteristics or conditions associated with a particular set. Membership scores in fsQCA can vary between 0 and 1, where 0 indicates that the case does not belong to the set at all, and 1 indicates full membership or complete conformity with the set's conditions. Intermediate values between 0 and 1 represent partial membership, indicating that the case exhibits some, but not all, of the characteristics of the set. These membership scores are used in the analysis to assess the degree of association between conditions and outcomes. This nuanced approach allows for a more realistic representation of complex social phenomena.

In the context of QCA, two parameters of fit are employed to gauge the degree to which cases align with necessity or sufficiency relations: consistency and coverage (Ragin, 2014, p. 44). Consistency quantifies the extent to which a necessity or sufficiency relation between a set of conditions and an outcome is met within a dataset, ranging from 0 (no consistency) to 1 (perfect consistency). Coverage assesses the empirical relevance of the explanatory pattern by measuring the overlap between sets in relation to the size of the larger set, also ranging from 0 to 1. For additional details on our analytical approach, please refer to Appendix C.

To perform a fsQCA we took the following steps (see Fig. 3) (Schneider and Wagemann, 2012; Oana et al., 2021): first, we selected the cases to be analysed with fsQCA (see 3.2), then we selected the conditions and the outcome of interest and collected the data accordingly (see 3.3). After that, to obtain the QCA solution, we determine membership scores for each case in relevant sets or conditions, a procedure called *calibration*. It involves assigning membership values to cases based on the observed characteristics or attributes of those cases in comparison to the criteria or conditions defined for each set (for instance, the characteristics of professionalisation). Calibration is a critical step because it allows researchers to translate qualitative or categorical information about cases into quantitative membership scores. Following calibration, we investigate which combinations of conditions are necessary (analysis of necessity) for achieving effective AES. Subsequently, we perform an analysis of sufficiency, determining each case's membership in logically possible configurations (truth table analysis) and assessing whether a specific configuration of conditions can be deemed sufficient for the outcome to occur, employing a process known as minimization.

Minimization is the process of simplifying the truth table to focus on the most essential combinations of conditions. This analysis yields three solutions: conservative, parsimonious, and intermediate. The conservative solution is the most complex solution and refers solely to the observed cases. The intermediate solution is guided by theoretical expectations of how single conditions contribute to the outcome. The parsimonious solution is the simplest solution: it reduces the solution to the main configurations with fewer conditions and includes non-observed cases ("logical remainders") (Oana et al., 2021; Bazzan et al., 2022b). The principles of minimization ensure that the three solutions are similar but differ in degree of complexity (Oana et al., 2021, pp 123–130). In this paper, we present the parsimonious solution. To

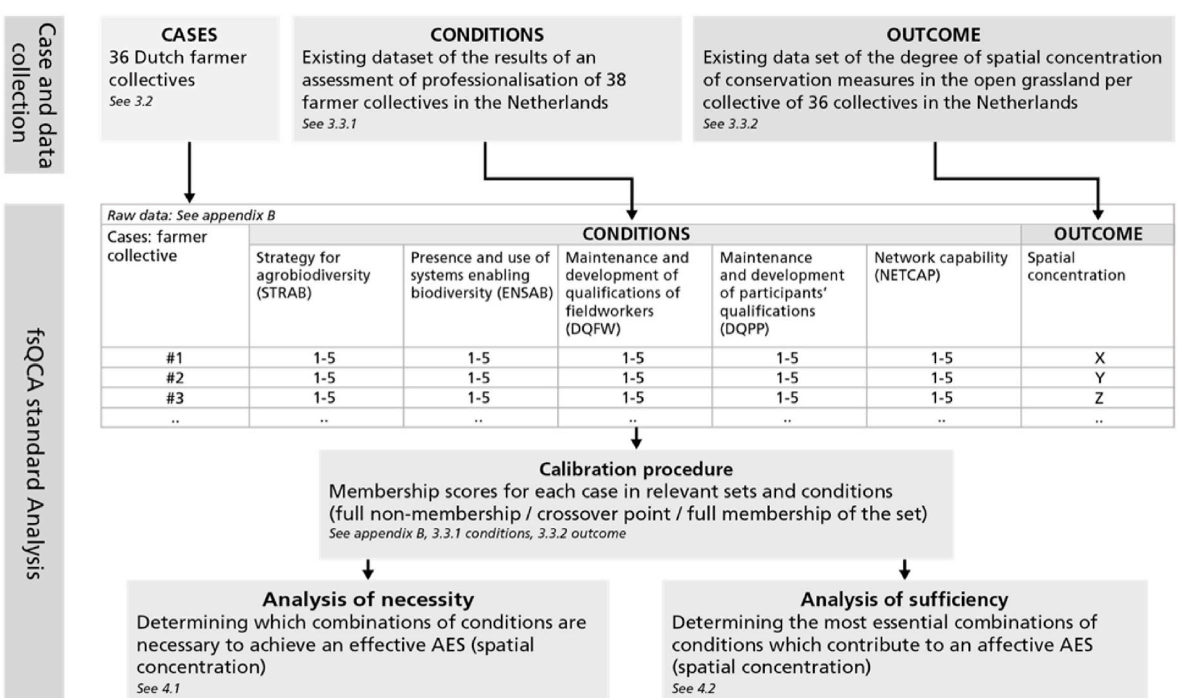

Fig. 3. Flowchart of the fsQCA conducted in this study.

implement fuzzy set QCA and derive solutions related to effective AES (our outcome), we apply the Standard Analysis (SA) (Oana et al., 2021).

3.2. Case selection

In this article, we compare 36 of the 40 farmer collectives in the Netherlands for four reasons. First, because to date, the Netherlands is the only EU Member State that has made farmer collectives the sole beneficiaries of AES (Barghusen et al., 2021; Westerink et al., 2020). Second, the Dutch government expects that the collective approach will enhance the effectiveness of AES by benefitting from local knowledge, a network, participants' ownership, collaboration between participants, and spatial coordination of conservation measures at landscape level (Bazzan et al., 2022a, 2023; Dik et al., 2022; Westerink et al., 2021). Third, the level of professionalisation of 38 of the 40 farmer collectives after three years of coordinating AES was known, as it had previously been assessed (Dik et al., 2020, 2023). And finally, we chose to look at the outcome of an effective AES (see 3.3) in the habitat of open grassland because much research has been done on effective management in that habitat (Angelstam et al., 2022; McMahon et al., 2020; Batáry et al., 2015). 36 of the 38 farmer collectives Dik et al. (2023) assessed operate in the habitat of open grassland.

3.3. Data collection and calibration

This research combined two datasets: data from an assessment of professionalisation of 38 of the 40 Dutch farmer collectives conducted in 2019, so 3 years after the collectives were established (Dik et al., 2023) and data from an interim evaluation of the effectiveness of AES conducted in 2020 (Boonstra et al., 2021).

In July 2019 an extensive online survey was held among the 40 farmer collectives. 38 out of 40 collectives had completed the survey.

Table 1
Characteristics of professionalisation are based on Dik et al. (2022). The green characteristics were used in this research as conditions (based on the discussion in the focus group).

Organisational professionalisation	
A common and shared strategy that has been worked out in aspirations, goals and strategy	What agrobiodiversity do we want to achieve in the long term?
	What kind of farmer collective do we want to be?
Organisation structure	Organisation structure of the primary process is in line with the strategy
	Leadership is shared between board and executive organisation
	Duties of board and executive organisation are segregated
Presence and use of the enabling systems for	Agrobiodiversity (e.g. location of conservation management contracts, monitoring)
	Business support systems (e.g. finance, HR)
Learning organisation	Presence of a knowledge programme
	Is there experimentation and innovation?
Occupational professionalisation	
Description of qualifications and people have these qualifications	Board members
	Executive organisation
	Participants
Maintenance and development of qualifications	Board members
	Executive organisation, fieldworkers
	Participants
Systemic professionalisation	
Network capability	Build, handle and exploit relationships based on trust and reciprocity
Policy-making capability	Ability to identify opportunities and active in agenda setting and raising awareness in line with the strategy
Entrepreneurial capability	Ability to 1: Create opportunities for innovation; 2: Build coalitions and collaborate; 3: Exploit financial business opportunities and 4: Execute actions

After that the researchers performed a qualitative content analysis by assigning codes to the answers. Using these results the researchers assigned 1–5 point for each characteristic of professionalisation. The assessment of the degree of professionalisation of the 38 collectives included too many characteristics for QCA. To determine which characteristics of professionalisation (i.e., which conditions) to use in this research and how to define the outcome of an effective AES two online focus group sessions were organised in March 2022 with representatives of BoerenNatuur (the umbrella organisation of the farmer collectives), researchers involved in the assessment of the farmer collectives (Dik et al., 2020) and researchers involved in the interim evaluation of the AES in the Netherlands (Boonstra et al., 2021). A focus group setting was chosen since the discussion in a focus group usually contributes more diverse perspectives on the selected topic than the researcher could imagine alone (Gundumogula, 2020). According to Krueger and Casey (2015) a focus group has five characteristics: 1) it is a small group of people (4–12); 2) the people in focus groups have certain characteristics determined by the purpose of the study; 3) the focus group provide qualitative data of interest to the researcher; 4) the focus group has a focused discussion based on open-ended questions by the researcher; 5) the focus group will help to understand the topic of interest. We organized two focus groups. The aim of the first focus group was to prioritise and select five conditions. As input, the participants were presented the full list of professionalisation characteristics (derived from Dik et al., 2022) (see 3.3.1). The aim of the second focus group was to define the outcome (an effective AES) for this study. The input presented at the participants, were the four criteria for an effective AES used in the interim evaluation of AES and the results of spatial concentration per collective (see 3.3.2).

3.3.1. The conditions: professionalisation characteristics

We selected the conditions of professionalisation used in this study on the basis of the assessment framework for professionalisation (Dik et al., 2022) and the discussion in the online focus group (see Table 1). The assessment framework consists of 18 characteristics of professionalisation, which corresponds to 262,144 (i.e. 2^{18}) possible combinations of characteristics. This is far too many combinations of conditions for a good and reliable fsQCA because there are too many combinations that cannot be matched to a case. Therefore, in our analysis with 36 cases we set a maximum of five conditions, so that we would have to handle 32 (i.e. 2^5) combinations of conditions. The aim of the focus group was to prioritise the 18 characteristics of professionalisation (Dik et al., 2022) and decide which five to use in this research. The following five characteristics of professionalisation which we expected would have a direct impact on achieving an effective AES were ultimately selected (see Table 1 the green characteristics).

Strategy for agrobiodiversity (STRAB): A professional farmer collective has a common and shared strategic plan which includes the aspiration and goals to improve the quality of habitat for the BHD target species. In this strategic plan the farmer collective has formulated how they want to accomplish this. This strategy is based on shared values and creates shared ownership throughout the organisation. The board monitors the performance and ensures goals are realised based on this strategic plan (Dik et al., 2022). We expect that in their strategic plans the farmer collectives have made choices about: 1) the effectiveness of AES at landscape scale and the spatial cohesion (Angelstam et al., 2022; Franks, 2019; Runhaar et al., 2017; Batáry et al., 2015), 2) the effectiveness of conservation measures to achieve the best ecological conditions (Angelstam et al., 2022; Melman et al., 2016) taking into account the abiotic conditions and the preconditions set by the province, and 3) which farmers must be involved (Batáry et al., 2015; Barghusen et al., 2021; Westerink et al., 2020).

Presence and use of systems enabling agrobiodiversity (ENSAB): A professional farmer collective has systems, rules and procedures to monitor and evaluate the goals and work being done to achieve more agrobiodiversity as mentioned in the strategy (Dik et al., 2022; Nagel et al., 2015). The farmer collective will use the results of monitoring and evaluation to adjust their goals for agrobiodiversity, their strategy and their actions relating to ecological management, network and ecological knowledge (Plan, Do, Check and Adjust) (Weggeman, 1992). In this way the farmer collective learns and can do better (i.e. is a learning organisation) (Triste et al., 2020).

Maintenance and development of qualifications of fieldworkers (DQFW): This condition focuses on the qualifications needed by fieldworkers to achieve effective AES. Fieldworkers are the people who work in the executive organisation of the farmer collective, such as the ecologist, the coordinators who recruit farmers for the AES and then guide them further and those who maintain contact with the government and other organisations. Together, they are expected to be able to create an effective AES when they use lessons learned from monitoring and evaluation and undergo continuous training (Schomers et al., 2021) on necessary topics such as ecology and networking skills. With these qualifications, fieldworkers can prepare the biodiversity strategy, find the right partners and advise farmers on how to use the right conservation measures and increase spatial cohesion.

Maintenance and development of participants' qualifications (DQPP): This condition focuses on the qualifications needed by farmers (participants) to achieve an effective AES. We expect that if participants know what the strategy for agrobiodiversity of the farmer collective entails, use the lessons learned from the evaluation and receive ongoing training (Schomers et al., 2021) in the knowledge and qualifications needed to manage their land and cooperate with other farmers, this will lead to an effective AES.

Network capability (NETCAP): This is the capability to build, maintain and handle a network based on trust and reciprocity (De Vries et al., 2019; Laasonen and Kolehmainen, 2017). If the farmer collective has a good network, for example with nature organisations, they can work together and create more spatial cohesion with nature areas. Or if they have a good network with the province, they can also use this to have influence on defining the preconditions the province sets.

We used the data for the conditions of professionalisation from the assessment of 38 Dutch farmer collectives done in 2019 (Dik et al., 2020). The degree of professionalisation of the farmer collectives in that assessment was expressed on a five-point Likert scale: 1) very poor; 2) poor; 3) fair; 4) good and 5) excellent. To determine membership of the cases in the conditions we used a five-point scale calibration scheme (Oana et al., 2021, p 41). The five-point Likert scale data were calibrated into the five-point fuzzy scores (see Table 2). In the five-point fuzzy score calibration scheme cases can have membership scores of 0 (full non-member), 0.33 (more out than in), 0.67 (more in than out), 0.9 (almost a full member) and 1 (full member). For example, let's consider the degree of professionalisation of network capability of the farmer collectives. During calibration, we assign a membership value of 0.9 to a farmer collective that scored in the assessment of Dik et al. (2023) a good (4) degree of network capability, indicating that it largely meets the criteria for building, handling, and exploiting relationships based on trust and reciprocity. On the other hand, farmer collectives with a membership value of 0.33 have a poor (2) level of network capability. The raw and calibrated data for the five conditions are presented in Appendix B.

Table 2
Data calibration of conditions.

Likert scale	Five-point fuzzy score calibration
1 very poor	*0*
2 poor	*0.33*
3 fair	*0.67*
4 good	*0.9*
5 excellent	*1*

3.3.2. The outcome: spatial concentration of measures as proxy for AES effectiveness

As discussed in the theoretical framework, an effective AES depends on the choices made by the collectives about the conservation measures to be applied by the participants. The interim evaluation (Boonstra et al., 2021) examined how the farmer collectives positioned the conservation measures in the different habitats. In this evaluation the expected outcome of the new system of AES was assessed. The expected outcome was that the new system would lead to an effective AES at the suitable location and to spatial cohesion. The aim of the second online focus group was to discuss two questions: first are the results of spatial concentration the right way to define in an effective AES in this research. And second how to determine the membership of cases; can we define the cross-over point.

The discussion about the first question led to input for the theoretical framework (2.2) and the discussion (5). But also, that spatial concentration is one of the ways to define an effective AES for this method. Much research has been done on effective management in open grassland (Angelstam et al., 2022; McMahon et al., 2020; Batáry et al., 2015). Successful management in this habitat includes a good spatial concentration of conservation measures (a mosaic) consisting of a combination of rewetting, mowing, grazing, sufficient large patches of wet grassland and predator control (McMahon et al., 2020). Spatial concentration is the distance between different conservation measures the farmer collective has contracted with the participants. The closer together the more effective. For example, if in an area of 500-m radius 100% of the area has conservation measures, that would be a very good spatial concentration of management (Boonstra et al., 2021). Based on the outcome of the online focus group and the literature we measured the outcome of an effective AES in this research as the degree of spatial concentration of conservation measures in the open grassland habitat (SPACON): the more concentrated, the better. We used data from the interim evaluation of the AES in the Netherlands (Boonstra et al., 2021). In this evaluation spatial concentration resulted in a map showing the proportion of the surroundings where conservation measures are implemented in an area of 500-m radius. We converted the data for spatial concentration into spatial concentration per collective.

Based on the discussion in the online focus group about the converted data for spatial concentration per collective and further research of literature, we agreed that there is no defined crossover point. For that reason, we looked for natural gaps in the distribution of the cases and used the direct method of calibration (Oana et al., 2021; Schneider and Wagemann, 2012) to determine the membership of the cases linked to the outcome. To find the thresholds for full membership (i), crossover point (c), and full non-membership (e) we used the threshold setter function of the Graphical User Interface of the QCA package in R (Dusa, 2019). In our analysis the identified thresholds were i = 52.322, c = 37.925 and e = 16.275. The raw and calibrated data for the outcome (SPACON) are presented in Appendix B.

4. Results

Using data on 36 Dutch farmer collectives, we set out to find out which combinations of the five selected characteristics of professionalisation (3.3.1) are necessary and/or sufficient to work towards spatial concentration (3.3.2). As a first step, we run the analysis of necessity to check whether there are necessary conditions present. In the second step, we run the analysis of sufficiency and interpret the so-called parsimonious solution. We performed the standard analysis with R software, QCA package (Dusa, 2019) and the SetMethods package, version 5.2.3 (Oana et al., 2018).

4.1. Necessary conditions

First, we conducted the *analysis of necessity* (Schneider and Wagemann, 2012) (see Table 3). A condition is necessary when that condition is always present when the outcome occurs (i.e. the outcome cannot be achieved without it) (Schneider and Wagemann, 2012; Oana et al., 2021). In the analysis of necessity, we checked the extent to which the empirical evidence indicated the presence of a necessary condition. For this purpose, we looked at the parameters of fit (Oana et al., 2021). Necessity is identified by two measures: consistency, which quantifies the strength of the relation, and coverage, which indicates the empirical relevance of the relationship to cases. A condition is regarded as necessary for explaining an outcome when the consistency of necessity is equal to or higher than 0.9 and coverage is greater than 0.6 (Schneider and Wagemann, 2012, p. 143). For necessary conditions, we also look at the relevance of necessity (RoN), which expresses the trivialness of the findings, where scores closer to 0 indicate higher trivialness, and scores closer to 1 indicate higher relevance (Oana et al., 2021; Bazzan et al., 2022b). The RoN should be greater than 0.5 (Oana et al., 2021). The analysis of necessity reveals that none of the conditions is strictly necessary to work towards spatial concentration.

Table 3
Necessary conditions for a positive outcome of spatial concentration.

Condition	Consistency (Cons.Nec.)	Coverage (Cov.Nec.)	Relevance (RoN)
Strategy for agrobiodiversity	0.650	0.739	0.737
Presence and use of systems enabling agrobiodiversity	0.803	0.721	0.569
Maintenance and development of qualifications of fieldworkers	0.914	0.703	0.366
Maintenance and development of qualifications of participants	0.756	0.766	0.700
Network capability	0.851	0.692	0.438
~Strategy for agrobiodiversity	0.485	0.753	0.847
~Presence and use of systems enabling agrobiodiversity	0.320	0.781	0.952
~Maintenance and development of qualifications of fieldworkers	0.146	0.655	0.944
~Maintenance and development of qualifications of participants	0.388	0.722	0.869
~Network capability	0.243	0.827	0.960

~ indicates the absence of the condition.

4.2. Analysis of sufficiency

We then conducted the *analysis of sufficiency*. Sufficiency means that a specific combination of conditions is enough to produce a certain outcome. We used consistency and coverage measures to evaluate the results of our analysis. Setting a consistency threshold is decisive for determining which configurations of conditions are sufficient. Since consistency values strongly depend on the specific dataset, truth table and case distributions, there are no fixed anchors for setting these thresholds. In this study, to evaluate the accuracy of the explanatory model for spatial concentration, we set the consistency threshold at 0.75 (Schneider and Wagemann, 2012). Table 4 shows four configurations towards spatial concentration based on the most parsimonious solution.

Configuration 1 shows that working on the maintenance and development of the participants' qualifications (DQPP) can enable farmer collectives to work on more spatial concentration (SPACON). This configuration explains 21 cases with membership in the set of spatial concentration. And for 9 of the cases this is the only pathway to enable spatial concentration.

Configuration 2 shows that having a strategy for agrobiodiversity (STRAB) in combination with maintaining and developing fieldworkers' qualifications (DQFW) can enable farmer collectives to work on more spatial concentration (SPACON). This configuration

Table 4
Four configurations to achieve spatial concentration (SPACON).

Conditions	Configurations			
	1	2	3	4
Strategy for agrobiodiversity (STRAB)		•		
Presence and use of systems enabling agrobiodiversity (ENSAB)			∅	
Maintenance and development of qualifications of fieldworkers (DQFW)		•	•	•
Maintenance and development of qualifications of participants (DQPP)	•			
Network capability (NETCAP)				∅
Cases	1, 3, 4, 5, 6, 8, 10, 11,17, 18, 19, 20, 21, 23, 25, 27, 29, 31, 32, 35, 36	2, 4, 6, 7, 10, 12, 18, 19, 21, 22, 25, 32, 34, 35	11, 20, 22, 28	1, 4, 16, 22
Consistency	0.766	0.769	0.810	0.869
PRI	0.709	0.696	0.718	0.797
Raw coverage	0.756	0.618	0.320	0.243
Unique coverage	0.183	0.068	0.014	0.014
Solution consistency	0.751			
Solution coverage	0.859			

PRI = proportional reduction in inconsistency • = causal condition present; ∅ = causal condition absent.

explains 14 cases. And for 4 of the cases this is the only pathway to enable spatial concentration.

Configuration 3 shows that the absence of using systems enabling agrobiodiversity (-ENSAB) in combination with maintaining and developing fieldworkers' qualifications (DQFW) can enable farmer collectives to work on more spatial concentration (SPACON). This configuration explains four cases. And for 1 case this is the only pathway to enable spatial concentration.

Configuration 4 shows the presence of the maintenance and development of the fieldworkers' qualifications (DQFW) in combination with the absence of network capability (-NETCAP) can enable farmer collectives to work on more spatial concentration (SPACON). This configuration explains four cases. And for 1 case this is the only pathway to enable spatial concentration.

5. Discussion

In this study we assessed which of the five selected characteristics of professionalisation contribute to more spatial concentration of conservation measures as a proxy for AES effectiveness. Below, we discuss the results of this study in relation to theoretical expectations and the aim of our study: the role of professionalisation of farmer collectives as part of the collective approach to work towards an effective AES. We also discuss the limitations of this research, also in view of how we operationalised and measured AES effectiveness, and give recommendations for future research that will assist policymakers and stakeholders.

5.1. The role of professionalisation of farmer collectives to work towards an effective AES

Table 4 shows that one of the professionalisation characteristics to work on as a collective to achieve spatial concentration is *maintenance and development of participants' qualifications (DQPP)*. For 21 farmer collectives it is one of the ways to achieve spatial concentration. This is in line with the expectations that farmer collectives have a key role in motivating farmers, using farmers' the local knowledge and the exchange of information between farmers to help ensure that the right conservation measures are located in the right place (Dijk et al., 2015; Runhaar et al., 2017; de Vries et al., 2019; Barghusen et al., 2021).

Furthermore, in the configurations 2, 3 and 4 it can be seen that for 19 collectives, one of the conditions to contribute to spatial concentration is *the maintenance and development of fieldworkers' qualifications (DQFW)*. As mentioned above, farmer collectives have a key role in motivating farmers to participate in AES, choose the right conservation measures, etc. This requires the people working in the executive organisation, the fieldworkers (i.e. regional coordinator, field officer, ecologist) of the farmer collective to be highly qualified. Limited research has been done on the influence of differences in the qualifications of fieldworkers on the effectiveness of AES. This study indicates that attention to maintaining and developing the qualifications of fieldworkers (DQFW) is important in order to work towards an effective AES.

Thirdly we find that the condition having a *strategy for agrobiodiversity (STRAB)* plays a role in one of the four configurations represented by 14 of the farmer collectives (Table 4). A common and shared strategic plan helps the farmer collectives to improve the habitat quality for the BHD target species. And having a strategic plan (STRAB) in combination with the condition DQFW is even better, because the knowledge of the fieldworkers (regional coordinator, field offices and ecologist) is important when developing the strategic plan, choosing the location of the conservation measures and motivating participants to participate in AES (cf. Dik et al., 2022).

We see that the absence of the condition *using enabling systems for agrobiodiversity (ENSAB)* plays a role in one configuration in combination with the presence of DQFW. This configuration is represented by only four farmer collectives. At first sight a surprising finding because enabling systems such as monitoring and evaluation and the subsequent adjustment of strategic plans would seem to contribute to spatial concentration of conservation measures (see e.g., Dik et al., 2022; Nagel et al., 2015). However, in this configuration, we assume the combination with the condition DQFW compensates for the absence of using enabling systems. In addition, when data was collected about professionalisation, the farmer collectives had been responsible for AES for only 3 years and had focused mainly on the mandatory certification process (Westerink et al., 2020), possibly paying less attention to the development of enabling systems (Dik et al., 2023).

Finally, in one configuration, also only represented by four farmer collectives, the condition *network capability (NETCAP)* is absent and DQFF is present. Even though literature suggests that a farmer collective with good network capabilities is able to achieve better preconditions for spatial concentration; for example, because of their relationship with the province they can arrange more budget (Dik et al., 2023; Westerink et al., 2020; Runhaar et al., 2017), we again assume fieldworkers' qualifications compensate for the absence of network capability.

5.2. Limitations and recommendations for further research

Although this research adds to our understanding of whether the professionalisation of farmer collectives enables an effective AES, it does have limitations. We looked at only five of the 18 characteristics of professionalisation (Dik et al., 2022) used in the earlier assessment of the 38 collectives (Dik et al., 2023). We expect all the characteristics of professionalisation to be interrelated (Dik et al., 2022; Dowling et al., 2014). By applying fsQCA we were able to analyse the relationship between some of the characteristics and how they contribute to an effective AES. But it was not possible to do an fsQCA with all characteristics and an intermediate number of cases (36), because in that situation too many combinations of characteristics could not be matched to a case (Oana et al., 2021). We therefore limited the number of characteristics to a maximum of five, based on the discussion in the online focus group, which we expected to have a direct impact on achieving an effective AES.

Moreover, we only considered the spatial concentration of conservation measures in open grassland as a measure of the outcome, an effective AES. However, it is evident that there are more aspects that define an effective AES (see Fig. 1), such as the specific biodiversity targets, the preconditions set by the province (e.g. the available budget, boundary of the habitat) and the biotic and abiotic conditions (e.g. soil type, hydrology, existing landscape elements), and also the choices made by the farmer collective about the type of conservation measures (e.g. rewetting, mowing and grazing, parcel size and predator control). We therefore recommend that our study is repeated in other contexts (e.g., arable farming) or using other proxies for AES effectiveness.

Despite the limitations, the use of fsQCA gives substantiated results for the relationship between professionalisation of farmer collectives and an effective AES. We expect that the results can be used by other organisations with a collective approach throughout Europe working on AES.

Repeating this research in the future could give additional insights, for example in combination with the evaluation of AES. But also in combination with other aspects of an effective AES, for example by defining an effective AES based on expert judgment or Delphi method. Another recommendation for further research is to expand the number of cases scrutinized so more characteristics of professionalisation can be involved: for example, to include other organisations with a collective approach from other EU member States working on AES.

5.3. Recommendations for policymakers and stakeholders

Based on configurations 1, 2, 3 and 4 (Table 4) it is important to work on maintaining and developing the qualifications of the staff of the executive organisations (the fieldworkers) and the participants. Occupational professionalisation is a continuous process of learning (Clarke and Hollingworth, 2002). Therefore, we recommend that.

- policymakers and collaborative organisations (e.g. the farmer collectives in the Netherlands) facilitate a learning environment for farmers and potential participants that is focused on the combination of social, motivating and development activities (Prager, 2022; Barghusen et al., 2021; Dik et al., 2023) but also, when necessary, evaluate the management activities of individual farmers to increase the effectiveness of AES (Dik et al., 2023; Prager, 2015).
- policymakers and stakeholders (for example BoerenNatuur, the umbrella organisation of Dutch farmer collectives) facilitate a knowledge programme for the staff of the executive organisations and think about the need for staff accreditation.

Based on configuration 2 we recommend collaborative organisations to work together with policymakers, stakeholders and participants at a strategy for agrobiodiversity, based on the (a-) biotical circumstances, to be able to make substantiated choices about conservation measures to improve the quality of the habitat. Provinces could set their preconditions based on these strategies for agrobiodiversity.

Based on configurations 3 and 4 we recommend policymakers to repeat this research in combination with the evaluation of AES. The farmer collectives will have more experience, so it will be interesting to see if the other characteristics of professionalisation have more influence on an effective AES.

6. Conclusion

A collective approach is important to achieve a more effective AES (Westerink et al., 2021; Franks, 2019; Runhaar et al., 2017). Whether a professional farmer collective achieves an effective AES was what this research aimed to find out. With help of the impact theory programme and a fsQCA we investigated which characteristics of professionalisation singly or in combination enable farmer collectives to work towards an effective AES. We looked at five characteristics of professionalisation: strategy for agrobiodiversity; presence and use of systems enabling agrobiodiversity; maintenance and development of fieldworkers' qualifications; maintenance and development of participants' qualifications; and network capability (Dik et al., 2022). As a measure of an effective AES we used the degree of spatial concentration of conservation measures in the habitat of open grassland.

Our research reveals that none of the five characteristics of professionalisation examined in this study are necessary or always needed to work towards more spatial concentration. We also found that the farmer collectives use different pathways to enable spatial concentration. In 60% of the cases, working on the maintenance and development of participants' qualifications is an important characteristic of professionalisation to enable more spatial concentration. Furthermore, we see that spatial concentration is enabled by different combinations of maintenance and development of fieldworkers' qualifications: first in combination with the presence of a strategy for agrobiodiversity (40% of the cases), second in combination with the absence of the presence and use of systems enabling agrobiodiversity and last in combination with the absence of network capability (both in 12% of the cases).

In general, we conclude that working to maintain and develop the quality of participants and fieldworkers was important to enable more spatial concentration by the farmer collectives as they had only been responsible for AES for 3 years. The farmer collectives are still working on their professionalisation, so it is to be expected that in the future we will see more combinations of characteristics that will enable more effective AES.

Declaration of generative AI and AI-assisted technologies in the writing process

The authors have not used Generative AI and AI-assisted technologies in the writing process.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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Appendix A. Assessment Framework

The assessment framework for characterising the degree of organisational professionalisation of farmer collectives (Dik et al., 2022).

Category	Characteristics		Indicators				
			1	2	3	4	5
Organisational	Strategy	A shared strategy (i.e. aspiration, goals and strategy) of which agrobiodiversity to achieve.	No strategy.	One or two parts of the strategy are partly common and shared.	One or two parts of the strategy are common and shared.	A complete strategy is partly common and shared.	A complete strategy is common and shared.
		A shared strategy (i.e. aspiration, goals and strategy) of the type of collective aspired to in order to realise the above.	No strategy.	One or two parts of the strategy are partly common and shared.	One or two parts of the strategy are common and shared.	A complete strategy is partly common and shared.	A complete strategy is common and shared.
	Structure	The organisation structure of the primary process of the organisation follows the strategy.	No clear structure.	Part of the farmer collective has a clear structure that does not follow the strategy.	The farmer collective has a clear structure not following the strategy.	Structure of the organisation partly follows the strategy.	Structure of the organisation follows the strategy.
		Shared leadership.	No shared leadership.	Shared leadership in 25% of the activities of the farmer collective.	Shared leadership in 50% of the activities of the farmer collective.	Shared leadership in 75% of the activities of the farmer collective.	Shared leadership.
		Segregation of duties between board and executive organisation.	No segregation of duties	For 25% of the board members there is a segregation of duties.	For 50% of the board members there is a segregation of duties.	For 75% of the board members there is a segregation of duties.	Complete segregation of duties.

Category	Characteristics		Indicators				
			1	2	3	4	5
Organisational	Enabling systems	Presence and use of systems to monitor and evaluate the agrobiodiversity.	No systems to monitor and evaluate the agrobiodiversity.	Has some systems and doesn't or only partly reflects and adjusts in light of the monitoring and evaluation of the collective's performance vis-à-vis its strategy.	Has some systems and regularly reflects and adjusts in light of the monitoring and evaluation of the performance vis-à-vis its strategy.	Has all systems and doesn't or only partly reflects and adjusts in light of the monitoring and evaluation of the collective's performance vis-à-vis its strategy.	Has all systems and regularly reflects and adjusts in light of the monitoring and evaluation of the collective's performance vis-à-vis its strategy.
		Presence and use of systems to monitor and evaluate the performance of the organisation.	No systems to monitor and evaluate the performance of the organisation.	Has some systems and doesn't or only partly reflects and adjusts in light of the monitoring and evaluation of the collective's performance vis-à-vis its strategy.	Has some systems and regularly reflects and adjusts in light of the monitoring and evaluation of the collective's performance vis-à-vis its strategy.	Has all systems and doesn't or only partly reflects and adjusts in light of the monitoring and evaluation of the collective's performance vis-à-vis its strategy.	Has all systems and regularly reflects and adjusts in light of the monitoring and evaluation of the collective's performance vis-à-vis its strategy.
	Learning organisation	Knowledge programme.	No programme for the transfer of knowledge within the organisation and for learning from others.	Minimal programme for the transfer of knowledge within the organisation and for learning from others.	Limited programme for the transfer of knowledge within the organisation and for learning from others.	Standard programme for the transfer of knowledge within the organisation and for learning from others.	Extensive programme for the transfer of knowledge within the organisation and for learning from others.
		Experimentation and innovation.	No experimentation and innovation.	Minimal experimentation and innovation.	Limited experimentation and innovation.	Standard experimentation and innovation.	Extensive experimentation and innovation.

The assessment framework for characterising the degree of occupational professionalisation of farmer collectives (Dik et al., 2022).

Category	Characteristics		Indicators				
			1	2	3	4	5
Occupational	Identification of qualifications	Qualifications identified for the various activities within the collective (members, board and	No identified qualifications available.	Identified qualifications are not adequately described and difficult to obtain.	Identified qualifications are not adequately described and obtained.	Identified qualifications are adequately described and difficult to obtain.	Identified qualifications are adequately described and obtained.

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(*continued*)

Category	Characteristics		Indicators				
			1	2	3	4	5
		employees) and people have these qualifications					
	Maintenance and development of qualifications	HR strategy available with follow-up interviews and the opportunity for personal development in order to maintain and develop qualifications. All participants, board members and employees participate.	No HR strategy.	Has a limited HR strategy. Members, board members and employees do not participate or participate only to a limited extent.	Has a limited HR strategy. Members, board members and employees all participate.	Has a clear HR strategy. Members, board members and employees participate only to a limited extent.	Has a clear HR strategy. Members, board members and employees all participate.

The assessment framework for characterising the degree of systemic professionalisation of farmer collectives (Dik et al., 2022).

Category	Characteristics		Indicators				
			1	2	3	4	5
Systemic	Network capability	Build, handle and exploit relationships based on trust and reciprocity.	Not able to build, handle and exploit relationships.	Able to build relationships based on trust.	Able to build and handle relationships based on trust.	Able to build, handle and exploit relationships based on trust.	Able to build, handle and exploit relationships based on trust and reciprocity.
	Policy-making capability	Identify opportunities and developments, active in setting the political agenda and awareness-raising, all in line with the strategy.	No policy-making capability.	Limited ability to identify opportunities and developments in line with the strategy.	Able to identify opportunities and developments in line with the strategy.	Able to identify opportunities and developments in accordance with the strategy but has limited activity in setting the political agenda and raising awareness.	Able to identify opportunities and developments in accordance with the strategy and is active in setting the political agenda and raising awareness.
	Entrepreneurial capability	1 Create opportunities for innovation, 2 Build coalitions and collaborate, 3 Exploit financial business opportunities and 4: Execute actions based on mutual understanding between a network of individuals and organisations.	No entrepreneurial capabilities.	Entrepreneurial capabilities in one of the four entrepreneurial capabilities.	Entrepreneurial capabilities in two of the four entrepreneurial capabilities.	Entrepreneurial capabilities in three of the four entrepreneurial capabilities.	Entrepreneurial capabilities in all four entrepreneurial capabilities.

Appendix B. Raw and calibrated data

Collective	Conditions										Outcome	
ID	STRAB		ENSAB		DQFW		DQPP		NETCAP		Spatial concentration (SPACON)	
	Raw	Calibrated	Raw	Calibrated	Raw	Calibrated	Raw	Calibrated	Raw	Calibrated	Raw	Calibrated
1	2	0.33	3	0.67	5	1	4	0.9	2	0.33	48.74472877	0.90139524
2	2	0.67	3	0.67	4	0.9	2	0.33	5	1	50.04595634	0.92265277
3	2	0.33	5	1	5	1	4	0.9	5	1	76.71153598	0.9964125
4	3	0.67	3	0.67	3	0.67	4	0.9	2	0.33	100	1
5	2	0.33	3	0.67	5	1	4	0.9	4	0.9	53.8587453	0.96298556
6	5	1	4	0.9	5	1	3	0.67	3	0.67	42.52594851	0.71929649
7	5	1	3	0.67	5	1	2	0.33	4	0.9	89.10242916	1
8	2	0.33	3	0.67	4	0.9	4	0.9	3	0.67	50.78589768	0.93278505
9	2	0.33	4	0.9	5	1	2	0.33	3	0.67	60.38752419	0.98998871
10	5	1	3	0.67	5	1	4	0.9	5	1	54.02659825	0.96418993
11	2	0.33	2	0.33	4	0.9	4	0.99	5	1	23.78133556	0.1274668
12	5	1	3	0.67	5	1	2	0.33	4	0.9	40.65620039	0.63612354
13	2	0.33	4	0.9	2	0.33	2	0.33	2	0.33	26.26793069	0.17003455
14	2	0.33	3	0.67	5	1	2	0.33	5	1	19.12565865	0.07197470
15	2	0.33	4	0.9	5	1	2	0.33	5	1	28.80204845	0.22430758
16	2	0.33	3	0.67	5	1	2	0.33	2	0.33	56.09047958	0.97622734
17	2	0.33	3	0.67	5	1	4	0.9	4	0.9	72.5639252	0.99916251
18	5	1	5	1	5	1	5	1	5	1	56.59941061	0.97852684

(*continued on next page*)

(*continued*)

Collective	Conditions										Outcome	
ID	STRAB		ENSAB		DQFW		DQPP		NETCAP		Spatial concentration (SPACON)	
	Raw	Calibrated	Raw	Calibrated	Raw	Calibrated	Raw	Calibrated	Raw	Calibrated	Raw	Calibrated
19	4	0.9	5	1	5	1	4	0.9	3	0.67	27.86316859	0.20287408
20	2	0.33	2	0.33	5	1	5	1	5	1	54.14851246	0.96504094
21	4	0.9	3	0.67	5	1	3	0.67	5	1	46.57067206	0.85423263
22	3	0.67	2	0.33	5	1	2	0.33	2	0.33	36.52364995	0.45249717
23	2	0.33	3	0.67	4	0.9	3	0.67	4	0.9	34.41197198	0.38277692
24	2	0.33	3	0.67	4	0.9	2	0.33	4	0.9	44.33507024	0.78767572
25	4	0.9	3	0.67	4	0.9	4	0.9	4	0.9	26.87424731	0.18199008
26	4	0.9	5	1	2	0.33	2	0.33	4	0.9	31.85030014	0.30445549
27	2	0.33	3	0.67	5	1	4	0.9	4	0.9	39.32649394	0.57117092
28	2	0.33	2	0.33	3	0.67	2	0.33	3	0.67	86.26361402	1
29	4	0.9	5	1	2	0.33	4	0.9	3	0.67	44.70060819	0.79990980
30	2	0.33	3	0.67	2	0.33	2	0.33	4	0.9	47.42009261	0.87456215
31	2	0.33	5	1	5	1	5	1	5	1	40.58323432	0.63266238
32	3	0.67	5	1	5	1	3	0.67	4	0.9	68.85120833	0.99821215
33	3	0.67	2	0.33	2	0.33	2	0.33	3	0.67	13.42542403	0.03449002
34	3	0.67	3	0.67	3	0.67	2	0.33	5	1	5.824455888	0.01254595
35	5	1	5	1	3	0.67	4	0.9	4	0.9	53.89464372	0.96324637
36	2	0.33	5	1	5	1	4	0.9	4	0.9	13.17839973	0.03338859

Conditions
STRAB = STRategy for Agro Biodiversity.
ENSAB = Presence and use of ENabling Systems for Agro Biodiversity.
DQFW = maintenance and Development of Qualifications of FieldWorkers.
DQPP = maintenance and Development of Qualifications of ParticiPants.
NETCAP = NETwork CAPability.

Appendix C. Results of the fsQCA

C.1 Truth table

Row no.	Conditions					OUT	Consistency		Cases
	STRAB	ENSAB	DQFW	DQPP	NETCAP		Incl	PRI	N
15	0	1	1	1	0	1	0.884	0.820	1
31	1	1	1	1	0	1	0.884	0.807	1
31	0	1	1	0	0	1	0.863	0.764	1
21	1	0	1	0	0	1	0.838	0.686	1
32	1	1	1	1	1	1	0.823	0.749	8
30	1	1	1	0	1	1	0.821	0.709	4
6	0	0	1	0	1	1	0.817	0.690	1
8	0	0	1	1	1	1	0.801	0.705	2
28	1	1	0	1	1	1	0.796	0.678	1
16	0	1	1	1	1	1	0.791	0.704	8
14	0	1	1	0	1	0	0.741	0.609	4
10	0	1	0	0	1	0	0.724	0.571	1
26	1	1	0	0	0	0	0.636	0.398	1
9	0	1	0	0	0	0	0.627	0.368	1
18	1	0	0	0	1	0	0.598	0.420	1
1	0	0	0	0	0	?	0	–	–
2	0	0	0	0	1	?	0	–	–
3	0	0	0	1	0	?	0	–	–
4	0	0	0	1	1	?	0	–	–
5	0	0	1	0	0	?	0	–	–
7	0	0	1	1	0	?	0	–	–
11	0	1	0	1	0	?	0	–	–
12	0	1	0	1	1	?	0	–	–
17	1	0	0	0	0	?	0	–	–
19	1	0	0	1	0	?	0	–	–
20	1	0	0	1	1	?	0	–	–
22	1	0	1	0	1	?	0	–	–
23	1	0	1	1	0	?	0	–	–
24	1	0	1	1	1	?	0	–	–
25	1	1	0	0	0	?	0	–	–
27	1	1	0	1	0	?	0	–	–

STRAB = STRategy for AgroBiodiversity, *ENSAB =* presence and use of systems ENabling.
AgroBiodiversity, *DQFW = maintenance and Development of Qualifications of Field Workers, DQPP = maintenance and Development of Qualifications of ParticiPants, NETCAP = NETwork CAPability*, *OUT = OUTput value*, *InclS = Inclusion Score*, *PRI = Proportional Reduction in Inconsistency*.

Table C1 presents the truth table, which systematically displays the complete range of logically possible configurations, with each row corresponding to a specific configuration. The truth table contains 2ˆk rows, where k represents the number of causal conditions in the explanatory model.

C.2 Solutions (outcome SPACON)

The analysis of sufficiency can operate three kinds of minimization. This operation, called logical minimization, is a procedure based on basic set theory: A*B*C + A*B*~C can be minimized to A*B. The first minimization treats only the configurations of the empirically true cases, resulting in a complex (or conservative) solution. The second minimization considers both empirically true configurations and logically possible but unobserved ones (logical remainders) to achieve the most parsimonious solution. The third minimization further includes only plausible logical remainders, aligning with theoretical expectations of the condition's contribution to the outcome, thereby providing informative yet general solutions that extend beyond specific instances (intermediate solutions). (For a detailed discussion, see Oana et al., 2021; Wagemann and Schneider, 2012.). Here we present the conservative and the intermediate solutions, while the most parsimonious solution is presented in the main text (see Section 4).

Conservative solution

```
M1: ENSAB*DQFW*DQPP + ~STRAB*~ENSAB*DQFW*NETCAP + ~STRAB*ENSAB*DQFW*~NETCAP +

STRAB*ENSAB*DQFW*NETCAP + STRAB*ENSAB*DQPP*NETCAP +

STRAB*~ENSAB*DQFW*~DQPP*~NETCAP -> SPACON


                                   inclS   PRI   covS   covU  cases
--------------------------------------------------------------------
1                   ENSAB*DQFW*DQPP  0.783  0.716  0.642  0.107   18
2         ~STRAB*~ENSAB*DQFW*NETCAP  0.811  0.725  0.256  0.029    3
3         ~STRAB*ENSAB*DQFW*~NETCAP  0.892  0.839  0.183  0.014    2
4           STRAB*ENSAB*DQFW*NETCAP  0.815  0.745  0.562  0.042   12
5           STRAB*ENSAB*DQPP*NETCAP  0.830  0.762  0.544  0.024    9
6   STRAB*~ENSAB*DQFW*~DQPP*~NETCAP  0.838  0.686  0.112  0.005    1
--------------------------------------------------------------------
                                 M1  0.777  0.719  0.756
```

Note: Thresholds for consistency sufficiency >0.75 (we set 0.75); PRI >0.5. 75% of cases is explained by the solution (coverage).

The conservative solution reveals that six paths are sufficient for the outcome to occur. The first path shows the presence and use of systems enabling agro-biodiversity (ENSAB) in combination with the presence of maintenance and development of qualifications of field workers (DQFW) and the presence of maintenance and development of qualifications of participants (DQPP). The second path shows the absence of strategy for agro-biodiversity (STRAB) in combination with the absence of use of systems enabling agro-biodiversity and the presence of DQFW and the presence of network capability (NETCAP). The third path shows the absence of STRAB in combination with the presence of ENSAB and the presence of DQFW with the absence of NETCAP. The fourth path shows the presence of STRAB in combination with ENSAB, DQFW and NETCAP. The fifth path shows the presence of STRAB in combination with the presence of ENSAB, DQPP and NETCAP. Finally, path six shows the presence of STRAB in combination with the absence of ENSAB, the presence of DQFW, the absence of DQPP and the absence of NETCAP.

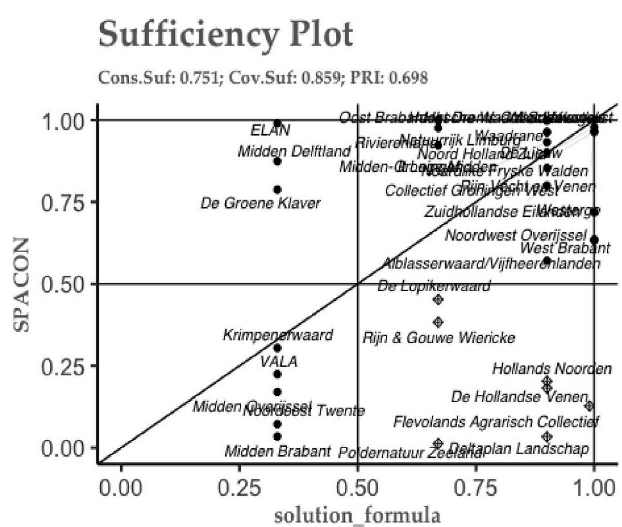
Intermediate solution

```
M1: STRAB*DQFW + ~ENSAB*DQFW*NETCAP + ENSAB*DQFW*~NETCAP +
    STRAB*ENSAB*DQPP*NETCAP + (ENSAB*DQFW*DQPP) -> SPACON


M2: STRAB*DQFW + ~ENSAB*DQFW*NETCAP + ENSAB*DQFW*~NETCAP +
    STRAB*ENSAB*DQPP*NETCAP + (DQFW*DQPP*NETCAP) -> SPACON


                                             ------------------ ------
                           inclS   PRI   covS   covU   (M1)   (M2)  cases
--------------------------------------------------------------------- -----
1             STRAB*DQFW  0.769  0.696  0.618  0.073  0.083  0.073    14
2      ~ENSAB*DQFW*NETCAP  0.827  0.744  0.315  0.014  0.029  0.014     3
3      ENSAB*DQFW*~NETCAP  0.897  0.840  0.238  0.014  0.014  0.029     3
4 STRAB*ENSAB*DQPP*NETCAP  0.830  0.762  0.544  0.024  0.024  0.024     9
--------------------------------------------------------------------- -----
5          ENSAB*DQFW*DQPP  0.783  0.716  0.642  0.000  0.093           18
6         DQFW*DQPP*NETCAP  0.759  0.690  0.669  0.032         0.124   18
--------------------------------------------------------------------- -----
                        M1  0.756  0.698  0.792
                        M2  0.749  0.692  0.824
```

Note: Thresholds for consistency sufficiency >0.75 (we set 0.75); PRI >0.5. 79% and 82% of cases are respectively explained by the two models (coverage). Model ambiguity. When faced with model ambiguity in QCA, one consideration when choosing between alternative models is the theoretical relevance of the conditions included. The model that best reflects and aligns with established theoretical perspectives may be preferred. We observe that path 5 and path 6 differ for only one condition: in path 5 we see the presence of ENSAB together with DQFW and DQPP while in path 6 we see the presence of DQFW together with DQPP and NETCAP. Against this background, we choose M2. More specifically, the presence of network capability can be seen as a better explanation for higher spatial concentration (path 6) compared to path 5. While both paths display the presence of DQFW coupled with DQPP, the presence of NETCAP signifies the ability to establish, sustain, and manage a network built on trust and reciprocity. Having a strong network, such as with nature organisations or the provincial authorities, enables farmer collectives to collaborate effectively, fostering spatial cohesion with nature areas.

C.3 XY plot for parsimonious solution (outcome SPACON)

DQPP + STRAB*DQFW + ~ENSAB*DQFW + DQFW*~NETCAP - > SPACON



In fsQCA, XY plots are employed to visualize the sufficiency relationships between conditions and outcomes. These plots provide a two-dimensional representation, where the solution is plotted against the outcome Y. Each case is represented as a dot on the plot, positioned based on its membership values in the solution and in the outcome set. Three guiding lines are commonly included in QCA XY plots: a diagonal line where X and Y values coincide (X = Y), illustrating cases where the condition and outcome have equal membership values; a horizontal line at Y = 0.5, which identifies differences in kind, indicating cases where the outcome is more present than absent; a vertical line at X = 0.5, used to identify differences in kind between cases in the condition set X. Any case below the main diagonal is a deviant case consistency in degree, while those in the lower right quadrant deviate both in degree and kind. Cases demonstrating Deviant Consistency in Kind offer more compelling evidence against a sufficiency claim compared to cases that deviate solely in degree. For a detailed discussion, see Oana et al., (2021).

C.4 Analysis of Necessity (negated outcome ~ SPACON)

	Cons.Nec	Cov.Nec	RoN
STRAB	0.696	0.414	0.555
ENSAB	0.829	0.390	0.376
DQFW	0.853	0.343	0.207
DQPP	0.715	0.380	0.467
NETCAP	0.902	0.384	0.280
~STRAB	0.561	0.456	0.715
~ENSAB	0.407	0.520	0.850
~DQFW	0.262	0.616	0.938
~DQPP	0.560	0.546	0.802
~NETCAP	0.278	0.493	0.892

No single necessary conditions for ~ SPACON.
Note: Thresholds for consistency necessity >0.9; coverage necessity >0.6, Relevance of Necessity >0.5.

C.5 Truth table (outcome ~ SPACON)

	STRAB	ENSAB	DQFW	DQPP	NETCAP	OUT	cases	inclS	PRI
9	0	1	0	0	0	1	1	0.783	0.632
26	1	1	0	0	1	1	1	0.759	0.602
18	1	0	0	0	1	0	1	0.709	0.580
10	0	1	0	0	1	0	1	0.632	0.429
21	1	0	1	0	0	0	1	0.606	0.239
14	0	1	1	0	1	0	4	0.597	0.391
6	0	0	1	0	1	0	1	0.592	0.310
28	1	1	0	1	1	0	1	0.570	0.322
30	1	1	1	0	1	0	4	0.560	0.285
13	0	1	1	0	0	0	1	0.557	0.236
8	0	0	1	1	1	0	2	0.525	0.295
31	1	1	1	1	0	0	1	0.514	0.193
16	0	1	1	1	1	0	8	0.487	0.273
15	0	1	1	1	0	0	1	0.472	0.180
32	1	1	1	1	1	0	8	0.472	0.249
1	0	0	0	0	0	?	0	–	–
2	0	0	0	0	1	?	0	–	–
3	0	0	0	1	0	?	0	–	–
4	0	0	0	1	1	?	0	–	–
5	0	0	1	0	0	?	0	–	–
7	0	0	1	1	0	?	0	–	–
11	0	1	0	1	0	?	0	–	–
12	0	1	0	1	1	?	0	–	–
17	1	0	0	0	0	?	0	–	–
19	1	0	0	1	0	?	0	–	–
20	1	0	0	1	1	?	0	–	–
22	1	0	1	0	1	?	0	–	–
23	1	0	1	1	0	?	0	–	–
24	1	0	1	1	1	?	0	–	–
25	1	1	0	0	0	?	0	–	–
27	1	1	0	1	0	?	0	–	–
29	1	1	1	0	0	?	0	–	–

STRAB = STRategy for AgroBiodiversity, ENSAB = presence and use of systems ENabling.
AgroBiodiversity, *DQFW = maintenance and Development of Qualifications of Field Workers, DQPP = maintenance and Development of Qualifications of ParticiPants, NETCAP = NETwork CAPability, OUT = OUTput value, InclS = Inclusion Score, PRI = Proportional Reduction in Inconsistency*.

C.6 Solutions (outcome ∼ SPACON)

Conservative solution

```
STRAB*ENSAB*~DQFW*~DQPP*NETCAP + ~STRAB*ENSAB*~DQFW*~DQPP*~NETCAP->~SPACON

                                      inclS   PRI   covS   covU   cases

--------------------------------------------------------------------------
1    STRAB*ENSAB*~DQFW*~DQPP*NETCAP  0.759  0.602  0.192  0.085       1
2  ~STRAB*ENSAB*~DQFW*~DQPP*~NETCAP  0.783  0.632  0.135  0.027       1
--------------------------------------------------------------------------
                                 M1  0.783  0.662  0.220
```

Note: Thresholds for consistency sufficiency >0.75 (we set 0.75); PRI >0.5. 22% of cases is explained by the solution (coverage). The analysis of sufficiency for the negated outcome (∼SPACON) shows in the conservative solution two paths sufficient for the outcome to occur: either the combination of the presence of STRAB with the presence of ENSAB, the absence of DQFW, the absence of DQPP and the presence of NETCAP or the combination of the absence of STRAB with the presence of ENSAB, the absence of DQFW, the absence of DQPP and the absence of NETCAP.

Intermediate solution

```
M1: STRAB*ENSAB*~DQFW*~DQPP + (~STRAB*~DQFW*~DQPP*~NETCAP) -> ~SPACON
M2: STRAB*ENSAB*~DQFW*~DQPP + (ENSAB*~DQFW*~DQPP*~NETCAP) -> ~SPACON
                                                        -------------------
                                inclS   PRI   covS   covU   (M1)   (M2)
 ------------------------------------------------------------------------
 1    STRAB*ENSAB*~DQFW*~DQPP  0.759  0.602  0.192  0.082  0.085  0.082
 ------------------------------------------------------------------------
 2  ~STRAB*~DQFW*~DQPP*~NETCAP  0.783  0.632  0.135  0.000  0.027
 3   ENSAB*~DQFW*~DQPP*~NETCAP  0.764  0.602  0.138  0.000         0.027
------------------------------------------------------------------------
                           M1  0.783  0.662  0.220
                           M2  0.783  0.662  0.220

                              cases
 ------------------------------------
1     STRAB*ENSAB*~DQFW*~DQPP      1
 ------------------------------------
2  ~STRAB*~DQFW*~DQPP*~NETCAP      1
3   ENSAB*~DQFW*~DQPP*~NETCAP      1
-----------------------------------
```

Note: Thresholds for consistency sufficiency <0.75 (we set 0.75); PRI <0.5. 23% of cases is explained by the solution (coverage). No sufficient path for the explanation of the negated outcome in the parsimonious solution. Consistency is below the 0.75 threshold and PRI is below 0.5.

Parsimonious solution

```
~DQFW*~NETCAP + STRAB*ENSAB*~DQFW*~DQPP -> ~SPACON

                              inclS   PRI   covS   covU   cases
---------------------------------------------------------------------------
1           ~DQFW*~NETCAP  0.671  0.473  0.146  0.036    1
2  STRAB*ENSAB*~DQFW*~DQPP  0.759  0.602  0.192  0.082    1
---------------------------------------------------------------------------
                        M1  0.717  0.570  0.228
```

Note: Thresholds for consistency sufficiency <0.75 (we set 0.75); PRI <0.5. 23% of cases is explained by the solution (coverage). No sufficient path for the explanation of the negated outcome in the parsimonious solution. Consistency is below the 0.75 threshold and PRI is below 0.5.

References

Angelstam, P., Manton, M., Yamelynets, T., et al., 2021. Maintaining natural and traditional cultural green infrastructures across Europe: learning from historic and current landscape transformations. Landsc. Ecol. 36, 637–663. https://doi.org/10.1007/s10980-020-01161-y.

Angelstam, P., Manton, M., Stjernquist, I., Gunnarsson, T.G., Ottvall, R., Rosenberg, M., Thorup, O., Wedholm, P., Elts, J., Gruberts, D., 2022. Barriers and bridges for sustaining functional habitat networks: a macroecological system analysis of wet grassland landscapes. Ecol. Evol. 12, e8801 https://doi.org/10.1002/ece3.8801.

Barghusen, R., Sattler, C., Deijl, L., Weebers, C., Matzdorf, B., 2021. Motivations of farmers to participate in collective agri-environmental schemes: the case of Dutch agricultural collectives. Ecosyst. People 17 (1), 539–555. https://doi.org/10.1080/26395916.2021.1979098.

Batáry, P., Dicks, L.V., Kleijn, D., Sutherland, W.J., 2015. The role of agri-environment schemes in conservation and environmental management. Conserv. Biol. 29 (4), 1006–1016. https://doi.org/10.1111/cobi.12536.

Bruges, G.d., 2014. Enhancing Territorial Cooperation for the Provision of Public Goods in the Context of the CAP Reform. Producer.

Bazzan, G., Daugbjerg, C., Candel, J., Pecurul, M., 2022a. Identifying institutional configurations for policy outcomes: a comparison of ecosystem services delivery. Pol. Stud. J. 1–27. https://doi.org/10.1111/psj.12476.

Bazzan, G., Alamos-Concha, P., Rihoux, B., 2022b. Identifying diverse paths toward successful policy performance in organization for economic Co-operation and development (oecd) and European union countries: a qualitative comparative analysis (QCA) exploitation of the sustainable governance indicators (SGI) data. Eur. Policy Analy. 8 (2), 178–208. https://doi.org/10.1002/epa2.1145.

Bazzan, G., Candel, J., Daugbjerg, C., 2023. Designing successful agri-environmental schemes: a mechanistic analysis of a collective scheme for eco-system services in The Netherlands. Environ. Sci. Pol. 146, 123–132.

Boonstra, F.G., Nieuwenhuizen, W., Visser, T., Mattijssen, T., van der Zee, F.F., Smidt, R. A., Polman, N., 2021. Collective Approach in Progress; Interim Evaluation of the Agri-Environment Scheme in the Netherlands. Wageningen Environmental Research. https://doi.org/10.18174/559899. Report 3066 (English).

Clarke, D., Hollingworth, H., 2002. Elaborating a model of teacherprofessional growth. Teach. Teach. Educ. 18 (8) https://doi.org/10.1016/s0742-051X(02)00053-7, 9470967.

De Snoo, G., Irina, H., Henk, S., Burton, R.J.F., 2013. Toward effective nature conservation on farmland: making farmers matter. Conservation Lett. 6 (1), 66–72. https://doi.org/10.1111/j.1755-263X.2012.00296.x.

De Vries, Jasper, R., Van der Zee, Eva, Beunen, Raoul, Kat, Rianne, Feindt, Peter H., 2019. Trusting the people and the system. The interrelation between interpersonal and institutional trust in collective action for agri-environmental management. Sustainability 11 (24), 7022. https://doi.org/10.3390/su11247022.

Dijk, W. F.A. van, Lokhorst, A.M., Berendse, F., de Snoo, G.R., 2015. Collective agri-environment schemes: how can regional environmental cooperatives enhance farmers' intentions for agri-environment schemes? Land Use Pol. 42, 759–766. https://doi.org/10.1016/j.landusepol.2014.10.005.

Dik, L., Westerink, J., van der Linde, A.W., Olieman, A., 2020. Zijn de agrarische collectieven voorbereid op de Toekomst? WUR and BoerenNatuur. Report Dutch.

Dik, L., Runhaar, H.A.C., Termeer, C.J.A.M., 2022. Farmer collectives for more effective agri-environmental schemes? An assessment framework based on the concept of 'professionalization'. Int. J. Agric. Sustain. 20 (4), 543–557. https://doi.org/10.1080/14735903.2022.1950389.

Dik, L., Westerink, J., van der Linde, A.W., Olieman, A., Termeer, C.J.A.M., Runhaar, H. A.C., 2023. Professional farmer collectives for agri-environmental management: an assessment. Int. J. Agric. Sustain. 21 (1) https://doi.org/10.1080/14735903.2023.2224648.

Dowling, M., Edwards, J., Washington, M., 2014. Understanding the concept of professionalisation in sport management research. Sport Manag. Rev. 17 (4), 520–529. https://doi.org/10.1016/j.smr.2014.02.003.

Dusa, Adrian, 2019. QCA with R. A Comprehensive Resource. Springer International Publishing. Cham, Switzerland.

European Commission, 2019. CAP Indicators: Biodiversity: Share of Land under Contract Supporting Biodiversity And/or Landscapes.

Franks, J.R., 2019. An assessment of the landscape-scale dimensions of land based environmental management schemes offered to farmers in England. Land Use Pol. 38, 147–159. https://doi.org/10.1016/j.landusepol.2019.01.044.

Gundumogula, M., 2020. Importance of focus groups in qualitative research. Int. J. Humanities Soc. Sci., Center Promoting Ideas 8 (11), 299–302. https://doi.org/10.24940/theijhss/2020/v8/i11/HS2011-082.

Haapakorpi, A., 2012. Work organization and professionalization in new media industry - the case of a Finnish company. Nordic J. Work. Life Stud. 2 (1), 23–39.

IPBES, 2018. The IPBES regional assessment report on biodiversity and ecosystem services for Europe and Central Asia. In: Rounsevell, M., Fischer, M., Torre-Marin Rando, A., Mader, A. (Eds.), Secretariat of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, p. 892. Bonn, Germany. https://www.ipbes.net/assessment-reports/eca.

IPBES, 2019. Global assessment report of the intergovernmental science-policy platform on biodiversity and ecosystem services. In: Díaz, S., Settele, J., Brondízio, E., Ngo, H. T. (Eds.), Secretariat of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, p. 1753. Bonn, Germany. https://ipbes.net/global-assessment.

Krueger, R.A., Casey, M.A., 2015. Focusgroups: A Practical Guide for Applied Reserach Edition 5. Sage Publications isbn 978-1-4833-6524-4.

Laasonen, V., Kolehmainen, J., 2017. Capabilities in knowledge-based regional development–towards a dynamic framework. Eur. Plann. Stud. 25 (10), 1673–1692. https://doi.org/10.1080/09654313.2017.1337727.

Marja, R., Tscharntke, T., Batáry, P., 2022. Increasing landscape complexity enhances species richness of farmland arthropods, agri-environment schemes also abundance – a meta-analysis. Agric. Ecosyst. Environ. 326, 107822.

McMahon, B.J., Doyle, S., Gray, A., Kelly, S.B., Redpath, S.M., 2020. European bird declines: do we need to rethink approaches to the management of abundant generalist predators? J. Appl. Ecol. 57 (10), 1885–1890. https://doi.org/10.1111/1365-2664.1.

Melman, T.C.P., Schotman, A.G.M., Meeuwsen, H.A.M., Smidt, R.A., Vanmeulebrouk, B., Sierdsema, H., 2016. Ex-ante-evaluatie ANLb-2016 voor lerend beheer : een eerste blik op de omvang en ruimtelijke kwaliteit van het beheer in het nieuwe stelsel (1566-7197). Retrieved from Wageningen: http://edepot.wur.nl/392331.

Nagel, S., Schlesinger, T., Bayle, E., Giauque, D., 2015. Professionalisation of sport federations – a multi-level framework for analysing forms, causes and consequences. Eur. Sport Manag. Q. 15 (4), 407–433. https://doi.org/10.1080/16184742.2015.1062990.

Oana, I.E., Schneider, C.Q., 2018. SetMethods: an add-on R package for advanced QCA. R J. 10 (1), 507-33. https://journal.r-project.org/archive/2018/RJ-2018-031/index.html.
Oana, I.E., Schneider, C.Q., Thomann, E., 2021. Qualitative Comparative Analysis Using R: a Beginner's Guide. Cambridge University Press.
Prager, K., 2015. Agri-environmental collaboratives as bridging organisations in landscape management. J. Environ. Manag. 161, 375–384. https://doi.org/10.1016/j.jenvman.2015.07.027.
Prager, K., 2022. Implementing policy interventions to support farmer cooperation for environmental benefits. Land Use Pol. 119 https://doi.org/10.1016/j.landusepol.2022.106182.
Runhaar, H.A.C., Melman, T.C.P., Boonstra, F.G., Erisman, J.W., Horlings, L.G., de Snoo, G.R., Arts, B.J.M., 2017. Promoting nature conservation by Dutch farmers: a governance perspective. Int. J. Agric. Sustain. 15 (3), 264–281. https://doi.org/10.1080/14735903.2016.1232015.
Schneider, C.Q., Wagemann, C., 2012. Set-theoretic Methods for the Social Sciences: A Guide to Qualitative Comparative Analysis. Cambridge University Press.
Schomers, S., Meyer, C., Matzdorf, B., Sattler, C., 2021. Facilitation of public Payments for Ecosystem Services through local intermediaries: an institutional analysis of agri-environmental measure implementation in Germany. Environ. Policy Gover. https://doi.org/10.1002/eet.1950.
Tanentzap, A.J., Lamb, A., Walker, S., Farmer, A., 2015. Resolving conflicts between agriculture and the natural environment. PLoS Biol. 13 (9), e1002242 https://doi.org/10.1371/journal.pbio.1002242.
Triste, L., Vandenabeele, J., Lauwers, L., Marchand, F., 2020. Strategies for expansive learning in sustainable farming initiatives: a CHAT analysis of a Dutch case. Int. J. Agric. Sustain. 18 (5), 392–409. https://doi.org/10.1080/14735903.2020.1787619.
Vaessen, J., Todd, D., 2008. Methodological challenges of evaluating the impact of the Global Environment Facility's biodiversity program. Eval. Progr. Plann. 31 (3), 231–240. https://doi.org/10.1016/j.evalprogplan.2008.03.002.
Weggeman, M.C.D.P., 1992. Kenmerken Van Professionele Organisaties. Management in Het Hoger Onderwijs Alphen Aan Den Rijn.
Westerink, J., Jongeneel, R., Polman, N., Prager, K., Franks, J., Dupraz, P., Mettepenningen, E., 2017. Collaborative governance arrangements to deliver spatially coordinated agri-environmental management. Land Use Pol. 69, 176–192. https://doi.org/10.1016/j.landusepol.2017.09.002.
Westerink, J., Termeer, C., Manhoudt, A., 2020. Identity conflict? Agri-environmental collectives as self-governing groups of farmers or as boundary organisations. Int. J. Commons 14 (1), 388–403. https://doi.org/10.5334/ijc.997.