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Research article



Overcoming barriers to agri-environmental management at landscape scale: Balancing farmer coordination and collaboration with the aid of facilitators and pioneers

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ABSTRACT

Policy instruments that integrate the actions of multiple farmers are of growing interest for improving landscape scale environmental sustainability of agriculture. We conducted in-depth, semi-structured interviews with farmers in south-east England and applied thematic analysis to the responses to perform a qualitative investigation into the combined role of economic, social, and cultural barriers to cooperative environmental management, and identify possible solutions for these barriers. Interviewees recognised environmental benefits of cooperative management, but this was a low priority compared to other management activities, being seen as complex and time-consuming, with uncertainty over direct benefits to participants. External coordination could address this by overseeing information sharing on cooperation benefits and minimising the logistical burden for participants, but given farmer mistrust of outside intervention, these projects will be more successful when collaborating farmers feel they are in control. The efforts of both pioneering farmers able to initiate projects with their peers, and respected facilitators who embody local knowledge and experience, will be vital for balancing coordination and collaboration. Finding the optimal balance between these different elements will vary with local circumstances: policy should have the flexibility to accommodate this. Farmers were wary of connecting with others possessing different farming ideals and thus having to compromise on their management approach. Some respondents sought to bridge these gaps by focusing on aspects of farming identities they shared with their peers, raising the possibility that support targeting these individuals will help develop relationships that foster lasting cultural change for farmer cooperative environmental management.

1. Introduction

Agricultural policy reforms have promoted agri-environment schemes (AES) to counter environmental harms of agricultural intensification (Hodge et al., 2015). Despite evidence for the effectiveness of AES in improving biodiversity and ecosystem service provision at the local level, the negative externalities of agriculture continue to prevent the achievement of sustainability goals at regional and national levels (Arnott et al., 2019; Pe'er et al., 2014; van Dijk et al., 2016). Researchers have attributed this limited effectiveness to, among other factors, the dominance of AES designed around farm level actions, and the relative lack of schemes supporting landscape level management, so that beneficial interventions of participating farmers occur in a fragmented pattern across the landscape (Lefebvre et al., 2015; Leventon et al., 2017). Landscape scale management in the form of the spatially targeted application of mutually beneficial practices across different landholdings can enhance ecosystem service delivery from agriculture, because many of the ecological processes targeted by AES transcend farm ownership boundaries (Dallimer et al., 2012; Dragosits et al., 2006; Lawton et al., 2010; Mckenzie et al., 2013). Consequently, the scientific community has identified spatial planning and collective implementation of landscape level measures, integrating the actions of multiple farmers, as a priority for developing environmentally sustainable agriculture (Lefebvre et al., 2015; Pe'er et al., 2020).

The policy instruments and mechanisms designed to address this need for landscape scale management vary in the extent to which they

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depend on close cooperation among farmers (Prager, 2015a). Some could enhance landscape level performance with relatively little direct collaboration between farmers, including spatial targeting of AES, guidance from environmental organisations to support applications for schemes involving locally appropriate practices, or financial incentives conditional on scheme uptake by neighbours (Banerjee et al., 2017; Cullen et al., 2018; Franks and Emery, 2013; Nguyen et al., 2022). Alternatively, rather than farmers entering scheme agreements on an individual basis, agreements can span multiple landholdings, requiring them to cooperate more closely on joint applications for agri-environmental funding. This may mean applicants must proactively identify cooperative partners (Emery and Franks, 2012; Prager, 2015a), or this could be achieved via pre-existing agricultural collectives responsible (Barghusen et al., 2021). Besides direct monetary rewards, support for these initiatives can involve bringing together potential collaborators, assisting with applications, aiding information exchange and financial management (Emery and Franks, 2012). Such cooperative management among farmers can generate long-lasting beneficial environmental outcomes at the landscape scale, but depending on context, it may not always be the most cost-effective mechanism for this purpose (Prager, 2022). Therefore, to maximise the impact of instruments for cooperative management, it is important to identify the conditions for their success, and in particular, their design and implementation should be informed by an in-depth understanding of farmer attitudes towards cooperation for landscape management.

Extensive research has been conducted to assess the role of different factors influencing farmer decisions to implement environmental practices at the farm level (Dessart et al., 2019; Mills et al., 2018; Schaub et al., 2023), but farmer willingness to cooperate for the delivery of landscape scale environmental objectives is less well understood, with fewer publications explicitly addressing this topic to date (Barghusen et al., 2021; Jones et al., 2023; Sander et al., 2024). While many studies have considered farmer cooperation for the production and sale of agricultural produce, their findings may be less relevant to environmental management as the nature of farmer cooperative relationships varies with cooperation purpose (Jarrett et al., 2015; Riley et al., 2018). Those studies that have evaluated farmer attitudes towards cooperative AES suggest that despite widespread recognition of the environmental value of these schemes, this does not necessarily translate into enthusiasm for participation in practice (Franks et al., 2016; Franks and Emery, 2013; Tyllianakis et al., 2023).

Among the influences identified for farmer land management decisions at farm level, economic and structural factors have been most prominent in guiding policy design, but the literature indicates that these factors are complemented by various social, cultural, and other contextual factors less commonly reflected in policy (Brown et al., 2021). Not all farmer environmental management activities are solely motivated by financial incentives (Mills et al., 2018), and policy and advice that target farmers' underlying beliefs and values may be more likely to foster long-term change for agricultural sustainability than a reliance on regulations and financial incentives that are typically more short-term drivers of change and at risk from declining public finances (Mills et al., 2017). Measures exclusively informed by economic drivers of farmer behaviour can be insufficient to fully understand barriers to cooperation and may reduce farmer willingness to work in groups long-term, for truly collective reasons (Brown et al., 2021; Kasabov, 2016; Wynne-Jones, 2017).

There is therefore, increasing interest in using social and cultural insights to complement economic approaches and build a more holistic understanding of drivers for cooperation to inform AES design (Brown et al., 2021; Kasabov, 2016; Wynne-Jones, 2017). This includes a growing body of studies considering how cooperation reconciles with farmer self-identities that provide context to farmer decisions and shape worldviews (Emery et al., 2017). This reflects broader trends in the literature on farmer decision-making, which has expanded beyond a focus on goals, attitudes, and values (Gasson, 1973) to place more emphasis on social and cultural capital, cultural identity, and individual variation (Burton et al., 2008; Sutherland and Darnhofer, 2012). There is a need for research to explore how these different types of barriers, economic, social, and cultural, may collectively influence farmer relationships with landscape level AES, and so inform policy measures to mitigate any resistance.

England provides an interesting case for investigating this topic: here, ideas of landscape have been deeply embedded in cultural assumptions of sustainable agriculture, informing the design of successive generations of AES. Assessments of landscape character have seen widespread use in AES targeting, to ensure sensitivity to local landscape context (Herlin and Sarlöv Herlin, 2016). While collective management is not as deeply embedded in policy as in some other European nations (Barghusen et al., 2021), English AES have increasingly made funds available to orient farmers towards thinking about landscape level goals, including to support individuals to develop farmer clusters and manage group efforts to deliver environmental benefits beyond what could be achieved by farmers independently (Franks, 2019). One of the intentions of post-Brexit policy reform was to expand this objective using the 'Local Nature Recovery' and 'Landscape Recovery' programmes to provide additional funding for farmers cooperating to deliver transformative environmental outcomes at landscape scale (DEFRA, 2020). While the Landscape Recovery programme was rolled out as planned, Local Nature Recovery was shelved and replaced by an extension of the existing Countryside Stewardship scheme, prompting some concerns that this represented a downgrading of ambitions for landscape scale projects (Harvey, 2023).

We sought to take advantage of this evolving national policy context and use qualitative interviews to investigate attitudes to landscape scale environmental management among a diverse group of farmers in south-east England. Through thematic analysis of interview responses, we explored farmer understanding of the value of cooperative AES, the factors affecting their willingness to be involved in these schemes, and what these suggest about options for increasing farmer engagement, and the circumstances under which cooperative management may be helpful for improving landscape scale environmental performance. In doing so, we reiterate the existence of a gap between farmer understanding and engagement in cooperative environmental management and show how this gap can be explained in terms of a combination of economic, social, and cultural barriers to participation. By considering how these barriers operate, individually and in combination, we identify priorities for tackling farmer resistance, including finding a balance between coordinating and empowering farmers, and supporting pioneering farmers and local facilitators in achieving this balance.

2. Methods

This study is based on in-depth qualitative interviews with farmers in south-east England. Respondents were drawn from a wide area stretching from the North Kent plain (fertile soils, primarily arable and horticultural land) to the High Weald (less productive soils, dominated by small beef and dairy farms) (High Weald Joint Advisory Committee, 2019; Natural England, 2015) (Fig. 1). Our study area overlapped with the National Landscapes of the Kent Downs and High Weald, where the management bodies of these designated landscapes are facilitating projects and supporting farmer networks for landscape scale environmental performance (High Weald Joint Advisory Committee, 2024; Kent Downs AONB, 2021; Tuson, 2021).

Interviewees were chosen using chain referral and purposive sampling (Marshall, 1996; Newing et al., 2011). Farmer relationships with cooperative management will reflect their experiences of it (de Vries et al., 2019; Prager, 2022), so we sought to interview farmers with differing histories of cooperative management. To achieve this, we first asked individuals involved in bringing farmers together and providing guidance on landscape scale management (including representatives of water companies, conservation organisations, designated landscape

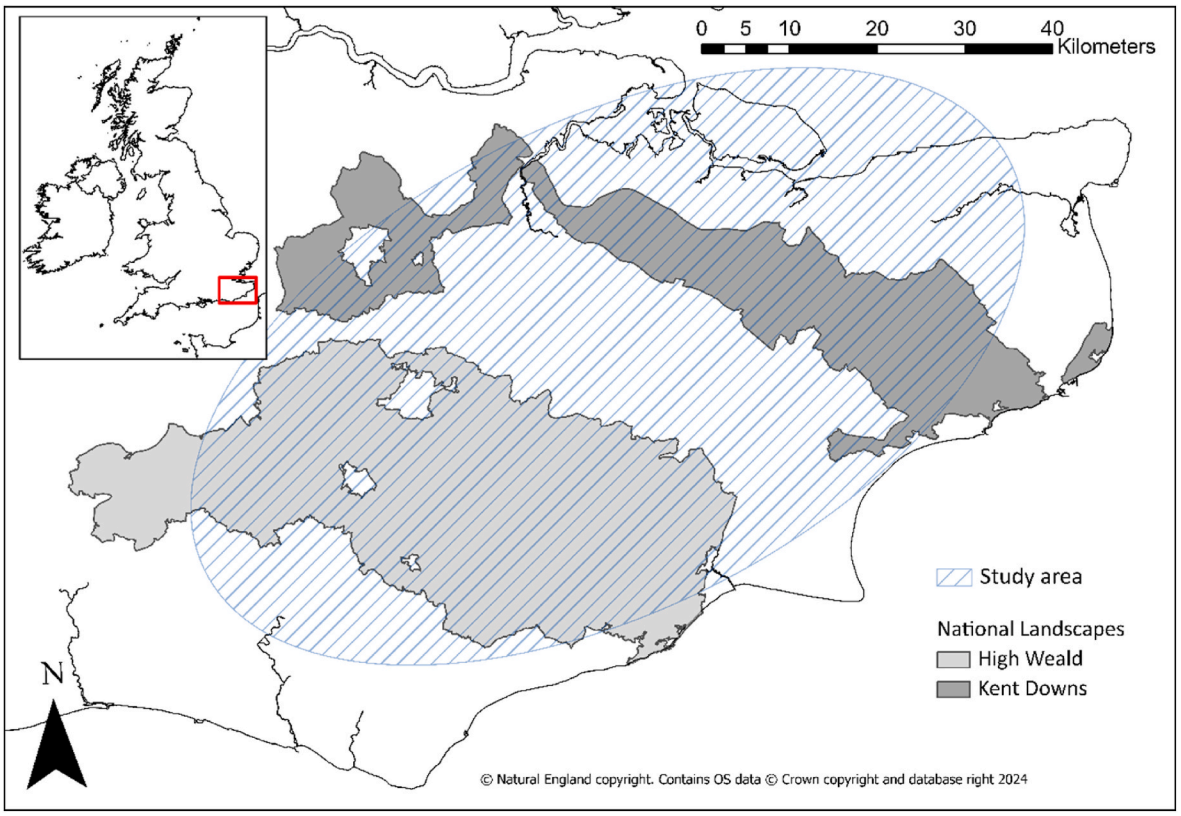


Fig. 1. Map of the study area from which interviewees were sampled, showing location in relation to the rest of the UK, and overlap with the High Weald and Kent Downs National Landscapes.

management bodies), to suggest highly engaged farmers for interview. We then used chain referral to access less engaged farmers, asking our initial interviewees to suggest farmers that they would expect to possess contrasting views. From the suggestions provided, we deliberately selected respondents to maximise the variety of production systems, farming approaches, and personal backgrounds, helping ensure that we could investigate the roles of different factors influencing relationships with cooperative management in different contexts, and generate a sample that would encompass some of the diversity of viewpoints among farmers in this region.

Sampling continued until saturation: when further interviews no longer contributed any substantially different perspectives on the topics of interest. Analysing interviews throughout data collection allowed us to monitor the occurrence of new themes in responses and so identify the saturation point (Lewis-Beck et al., 2004). We continued recruiting respondents up to the point at which three consecutive interviews generated no new major thematic codes, and when each major theme was addressed in multiple interviews, sufficient to inform a robust understanding of its significance (Francis et al., 2010; Hennink et al., 2017).

Table 1 summarises key features of the final sample. These 18 farmers encompassed a variety of farm sizes, production systems, and approaches, including conservation and organic agriculture, alongside more conventional farms. Interviewees differed with regards to whether they were currently participating in AES, had participated in the past, or had never participated, and represented a range of backgrounds: 13 had a family history of farming, while 5 were new entrants. There was a roughly forty-year age gap between the youngest and oldest interviewee, and the sample included men and women.

Before recruiting participants, an ethical review was completed for the research, and prior to each interview, participants were briefed on the nature of their research, including their anonymity and how their responses would be used. We used a semi-structured interview design, involving in-depth conversations structured around a schedule covering a set of topics, focused on perceptions of cooperation for environmental management at the landscape scale. The interviews lasted between 40 and 90 min.

The interviews were conducted during March 2020 (to pilot the

Table 1
Characteristics of farmers (and their farms) selected for interview.

Farmer characteristics		No. of respondents	Farm characteristics		No. of respondents
Age	<40	5	Farming approach	Conventional	12
	40–59	7		Organic	3
	≥ 60	6		Conservation/Regenerative	3
Sex	Male	13	Area managed (hectares)	<100	4
	Female	5		100–999	9
Background	New Entrant	5		≥1000	5
	Family farming background	13	Farm type	Arable	4
AES participation	Never	3		Grassland	4
	Previously	3		Fruit and vegetables	3
	Currently	12		Mixed	7

interview design) and from November 2020 to February 2021. Restrictions on travel and social gatherings under the Covid-19 pandemic meant that a mix of in-person (8) and video-call based (10) interviews were used. Rural researchers making the case for conducting farmer interviews in situ have emphasised the potential for visual cues in the farm environment to foster new insights and unforeseen narratives (Mackay et al., 2018; Thomas et al., 2019). Being physically present at the farm for at least some interviews was occasionally useful in allowing our respondents to illustrate their perceptions of landscape scale management with reference to views or maps of the local area. However, given that our questions often focused on farmer social contexts and often hypothetical interactions with others, necessitating more abstract thinking and discussion, going beyond specific physical features of the farm environment, we still expect our remote interviews to provide meaningful information to address our research topic, and perform similarly to in-person interviews in terms of data quality and respondent disclosure (Dubé et al., 2023; Jenner and Myers, 2019).

Our exploration of the challenges and opportunities involved in engaging farmers with cooperative environmental management was informed by a framework for environmental psychology developed by Hamann et al. (2016) from a behavioural model proposed by Matthies (2005). This framework defines three types of factor influencing decisions to engage in pro-environmental behaviours: 1) the individual's personal ecological norms (their perceived obligation to behave in an environmentally friendly way), 2) the balance of the costs and benefits of the action, and 3) the social norms guiding the individual's behaviour (both in terms of conforming to the standards of their peers, and personal beliefs about the right way to behave). In the context of the farmer interviews, personal ecological norms were explored by investigating the extent to which respondents could understand the value of cooperation for landscape scale management, and their role in contributing towards this. Whether this understanding was likely to translate into positive action could then be explored by assessing how farmers perceived the personal costs and benefits of participating in cooperative projects, and how actual or hypothetical participation reflected attitudes to social norms, including cultural ideals about what 'good farming' is and how this influenced their relationships with their peers (Sutherland and Burton, 2011).

Participants were asked for their reactions to cooperating for environmental management, and the role of cooperation in farming more generally, and the factors influencing their willingness to engage in these activities. Since the interviews were conducted at a time when both Brexit and the Covid-19 pandemic were dominant topics in the agricultural sector, we also asked participants about the role of these factors in farming, to understand how these current issues could be influencing responses.

All participants consented for their interviews to be recorded, and the recordings were transcribed verbatim. Every transcript was read multiple times and coded manually to identify overarching patterns or themes. For the pilot interviews, this thematic analysis was based on a data-driven, inductive approach, in which coding was done without a predetermined coding framework, nor, as far as possible, researcher preconceptions about the subjects covered (Braun and Clarke, 2006). The resulting basic coding framework was then applied to the analysis of the remaining interviews, and further refined. For the purposes of reporting key quotes representative of particular themes, each respondent has been assigned a number between 1 and 18 (i.e., R1, R2, R3 etc.).

3. Results

3.1. Personal ecological norms: recognising the value of cooperation for landscape-scale management

Respondents identified a range of approaches for achieving landscape-scale management, including habitat creation and restoration to increase connectivity, managing farm infrastructure such as watercourses and hedgerows, promoting spatial heterogeneity, and the spatial zoning of management for different outcomes in different areas. Equally, respondents often acknowledged that their own farm could only achieve so much in using these approaches to deliver environmental benefits at scale, hence the need for farmers to work together:

> "*We've got a quite a large marsh area going through, and we can do better as a group of farmers through the area, to improve environmental impacts* […] *if they're not all working together, all the way through, what's the point? We've got a hundred and twenty hectares down there, and we can do what we want. But if it's not being, the wildlife, the birds migrating …*" (R10)

> "*I can do stuff on my farm which will encourage* [dung beetles]*, but if no-one else around me is doing it, then it's a drop in the ocean.* […] *obviously, insects and animals and birds and things, don't just stay on one farm, they migrate and travel around, they find food everywhere.*" (R15)

In these examples, cooperation is necessary because of the way environmental features – habitats and wildlife – span multiple farms. Across interviews, farmers described how features such as species populations, public access networks, and flows of water or nutrients, cross farm boundaries. They understood that this meant management for these features on one farm has little value if their neighbours are not "*all working together*". This was reinforced by the geography of land ownership: "*no one farm is ring-fenced and satellited on their own. We're all intertwined, pockets of land owned and not owned*" (R16). This 'intertwining', with complex ownership boundaries and farms comprising dispersed landholdings, not necessarily aligning with physical geography, meant responsibility for management of natural features was divided between many landowners. Achieving a coherent management approach for the whole feature would require a cooperative effort.

However, this understanding did not always translate into action. Respondents often expressed reluctance to participate in these projects, reflecting the economic costs and benefits of cooperative management, access to information on these costs and benefits, and social and cultural issues concerning how farmers relate to others and perceive their role. Some key challenges (and possible solutions) are summarised in Figs. 2 and 3 and described in more detail in sections 3.2 to 3.5 below.

3.2. Costs and benefits: cooperation as costly and time-consuming

Cooperation to enhance landscape level environmental performance was often viewed as a low priority:

> "*I'm trying to link bits of my land with bits of cover and things like that, that's my strategy. Whether my neighbours do it, that's out of my control* […] *I've got enough on worrying about my farm, making sure I'm doing the right thing* […] *it's all very well cooperating in that sense, but I don't have enough time in my day to be going to meetings all day and discussing what would you do here and how would you link it in with this and that. It becomes very complicated.*" (R6)

As expressed by R6, respondents typically felt that their own farm required all their time and energy to manage. R6 valued landscape-scale approaches, as evidenced by efforts to increase connectivity on their own farm, but cooperating for this purpose was perceived as onerous and time-consuming, requiring careful planning: participants must implement management in exactly the right places relative to each other to "*link it in with this and that*". This alignment is expected to be "*very complicated*" to organise, meaning increased time spent discussing management with partners, that would be better spent on tasks more directly relevant to their own farm's performance.

While cooperation for landscape-scale environmental performance was a low priority, several respondents identified cooperation specifically to increase farming profitability, such as sharing or exchanging resources and equipment, as worthwhile and cost-effective. Equally,

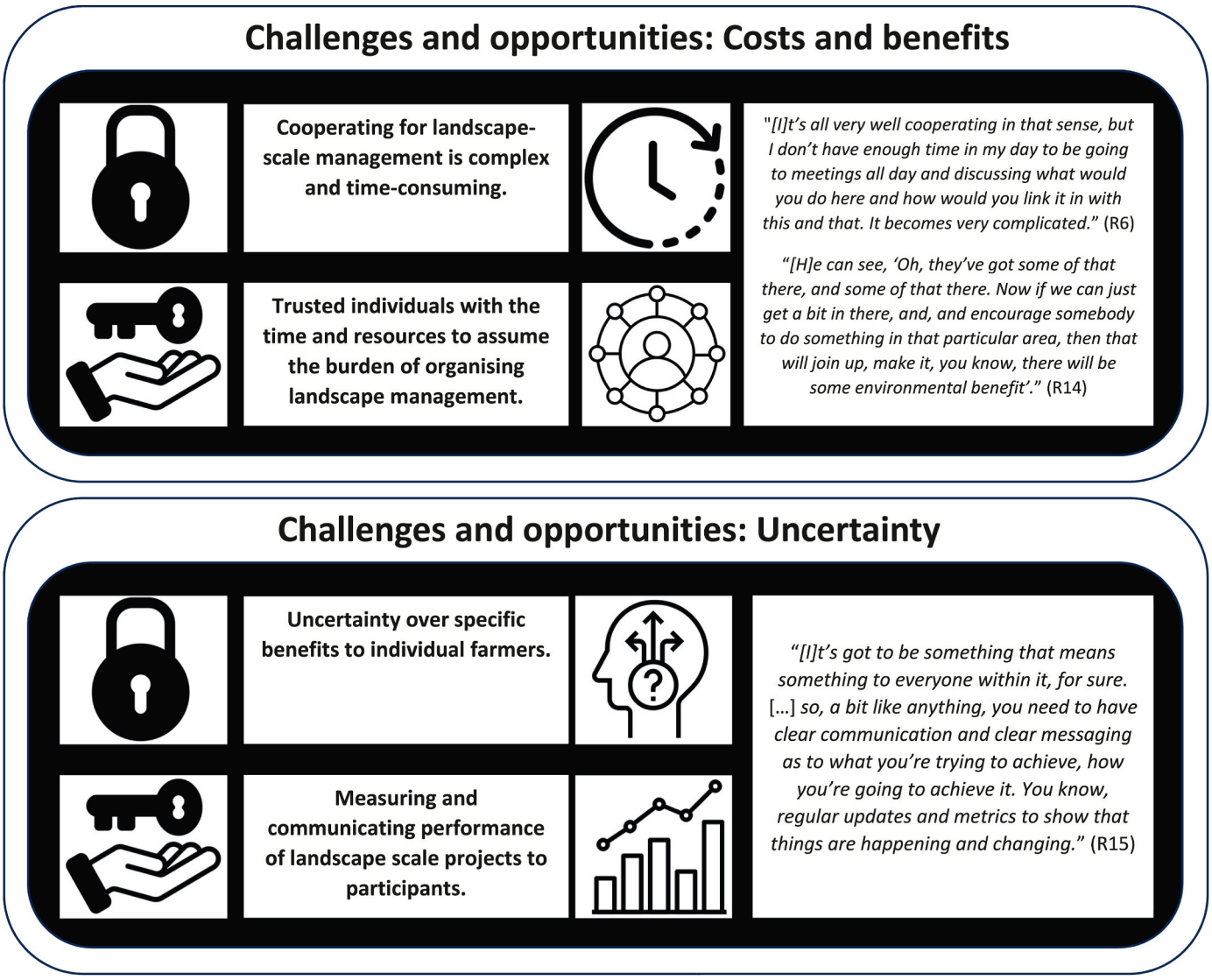


Fig. 2. Key challenges (and potential solutions) relating to costs and benefits, and farmer uncertainty over these costs and benefits, for delivering cooperative landscape-scale environmental management, as identified by respondents (see sections 3.2 and 3.3).

environmental management on a farmer's own farm was seen as more straightforward and rewarding compared to cooperative environmental management. This focus on their own land was partly due to the structure of financial incentives, but also an understanding that their farm's environmental condition clearly underpinned its profitability: "*it's in a farmer's interest to look after their farm as best as they can, because they want their farm to be profitable*" (R17).

Reducing participation costs could be achieved by getting a third party to assume the logistical burden of organising management across farms. Respondents linked the complex nature of cooperation for landscape scale outcomes with the need for external coordination:

> "*… kind of unofficially, one of the advisors, has got a grand scheme to sort of link up a lot of these environmental activities, on the various farms […] he's got this unofficial sort of masterplan, […] he can see, 'Oh, they've got some of that there, and some of that there. Now if we can just get a bit in there, and encourage somebody to do something in that particular area, then that will join up, there will be some environmental benefit*'." (R14)

In this example, an external advisor is key to synthesising information on environmental activities and evaluating this information to identify needs and opportunities. Unlike the farmers, the advisor has the time and resources to get to grips with this complexity, and highlight the contributions required from each farmer to fill in the gaps in ecological networks.

With regards to increasing the benefits for participants, respondents could point to the necessity for adequate financial incentives:

> "*So, it would be hard, and that's why you, ultimately, it's going to have to be a financial incentive to do that.* […] *You may get two or three, and we would probably be able to do it with a couple of our neighbours down there, but I'm sure you wouldn't be able to get the whole, unless there was a good, it's going back to having a good reward*" (R10)

Here, the demanding nature of cooperative environmental management is linked to the need for a 'good reward' that properly reflects the fact that this will be 'hard' to achieve. Only by providing sufficient funds to appropriately compensate farmers for these difficulties, will the barrier to entry be low enough to achieve the widespread uptake necessary to apply a consistent approach across a large continuous area. However, R10 anticipates limited engagement with some neighbours even without a 'good reward', suggesting that participation may not be solely dependent on incentive monetary value, and other factors need accounting for to fully understand the drivers and barriers involved.

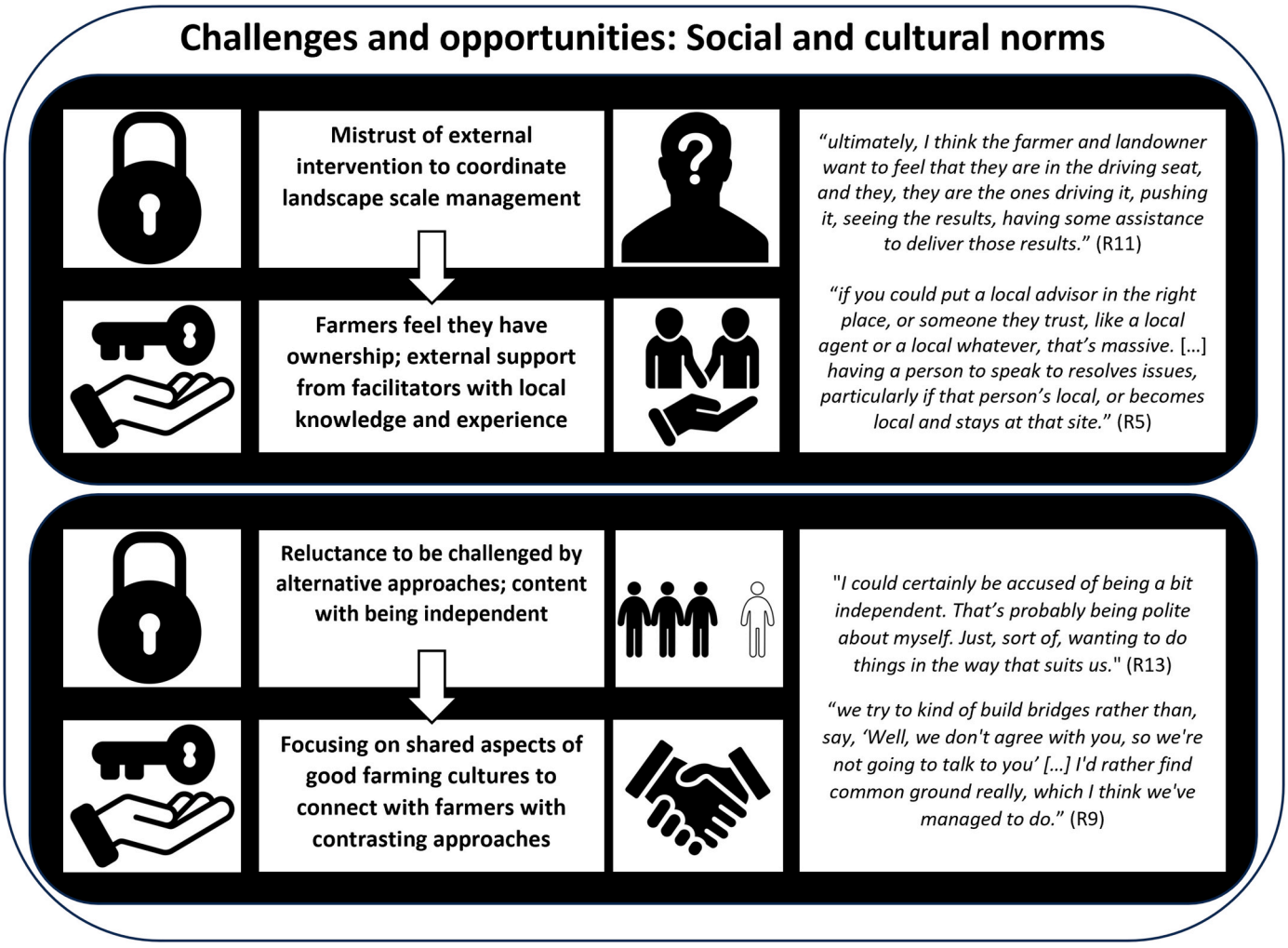


Fig. 3. Key social/cultural challenges (and potential solutions) identified by respondents for delivering cooperative landscape-scale environmental management (see sections 3.4 and 3.5).

Moreover, financial incentives themselves could interact with other types of barriers to participation:

> "*as it is at the minute, it's farm-specific, you farm two thousand acres, you get paid x pounds per acre, for the acres that you farm, and you get a little bonus on top depending how many stewardship things you put into place, everyone's, of course they're gonna look after number one.*" (R16)

Here, R16 connects the 'farm-specific' design of financial support to an individualist way of thinking. The idea of a desire to be independent from others as a characteristic of farming, featured in half of all interviews, with reasons given for this including valuing self-sufficiency: farmers "*don't want to be reliant on other people*" (R5), and a reluctance to share information with potential competitors: "*a lot of my neighbours play their cards very close to their chest*" (R6) (although for food production, there were also arguments that acting collectively gave farmers more power in negotiations with buyers). Despite recognising the existence of collective AES, R16 still viewed financial support for farmers as primarily "*farm-specific*": farmers are paid based on the land they are directly responsible for, and the actions they perform as individuals, encouraging them to "*look after number one*", focusing on management of their own farm.

3.3. Costs and benefits: farmer uncertainty

Respondents also indicated that farmer engagement in landscape scale projects could be influenced by their ability to accurately assess the relative costs and benefits of participation, highlighting the value of communication and access to information. Environmental management on the respondent's own land was described as generating clear, observable outcomes, so they can readily identify and demonstrate the benefits of such actions. Where farmers cooperate for environmental outcomes at the landscape level, identifying the specific benefits of cooperation may not be so straightforward:

> "*But what we're trying to do is provide a bit of a helping hand, provide a contiguous link* […] *we'd hope that we can create a system which means that we can then go out to others, and we can work more collaboratively. We don't know what benefit that might bring, but we feel that that's the direction of travel …*" (R11)

R11 could articulate why they thought working together would be environmentally beneficial in a general sense, but also admitted not knowing what the specific benefit would be for them in terms of farm performance. Instead, their cited motivation was that they saw cooperation as the "*direction of travel*" for policy and wanted to be well positioned to exploit future opportunities for support. Although farmers could explain the value of cooperation for environmental performance at the landscape scale, how this translates into an effect that they can observe themselves is less clear.

The importance of being able to see and understand the impact of one's actions was acknowledged as a requirement for effective

cooperative projects:

> "… *it's got to be something that means something to everyone within it, for sure.* […] *so, a bit like anything, you need to have clear communication and clear messaging as to what you're trying to achieve, how you're going to achieve it. You know, regular updates and metrics to show that things are happening and changing.*" (R15)

R15 identified continuous performance evaluation and clearly communicating results back to participants as necessary for meaningful cooperation. If participants see how working together makes a difference, this increases personal investment in the project because it "*means something*" to those involved. In general, measuring environmental performance was something respondents were giving increasingly serious thought to, partly to obtain funds under anticipated future results-based schemes, but also to demonstrate to others that they know what they are doing: "*I've got to prove the numbers for it, for it to be recognised* […] *that we can feed ourselves and a growing population, with doing this type of farming.*" (R3). Therefore, finding appropriate methods for measuring performance at the landscape scale, and making connections between farm and landscape-scale performance, could increase willingness to cooperate for environmental management.

3.4. Social/cultural norms: coordination and trust

Even if farmers recognise the value of cooperating for landscape scale management, and it makes economic sense for them to do so, relationships with others, and cultural ideals of what farming should be about, still present challenges for the delivery of these projects. A case in point concerns farmer reactions to external coordination of landscape management. While getting a third party to assume the responsibility of coordinating management makes farmer participation less costly, respondents tended to be mistrustful of interventions from outside farming circles influencing land management. Farmers resented external bodies seeking to control farm outputs and impose management prescriptions that would ignore their farming expertise, accrued over years of farming experience, which meant that "*no-one else really but me, will understand the farm in the way I understand it* (R17).

Respondents felt that effective cooperation required trust among participants, and farmers trust and respect information from their peers: "*farmers tend to listen to farmers*" (R15). This importance of trust underpinned arguments for landscape-scale efforts to be farmer-driven, while also acknowledging that such a bottom-up approach may not be the full solution:

> "*So, there does need to be some landscape-led schemes. And I think the best way for those schemes to be harnessed in the future is for them to be farmer, landowner, driven, collectively, because there's an element of less suspicion, but collaboratively alongside Natural England, DEFRA, local wildlife trusts* […] *there's sort of good and bad sides to both, in some respects?*" (R11)

R11 justified the need for landscape-scale schemes to be farmer or landowner driven "*because there's an element of less suspicion*": farmers are less trusting of the motives of those outside farming circles, while a farmer-driven scheme engenders greater trust and support. However, in identifying a need for partnership with other organisations, they acknowledge that the optimal scheme design is not purely farmer driven. If coordinated landscape-scale management demands some involvement by non-farmer coordinators, then farmer mistrust needs to be addressed, which could be achieved by prioritising local knowledge and experience:

> "*And so, if you could put a local advisor in the right place, or someone they trust, like a local agent or a local whatever, that's massive. […] Doesn't always work, but the majority of times, having a person to speak to resolves issues, particularly if that person's local, or becomes local and stays at that site.*" (R5)

R5 suggests that being embedded in the local context makes a 'massive' difference to farmer willingness to trust third party input. Moreover, if trust can still be built if the person "*becomes local and stays at that site*", it suggests the advantages of being local can be gained over time. With time, the advisor's experience and knowledge of the area increases, so farmers are more likely to view their advice as relevant to their farm and the local conditions.

Despite recognition of the value of advisory support, respondents still preferred landscape-scale management to be weighted towards a farmer led approach overall: "*Ultimately, I think the farmer and landowner want to feel that they are in the driving seat* […] *having some assistance to deliver those results*" (R11). The role of non-farmers is therefore limited to facilitating action rather than driving it. Being 'in the driving seat' meant farmers setting the objectives: "*we're supposed to have a meeting where we meet everyone and we talk, sit round, and say, what does everyone want to get out of it*" (R16), and, having the autonomy to choose the actions that they know would be best for achieving these outcomes.

3.5. Social/cultural norms: independence and building relationships

Respondents varied in the extent to which they were involved in cooperative projects, and for what purpose: 3 were attempting to initiate new projects, 2 had joined such projects after being invited, 8 reported participating in cooperative management on an occasional basis, and 5 had minimal engagement with other farmers. These differences in enthusiasm for cooperation were often attributed to differences in attitudes. Respondents indicated that the act of reaching out and initiating cooperative management required a degree of boldness, and that working alone was appealing:

> "… *we really wanted to kind of open it up, and have more people involved […] So, not in a kind of, little bubble of, which is sometimes attractive, isn't it, in life? You know, I think, just stay where we are and do what we do and what we agree with.*" (R9)

Although R9 aspires to widen their network and work with others, they evidently recognise the appeal of working in isolation. The idea of isolation as comfortable was highlighted by others, particularly concerning the ease with which they embraced lone working during the Covid-19 pandemic: "*Social isolation is what we do*." (R14). R9 describes isolation as working in a 'bubble': they can keep managing their farm how they have always done and focus on doing "*what we agree with*". This implies working with others could involve being challenged by approaches that they may not agree with. A key factor contributing to wariness of cooperation was the farmer's desire to manage their own farm in the way they thought was right: "*what we decide to do is our business. And our neighbours aren't involved at all. We make our own decisions*" (R14); "*We want to do things our own way*" (R15). This desire for control was related to the view that the farmer's accrued knowledge meant they knew best how to manage their own land. Cooperation could make them compromise on their tried and tested personal approach to accommodate the goals of a larger project.

Engaging with farmers with different outlooks on how farming should be done meant risking exposure to disagreements or criticism. One interviewee described the idea of initiating cooperation for environmental management as "*you've got to stick your head above the parapet and start these things*" (R18): the metaphor implying an element of danger, inviting attack from others. These concerns are particularly relevant where cooperation means making connections with neighbours with contrasting perspectives on good farming practice. Respondents often identified compatible mindsets among partners as a requirement for successful cooperation, with working relationships between farmers with contrasting approaches being harder to maintain. However, interviewees had different reactions to this challenge, as illustrated by comparing two respondents who were both managing their land in a manner that was at odds with their more conventional neighbours.

> "*We're an island up here. It's been like it since I started* […] *you have to be stubborn. I don't really care what they think or what they say, I couldn't give a toss. I really couldn't. I know what I'm doing is right, and I'm happy with it, and I know what I'm doing will leave my land in a better state than I found it.*" (R12)

In this first case, R12 could not see any point in spending time and effort to engage others who would not understand why they were managing their farm in this way. The difference in viewpoints was too great, and they were resigned to the fact that they will not understand each other, there is little they can do to influence their neighbours. Instead, it was enough for them that they "*know what* [they are] *doing is right*". What happened beyond their farm boundaries was none of their concern: they are content to be an outlier amidst more conventional farmers, regardless of what others think of them.

R9 had also adopted non-conventional practices but had a different outlook on their relationship with the surrounding farmers.

> "*I know that* [a nearby farmer] *doesn't think much about what we do, but I think he, even he might have changed over the last few years, 'cause again, we try to kind of build bridges rather than, say, 'Well, we don't agree with you, so we're not going to talk to you'* […] *'we're doing things differently* […] *and you don't want to talk to us' and … Yeah, I'd rather find common ground really, which I think we've managed to do.*" (R9)

Again, R9's description of how they are "*doing things differently*" and identifying a gap that needs to be bridged, acknowledges a divide between their approach and that of others. However, unlike R12, they see themselves as still able to effect change on the farms around them. The differences are not too great for them not to try to "*build bridges*", and so they still aspire to reach out in the hope of finding "*common ground*". This suggests they see a way forward for engaging others despite disagreements over management: if potential partners can identify those areas where they do think alike, they have something to build upon as a first step towards a closer relationship that will support cooperative working and influence.

4. Discussion

4.1. Unwillingness to cooperate despite understanding benefits

Among interviewees, widespread understanding of the value of working together for landscape scale environmental performance did not necessarily translate into a desire to engage in cooperative environmental management, and engagement in farm level agri-environmental initiatives did not predicate willingness to participate in landscape level projects. 3 respondents were willing to spend time and effort engaging neighbours for environmental land management and initiate cooperative projects, 10 showed varying levels of receptivity to these engagement efforts, and the remainder were strongly resistant, even if they expressed enthusiasm for managing their own farm for the delivery of public goods and ecosystem services. The interviews provided different reasons for why resistance to cooperative management may be so pronounced, including the perception of cooperative management as complex and costly, uncertainty over direct benefits for individuals, mistrust of external coordination for landscape management, and challenges associated with connecting with farmers with contrasting ideals of good farming. These barriers were often interlinked, such that an optimal strategy to increase farmer engagement must address all of them simultaneously.

4.2. Accounting for cooperation costs and communicating benefits

Persuading reluctant farmers to engage in cooperative environmental management can be achieved by reducing the actual and perceived costs of this activity, or by increasing the benefits. Complexity and high administrative burden are known to contribute to the perception of farm-level AES as costly, deterring farmer engagement (Birge et al., 2017). Our interviews show farmer perceptions of the nature of collective management projects contribute to this also being a deterrent for uptake of landscape level AES. One way of addressing this barrier could be to ensure that scheme payment levels are high enough to be commensurate with the additional challenges of organising management across multiple farms. However, the interviews also point to the value of facilitation and coordination for reducing the complexity of participation, and so increase the reach of landscape level AES.

For improving perceptions of cooperation benefits, it will also help to enable farmers to see the difference that their participation makes. Respondents reported being motivated to apply environmental management practices at the farm level not just to qualify for subsidies, but because they could readily link farm level environmental performance to the productivity and viability of their farm. Agronomic motivations are recognised as an important influence on the delivery of unsubsidised environmental activities at the farm level (Mills et al., 2018). If the environmental benefits of landscape scale management can be quantified (for example, by measuring the contribution of improved habitat connectivity towards the delivery of an ecosystem service), communicated, and linked back to farm level performance, this could increase motivations to cooperate independently of the value of financial incentives, making farmer participation feel more meaningful and relevant to their own farm's performance. Regular monitoring and maximising visibility of outcomes have been linked to long-term farmer involvement in other collective management projects (Amblard and Mann, 2021), and this is something that could be achieved with the support of intermediaries aiding the exchange of information among farmers (Prager, 2015b).

4.3. Supporting farmers to make new connections

Besides the actual and perceived economic costs and benefits of participating in landscape-scale environmental management, reluctance to participate was often linked to concerns about the reactions of other farmers, particularly where disagreements over management approaches are involved. Whether farmers are open to cooperating and for what purpose may depend on cultural ideals of good farming, as farmers resist cooperative projects requiring them to perform activities that are at odds with these ideals (Sutherland et al., 2012), and our interviewees were wary of entering partnerships requiring them to compromise on their personally favoured approach to farming. Farming ideals can vary across different subcultures within the sector (Barbieri and Valdivia, 2010; Hunt, 2010; Naylor et al., 2018), and differing identities and ideals among neighbouring farmers mean a farmer may have a variable reputation with potential cooperative partners, which matters because the quality of a farmer's reputation can affect their ability to work with their peers (Burton and Paragahawewa, 2011; Lundqvist, 2001). Our more resistant respondents felt that this meant it was not worth approaching others to cooperate as they would be unable to reconcile the differences in identities. However, others saw these differences as a challenge to overcome by finding common ground with potential collaborators. Despite cultural variation among farmers, there may be aspects of the good farmer identity that are more widely shared (Sutherland, 2013), which could be used to build reputations that are recognised across different types of farmers.

Forming these connections also provides opportunities for changing identities to support the transition to more sustainable modes of agriculture. Research suggests shifts in farmer identity are most likely to come from dialogue with peers rather than external intervention (McGuire et al., 2013). Therefore, farmer engagement with new identities placing more emphasis on landscape scale environmental performance can come from key farmers trying to proactively connect with otherwise resistant farmers around them. The actions of these individuals may be more able to initiate widespread behavioural change compared to external interventions which may be frustrated by farmer

mistrust (Hurley et al., 2022; Jones-Garcia and Touboulic, 2022). In the long-term, building connections with disengaged farmers could have a self-reinforcing effect. Those of our interviewees that were less interested in cooperative management also lacked direct experience of involvement in cooperative projects. A farmer's history of interactions with others influences their current attitudes towards cooperation: positive experiences of working with others over time is needed to build the social capital and trust that provides the foundation for successful cooperative projects (de Vries et al., 2019; Prager, 2022).

Targeted interventions to support those influential farmers able to build connections could promote more widespread engagement with cooperation, but this depends on our ability to recognise these individuals. To this end, further quantitative research could be useful for identifying any characteristics consistently associated with farmer willingness to make new connections and initiate collective projects. Influential farmers may also be identifiable by reputation, such that asking farming communities and other rural stakeholders to nominate key individuals could be a useful approach, and increasingly, social media presence may also give some indication of farmer outreach and influence (Rust et al., 2022; Skaalsveen et al., 2020). Moreover, farmers who adopt one novel environmentally friendly practice before their peers are often more likely to do the same for other types of agri-environmental projects (Gailhard et al., 2015), so targeting early adopters could be another way to identify farmers likely to lead the way in establishing new landscape scale initiatives.

Strategies to help these influential farmers maximise their impact could include specialist training in communication methods and use of technologies, or recruitment to events or groups that maximise opportunities for information transfer, connections with other rural stakeholders, and expanding professional networks that can be leveraged to increase their reach in engaging others (Bressler et al., 2021; Gailhard et al., 2015; Lei and Yang, 2024). These farmers could be targeted for information dissemination to keep them up to date on priorities for achieving local sustainability goals, and progress towards these goals, equipping them to make informed decisions for planning environmental management at landscape scale.

4.4. Balancing coordination and collaboration

The occurrence of key individual farmers with the resources and willingness to engage others and initiate cooperative networks implies potential for landscape scale environmental management to be farmer driven. Bottom-up, locally led approaches to farmer cooperation in other contexts tend to be more suited to levels of farmer experience and commitment and more likely to generate effective working relationships (Franks and Mc Gloin, 2007; van Dijk et al., 2015). Our interviews support this view, especially given the tendency of farmers to rely more on their own peer networks to learn about alternative management approaches as opposed to traditional academic and government experts (Rust et al., 2022), and wider mistrust of top-down control for landscape-scale schemes limiting farmer willingness to join in collective management initiatives (Franks et al., 2016; Kropf et al., 2020).

However, despite widespread support for a bottom-up approach, responses also pointed to the need to have someone else assume the laborious and time-consuming responsibility of coordinating participants. A distinction can be made between 'collaboration', where parties work together and exchange information, in an active and constructive dialogue, and 'coordination', where parties work independently towards a common goal, but are organised in a top-down manner (Boulton et al., 2013). In practice, cooperative schemes fall on a continuum between total coordination and total collaboration (Prager, 2015a). Our findings illustrate the value of such a blended approach for optimising the performance of landscape-scale projects: it ensures participants will be more trusting and less sceptical of project aims while still minimising the logistical burden on farmers associated with organising management across the landscape.

Among interviewees, the preferred balance between these two approaches was weighted in favour of collaboration. Coordination may be useful in guiding farmers to optimise landscape-scale environmental performance, but the importance of trust and respect implied that successful cooperative management is more likely when farmers feel they are in control. The process described by our interviewees, in which farmers and other actors jointly identify landscape scale objectives and the means of achieving them, rather than having objectives and solutions imposed upon them, provides fertile grounds for co-innovation, in which solutions can be tested and adapted to optimise their performance for the local conditions (Dogliotti et al., 2014; Ingram et al., 2020). This does mean, however, that the distribution of cooperative management may depend strongly on the occurrence of those farmers who can champion this approach, and policy and advisory support should recognise that the actors mediating these interactions will be central to shaping co-innovation and cooperation outcomes through their actions in negotiating tensions and power dynamics among collaborators (Ingram et al., 2020). Where such champion farmers or key mediators are absent, it may be easier to achieve landscape-scale management via mechanisms that are less reliant on close farmer cooperation, such as scheme targeting, agglomeration bonuses, or coordination of individual applications via an advisor (Prager, 2022). There may also be more need for external support to deliver these mechanisms, and the interviews indicate that this will be most effective when done in a way that respects local knowledge and experience. Identifying trusted individuals to act as intermediaries will be crucial for maximising engagement and reaching less connected farmers (Hurley et al., 2022; Riley et al., 2018).

While provision of external support can help reduce costs of cooperative management for farmers, administering this support still incurs substantial transaction costs, and so depend on adequately resourced and funded advisory services. Agricultural advisory services are increasingly delivered by a diversity of providers encompassing public, private, and charitable sectors (Klerkx and Proctor, 2013). Accordingly, our interviewees identified a variety of candidates, actual and hypothetical, who could fulfil this role, including local environmental NGOs, paid-for private advisors, and protected landscape management bodies. For this support to be accepted and viewed as legitimate, longevity and expertise are key factors (Sutherland et al., 2013) and our interviewees' calls for advisors who have been in place long enough to acquire in-depth local knowledge and experience reiterated this point. Therefore, ideally this support should be delivered through well-established organisations and professionals with strong interpersonal skills, to build enduring and relational trust through a history of formal and informal interactions (King et al., 2019; Sutherland et al., 2013).

4.5. Conclusions

We draw upon diverse aspects of farmer decision-making to show how a combination of economic, social, and cultural barriers can explain the persistence of the disconnect between farmer understanding of the value of cooperative environmental management for landscape scale performance, and actual willingness to cooperate for this purpose. The perception of cooperative environmental projects as especially complex meant they were seen as more costly, and less rewarding, compared to cooperation explicitly for food production or environmental management on the farmer's own land. Increasing engagement could be achieved by altering this cost-benefit ratio (including setting an appropriate value for financial incentives and using coordination to minimise the logistical burden for participants), but also by changing how farmers perceive these costs and benefits (and provide more opportunities for non-financial motivations for cooperation), which will depend strongly on the data collection and sharing associated with these projects.

Interactions between the different types of challenges for cooperative environmental management, mean that policy interventions should allow for the possibility that tackling one may negatively impact another. This is illustrated by the need to find a balance between

coordinating management at the landscape scale, making participation less complex and costly, and maintaining a collaborative element where farmers still feel they have ownership of these projects, so that they are not compromised by farmer mistrust of outside intervention. The interviews identified two types of individuals who will be crucial for finding this balance: pioneering farmers with the ability and motivation to initiate projects and make new connections with their peers, and respected, locally based facilitators to help organise the distribution of management actions and exchange of information across farms.

The relative contributions of these two groups, and the ideal balance between coordination and collaboration, will vary with the local context. Where willing, pioneering farmers are present, the focus should be on supporting them to develop their own outreach activities and connect with other farmers, emphasising a farmer-driven, collaborative model. This can help ensure that cooperative schemes attract previously less engaged farmers and achieve the widespread uptake necessary to improve sustainability at the landscape level (Tyllianakis et al., 2023). The relationships built by those farmers seeking common ground among contrasting identities can be a key route for achieving lasting cultural and social change for cooperative management (Hurley et al., 2022; Jones-Garcia and Touboulic, 2022; McGuire et al., 2013). Where these influential farmers are absent, there will be more need for facilitators to act as intermediaries between farmers and assume more responsibility for coordinating management. Therefore, policy measures should have the flexibility to adapt to this variation in circumstances. Having a diverse and balanced mix of policy instruments, with different mechanisms suited to different circumstances, will help achieve this flexibility, and so maximise engagement and support lasting social acceptance of agricultural policy changes for sustainability (de Boon et al., 2022; Mills et al., 2017; Pedersen et al., 2020).

CRediT authorship contribution statement

Peter G. Matthews: Writing – review & editing, Writing – original draft, Methodology, Investigation, Conceptualization. **Robert D. Fish:** Writing – review & editing, Supervision, Conceptualization. **Joseph Tzanopoulos:** Writing – review & editing, Supervision, Conceptualization.

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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