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Farm advisors' perspectives on barriers and opportunities for wetland creation – the view from Sweden

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Farm advisors are important knowledge transfer agents for improving rural sustainability. Most literature focuses on their role in improving farm economies, but they can also promote greater environmental sustainability. Across Europe, most natural wetlands have been drained, impacting multiple ecosystem services (ES) including biodiversity support and nutrient retention, highlighting the need for increased restoration and creation efforts. In Sweden, these efforts depend on voluntary landowner actions. We interviewed farm advisors to learn how they encourage landowners to create and manage wetlands and the institutional barriers they still encounter. Advisors highlighted trust and long-term relationships as key success factors and considering landowner motivations that often prioritize recreational and cultural ES. Advisors noted overly complex bureaucracy, breaks in funding, inadequate long-term support, and lack of holistic perspectives as barriers for wetland creation. These insights about successful advisor/landowner interactions for wetland creation can be applied when implementing other agri-environmental measures.

Keywords: farm advisors; agri-environmental schemes; funding; landowners; wetlands; agriculture

1. Introduction

The global decline in wetland areas and the consequences for the important ecosystem services (ES) they provide is rising up the societal agenda (Acreman and Holden 2013; Hambäck *et al.* 2022). While numerous policies and initiatives aim at protecting and restoring wetlands (CEC 1992; EPCEU 2000, 2009; HELCOM 2007), progress is still slow (Kingsford, Basset, and Jackson 2016; Hu *et al.* 2017). This calls for increased efforts for wetland creation and restoration, as well as an examination of factors that could support wider implementation of wetlands across agricultural and other landscapes.

In many countries, wetlands can be established on private land, and thus possibilities to accelerate wetland restoration and creation depend on voluntary participation by landowners, farmers and managers (Hansson, Pedersen, and Weisner 2012). Thus, it is

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important to motivate and enable these groups of actors to partake in wetland creation efforts. Two main mechanisms to encourage participation in wetland initiatives are knowledge diffusion and provision of support, e.g. people are more motivated to create wetlands when given access to information, support and advice. Information about the on-farm benefits of wetlands, as well as support prior to, and during, wetland construction is particularly important (Bratt 2002; Hansson, Pedersen, and Weisner 2012; Blicharska and Rönnbäck 2018; Graversgaard *et al.* 2021). Landowners more readily get involved in activities such as wetland construction when not much investment is required from them and they have long-term support (Blicharska and Rönnbäck 2018). One way to provide such support is through agri-environmental information provided by farm advisory services (Jones, Rolls, and Tranter 1987; Eldon 1988; Angell *et al.* 1997). The farm advisors who deliver these agri-environmental advisory services (referred to hereafter as agri-environmental advisors) are key agents who can disseminate knowledge and motivate landowners to change agricultural practices, including wetland creation.

Considering their influential role, agri-environmental advisors have been described as “street-level bureaucrats” who deliver policy at the local level (Juntti and Potter 2002); change agents who promote sustainable agriculture (Cerf, Guillot, and Olry 2011); mediators between landowners and various information sources (Garforth *et al.* 2003); and experts who possess scientific knowledge (Burgess, Clark, and Harrison 2000). With their specialized set of experiences, competencies and scientific knowledge, advisors translate and transfer information in the form of advice to their farmer and land manager clients with the aim of achieving changes in land and water management practices. This reflects a paradigm shift in environmental management from a top-down process towards a focus on knowledge diffusion and interaction between stakeholders (Röling and Jiggins 1994). These interactions also allow different actors to navigate through the vast and ever-growing body of scientific research (Mills and Winter 2000).

Information and guidance from advisors have been shown to motivate farmers’ participation in nutrient and climate-related agri-environmental schemes in several countries (Hasler *et al.* 2019). At the same time, deficient knowledge can hinder landowners’ willingness to construct wetlands (Hansson, Pedersen, and Weisner 2012). In relation to that, previous scholars have highlighted the role of agri-environmental advisors as knowledge disseminators who are responsible for the ‘environmental re-skilling’ of landowners and farmers (Curry and Winter 2000). Such knowledge includes both general information (e.g. the scientific literature) and context-specific knowledge co-constructed during meetings between actors (Wolf, Just, and Zilberman 2001; Werr and Sternberg 2003): more specifically between farmers and advisors (Klerkx and Proctor 2013). While knowledge itself is important, the trust (Taylor and van Grieken 2015) and mutual learning that happens during such co-construction of knowledge are essential, as they allow for identifying challenges, evaluating alternatives and arriving at optimal solutions by learning from each other (Sheath and Webby 2000; Ingram 2008; Klerkx and Jansen 2010). Such a process allows for a flexibility that characterises bottom-up approaches, as opposed to rather rigid top-down control systems (Toderi *et al.* 2017; Meli *et al.* 2019) and allows for trust building between the advisors and farmers (Stern and Coleman 2015). Such a co-construction approach can facilitate long-term commitment of landowners, which is needed in wetland construction initiatives (Blicharska and Rönnbäck 2018).

While advice can be provided by a variety of methods, on-farm visits are the most effective means of communication between advisors and farmers/landowners (Jones,

Rolls, and Tranter 1987; Eldon 1988; Angell *et al.* 1997). There is a considerable literature on the effectiveness of farm advisory services for improving economic performance (Nordin and Højgård 2017; Cawley *et al.* 2018; Krafft *et al.* 2021). However, there has been relatively little research focused on how agri-environmental advisors promote the adoption of environment enhancing activities, such as Nature-based Solutions, and specifically wetlands. We address this knowledge gap by exploring the largest Swedish farm advisory programme “Greppa Näringen” (GN, “Focus on Nutrients”) established in 2000 with an initial focus on nutrient retention. Since then, the programme has expanded to provide free on-farm advice on 30 different topics (including wetland construction) to landowners who have at least 25 animals and 50 ha of arable land. The GN programme is funded by the Rural Development Programme (RDP) and operates across southern Sweden as a cooperation between the Swedish Board of Agriculture, the County Administrative Boards (CABs) and the Swedish Federation of Farmers (LRF, “Lantbrukarnas riksförbund”) (Hoffman *et al.* 2011). Typically, more than one GN advisor will have contact with an individual farmer or landowner. A general GN advisor initiates contact with a start-up visit and then suggests suitable specialised topics for advisory visits. A GN agri-environmental advisor with wetland competency can provide the farmers with free topical advice on “wetland planning” and “maintenance of wetlands”. As part of the “wetland planning” service, advisors assess whether wetland creation is possible at locations identified by the landowner, provide information about available financial support and may also recommend potential locations and wetland design that can both reduce nutrients and increase biodiversity (Greppa Näringen 2020). Landowners who do not have enough land or animals, but are interested in wetlands can also get the “wetland planning” advisory visit for free by contacting the CAB. Between 2001 and 2020, GN provided 4,447 “wetland planning” advisory visits and since 2008, about 430 visits for “wetland maintenance and restoration” (Greppa Näringen 2022). According to a follow-up survey of 123 GN members who received “wetland planning” advice, only a quarter of them eventually constructed a wetland. Another recent survey of Swedish farmers assessing possibilities for increasing uptake of measures for phosphorous management, concluded that both improved opportunities for financial support and opportunities to receive advice could increase farmers’ motivation to implement agri-environmental measures (Malgeryd *et al.* 2020). However, relatively little is known about the role of advisors in the creation of wetlands and how advisory systems work in practice.

This study presents qualitative suggestions for improvements to systems specifically for wetland creation and maintenance derived from interviews with agri-environmental advisors. The following research questions are addressed:

- How do agri-environmental advisors perceive their role in encouraging and enabling landowners to create, restore and manage wetlands?
- What barriers do advisors experience?
- Are there any potential institutional changes that could reduce these obstacles?

While the study is focused on wetland advisory systems in Sweden, its overarching objective is to provide insights that may be relevant in other contexts, where policies aim at increased farm-based implementation of wetlands and other environment enhancing activities such as Nature-Based Solutions to improve ES delivery.

2. Methodology

2.1. Background

Since the early 1990s, there have been several national investment programmes and subsidies available for wetland restoration and creation in Sweden. Wetland implementation was further promoted when the Swedish National Environmental Quality Objectives (EQOs), including “No eutrophication,” “Thriving wetlands,” “Flourishing lakes and streams” and “A varied agricultural landscape” were adopted in 1999. A national goal of constructing at least 12,000 ha of wetlands by 2010 was set (Prop. 1997/98:145; Prop. 2000/01:130). However, this goal was not met, and the 2021 EQO annual assessment concluded that, despite some successes, the general trend for development of wetlands is negative and efforts to preserve the functions of wetlands need to be accelerated (SEPA 2021). The Swedish Environmental Protection Agency (SEPA) has communicated that the objectives will still remain active with the new aim of achieving the targets by 2030 (SEPA 2022).

Currently, three main national programmes support wetlands in Sweden (Table 1 adapted from Speks (2021)). Each programme is managed by different agencies that derogate to county level. Counties have the responsibility for approving permits for new wetlands. Financial support for construction, management and maintenance of wetlands for nutrient reduction or biodiversity conservation are available for public actors, organizations and private individuals mainly through the partly EU-funded Swedish Rural Development Programme (RDP) (Geranmayeh *et al.* 2023). Agri-environmental advisory services are also funded through the RDP (SJVFS 2021:12). One challenge with the RDP is that landowners cannot receive reimbursement at the start of wetland creation (all payments are made after completion) or if they undertake the work themselves.

Table 1. Comparison between the available grants for wetland construction: Rural Development programme (RDP), “Lokala Vattenvårdsprojekt” (LOVA) and “Lokala Naturvårdssatsningen” (LONA).

	RDP	LOVA	LONA
Responsible authority	Swedish Board of Agriculture	Swedish Agency for Marine and Water Management	Swedish Environmental Protection Agency
Available for	All landowners	Municipalities and non-profit organisation (also in combination)	Municipalities
Purpose	Nutrient retention or Biodiversity (irrigation from 2023)	Improved water quality	Biodiversity/ recreation, flood control and ground water recharge, climate (rewetting peatland)
Payment at start of work	No	Yes, maximum 75%	Yes, maximum 75%
Level of financial support	Maximum 100%	Maximum 90%	Maximum 90%
Reimbursement	Actual costs	Actual costs	Actual costs

In 2004, funding for wetland initiatives was offered by SEPA to municipalities with landholdings through LONA (“Lokala naturvårdssatsningen”) and in 2009 by the Swedish Agency for Marine and Water Management (SWAM) to municipalities and non-profit organizations through LOVA (“Lokala vattenvårdsprojekt”) (Table 1). Individual landowners can initiate or partake in wetland projects financed through LONA (with a focus on recreation, biodiversity, flood control and climate) and LOVA (improve water quality) if done in cooperation with municipalities or non-profit organizations (SFS 2017:1299; SFS 2021:207). However, there has been limited uptake to date of these two programmes by individual landowners. As a result, during 2019–2021, 20 catchment officers were employed in pilot areas in southern Sweden to increase the collaboration between landowners and municipalities.

2.2. Methods

All data were gathered during semi-structured interviews with GN agri-environmental advisors. Relevant documents (e.g. GN policy and recommendation documents and evaluation reports) were studied prior to conducting interviews. This was complemented by telephone conversations with key people within GN. All interviews were conducted by the same interviewer using the same set of 30 questions (online supplementary Table 1), which was developed by utilizing basic information about GN in combination with key dimensions of the interactions between advisors and landowners, i.e. knowledge creation and diffusion, mutual learning, motivation, dialogue, and trust.

Five main themes were covered in the interview guide (online supplementary Table 1):

- i. Background questions exploring interviewees’ experience in advisory services.
- ii. Questions regarding interviewees’ knowledge sources and knowledge gaps.
- iii. Questions focusing on landowners’ motivations and interests, including proposed wetland purpose, factors influencing wetland location, and factors contributing to increased landowner motivation and knowledge.
- iv. Questions exploring barriers for wetland implementation and potential changes or improvements needed to address the barriers identified.
- v. Demographic questions, including interviewee education topic and level.

Twenty-five individuals who currently, or within the past five years, have worked as GN wetland advisors were contacted and asked if they would participate in interviews. Fourteen advisors from eight different consulting companies agreed to participate. The advisors had worked in all the southern counties (including Gotland). Half of the interviewees were currently working in Skania, the county where the majority of wetlands have been constructed. Participants were informed about the topic and purpose of the study, and the use of data from interviews. Interviews were carried out in Swedish via video calls between March and April 2021. With interviewees’ consent, all interviews were recorded and transcribed in full and selected material translated into English. While the sample of the advisors interviewed cannot be seen as representative of all wetland advisors in Sweden, it represents the majority of the wetland advisor “pool.” As such, we believe that this study can provide important insights regarding the role of advisors in wetland implementation.

Transcriptions were coded and categorized using the thematic analysis approach (Bryman 2012). The five themes in the interview guide were used as the main

categories for coding. Main categories included subcategories that were either pre-defined or that emerged during the analysis. For example, in the main category “important sources for advisors’ knowledge,” subcategories included: e.g. “scientific articles,” “interaction with other agri-environmental advisors,” “interaction with landowners.” For the main category “factors influencing landowners’ motivation and knowledge” the sub-categories included: “discuss multiple benefits,” “realistic,” “respect,” “dialogue.”

Results were analysed in relation to previous research and relevant theoretical concepts on interactions between farm advisors and their clients. In this study, the ideas about knowledge, mutual learning, motivation, dialogue, and trust comprise the framework that guided the analysis of the perceptions, opinions, and experiences of the wetland advisors (Collins and Stockton 2018).

All steps in the research process were thoroughly documented, and frameworks (e.g. an interview guide and coding matrix for data collection) were used throughout. A pilot interview with an experienced wetland advisor was conducted prior to gathering data to refine interview questions and ensure that accurate operational measures were used when gathering data (Kvale 2008; Hayashi, Abib, and Hoppen 2019).

3. Results

3.1. *The advisors*

Twelve of 14 interviewees worked as agri-environmental advisors within GN at the time of the study. The amount of time interviewees had worked with wetlands within GN ranged from less than one year to over 20 years. More than half of the interviewees conducted fewer than 10 advisory visits per year, three conducted 11–20 visits, and two conducted more than 30 visits. Most visits focused on planning for creation of new wetlands, and only a small number of visits concerned maintenance of existing wetlands. The number of advisory visits varied between years, depending on prioritization of other advisory projects, or landowner interest. This latter factor was strongly dependent on perceived availability of funding for wetland creation. All but one advisor had an academic background in biology (mainly limnology), ecology or environmental science. The one advisor without higher education had practical experience equivalent to such education. Almost all interviewees handled issues regarding water restoration and wetland projects in their daily work and more than half of them had previous advisory experience outside GN. All interviewees worked at consultancy companies offering services within nature and water conservation and management, some focusing specifically on agricultural lands and practices. Landowners usually contacted advisors after recommendations from CABs or through consultancy company marketing.

3.2. *Advisors’ knowledge*

As one advisor explained, it was important to combine knowledge from both written and oral sources because there are a large number of different aspects to wetland creation, e.g. its planned function and efficiency, landowners’ expectations, considerations regarding wetland management and funding issues. Advisors obtained information from multiple written sources including scientific articles and non-scientific reports and articles. The former was a particularly important information source for more than

half of the interviewees. Keeping up to date with new research findings was seen as important by many advisors; multiple interviewees identified interaction with other advisors, landowners, governmental officials, contractors and other experts as important sources of knowledge and information. The agri-environmental advisor network in Sweden was seen as essential for learning about technical solutions and addressing wetland planning issues. Advisors with 10–15 years' experience in water-related issues were seen as particularly valuable information sources. Regular contact with governmental authorities was also important to understand the financial support systems and application processes, e.g. what factors authorities prioritize when processing applications. Having this knowledge made interaction with landowners easier, as advisors had up-to-date practical information. Contacts with landowners provided useful knowledge about their land and management needs for wetlands. Finally, three advisors mentioned that actual design and construction work provided them with a deeper understanding of wetlands.

Most interviewees were satisfied with their level of knowledge. However, a few mentioned knowledge gaps, including a lack of scientific research on technical solutions, e.g. how to deal with soil masses from excavation, or how wetlands can be constructed and designed to optimally contribute to particular functions, as well as how to achieve a holistic perspective for creation and maintenance of multifunctional wetlands.

3.3. Landowners' motivations and interests

Interviewees reported that there was rarely one single ecosystem service motivating landowners to construct a wetland. However, recreation was something all advisors mentioned as a motivation for wetland creation. Recreational activities included enjoying scenery, improving aesthetic values, wildlife and hunting, birdwatching, and ice-skating. In addition, biodiversity was commonly linked to recreation and birdwatching. Particularly since the 2018 drought, water supply for grazing animals, wildlife and irrigation was increasingly important for landowners. However, some advisers highlighted that as the goal of water retention is not fully aligned with the aim and goals of GN, it was not commonly mentioned as a motivation for wetland creation.

Nutrient retention, specifically nitrogen, was mentioned as a motivation several times. However, according to some interviewees, it was not the landowner's actual motivation. Instead, advisors believed that landowners focused on nutrient retention because they thought it increased their chances of receiving a permit and financial support for wetland construction. While advisors discussed multiple benefits of wetlands with landowners, the actual wetlands were most often constructed with a primary purpose of nutrient retention, due to funding available from the RDP and GN. On the other hand, converting unproductive land to a wetland was identified as a motivation as this generates income.

Interviewees explained that it is vital to engage landowners in discussions about the planned wetland from the beginning. Several interviewees emphasized that landowners are experts on their own lands, and in most cases, landowners had an initial idea of potential location or, in some cases, design. However, these initial ideas were often modified to improve environmental benefits and cost-efficiency during discussions between the landowner and advisor. A few advisors highlighted that even if a suitable location could be identified, the cost-efficiency of actual construction or

the chance to obtain funding could be low. One interviewee suggested that wetlands are not always optimally located as available funding does not necessarily cover the full costs, leading landowners to choose locations where construction could be fully funded. Landowner interest and possibilities to receive financial support were identified as the most influential factors for wetland purpose and location. Most advisors highlighted the need to maintain landowner interest, as the Swedish model for wetland implementation is based on voluntary participation. Because of that, financial support was also critical. However, some interviewees stressed that it is difficult to judge whether the possibility of financial support is the most decisive factor, as financial considerations typically enter the process at a later stage. Potential environmental benefits, estimated cost efficiency, and geographical constraints, e.g. topography, hydrology and sites of high biological or cultural values were also considered when planning wetland location. Most interviewees believed that a balance between these factors should always be sought.

All interviewees believed that landowner interest in wetland creation increased after their visits. Most also believed that landowner knowledge increased post visit. In general, advisors highlighted the importance of dialogue during the visits. They believed that listening and not just lecturing was crucial to build landowner interest in, and knowledge of, wetlands. Many advisors also highlighted the importance of being flexible and adaptable to different people, situations and possibilities, and to respect landowner interests and ideas.

Several interviewees highlighted that to encourage landowners to create wetlands on their land, it was necessary to show them that a wetland could provide multiple environmental and societal benefits, as well as provide detailed information on practical and technical aspects of wetland creation. Sharing photos of wetlands and giving examples of best practices were mentioned by some interviewees as good approaches to encourage wetland construction. Finally, a few interviewees mentioned the need to be realistic when talking about wetland construction, possibilities of financing, and other practical aspects. Particularly, it was important to make landowners aware that wetland construction and management are long-term commitments that stretch over time. Being pragmatic and realistic was, according to interviewees, important to building trust by making sure that landowners do not believe that important information has been withheld or not fully explained.

3.4. Barriers for wetland implementation and potential changes or improvements

Many advisors believed that GN is successful in connecting authorities and landowners and that wetland advisory visits are crucial first steps in wetland creation on private land. However, some interviewees raised certain obstacles and suggestions for potential changes in the advisory system. These included barriers linked to specific structures of the advisory system, as well as larger scale institutional barriers.

3.4.1. Barriers within the advisory system

Interviewees identified a number of barriers to wetland creation and restoration inherent in the advisory system. Many interviewees mentioned limited resources – both budget and time to visit landowners under the advisory visit. Resource availability differed both amongst and between regions (counties). This limited the amount of data

(e.g. measured land slope) that could be gathered on a candidate wetland site and of the information that could be shared with landowners. Interviewees suggested increasing the time and budget for wetland advisory visits for a number of reasons including increasing the quality of advice, permitting travel to sites further away and supporting consideration of multiple ES benefits of wetlands. A few advisors explained that, as consultants, they need to prioritise the requests they receive (i.e. they respond to demands as opposed to setting their own priorities). As a result, they often prioritise projects focused on nutrient retention as opposed to biodiversity or climate change adaptation. A few respondents highlighted the narrow focus on nutrient retention as an important limitation and suggested the need to consider a broader range of ES benefits. Particularly, interviewees suggested that GN should improve its communication and share good examples of multifunctional wetlands to encourage more landowners with different interests. The importance of start-up visits by general advisors was also mentioned by a few interviews. The agri-environmental advisors conducting such general start-up visits could recommend a wetland creation advisory visit, if they believed that wetland creation was suitable. However, many of these general advisors did not have wetland-specific knowledge and thus most often did not recommend wetland creation. Another reason for not recommending wetland advisory visits is competition with other farm advice services, as GN members are limited to seven free advisory visits. To address these problems, interviewees identified education of both general agri-environmental advisors and new wetland advisors as one solution, as well as removing limits on the number of advisory visits. Several interviewees also mentioned lack of sufficient long-term support, including follow-up visits, help with the application process and the design and construction of wetlands as barriers. Some interviewees were never involved with the actual wetland construction, while most were involved most of the time and some all the time. Interviewees suggested that longer and more comprehensive support chains could encourage more landowners and increase advisors' knowledge. Interviewees mentioned that not all landowners are aware of the need for wetland maintenance. Follow-up visits after two to five years would provide opportunities to evaluate the wetlands and the ES benefits they delivered as well as to provide maintenance support.

3.4.2. *Institutional barriers*

Advisors identified financial support systems, administrative issues, opposing interests and conflicts, and the lack of holistic views by advisory service management on wetland creation as large-scale institutional barriers. Almost all interviewees believed there are structural obstacles within the financial support systems. Specifically, they suggested that these systems are complex and not comprehensive, which created uncertainties about what measures can be compensated. Several interviewees also mentioned lack of continuity in financial support. For example, RDP funding in Sweden was withdrawn without notice during a period in 2013 and 2020, leading to uncertainty among landowners. Many advisors believed that such situations could lead to a decrease in landowners' trust toward both advisors and authorities. Financial support for wetland management is granted in five-year blocks. Interviewees suggested that this perceived lack of long-term commitment could lead to further reluctance among landowners to create wetlands, as these payments are an important income source for many of them. One interviewee stated that the key problem was that Swedish

authorities were not responsive to landowners' situations. Landowners take financial risks when planning a wetland and starting administrative processes, but they perceive a lack of security regarding compensation for their expenses and an absence of guarantees of continued support needed for wetland maintenance. Several interviewees highlighted that, as the Swedish system for wetland implementation depends on voluntary action by landowners, building trust and ensuring financial security should be crucial. It was suggested that all three programmes for wetland support (RDP, LOVA and LONA) should be gathered under one umbrella and support should be guaranteed for longer time periods. Some interviewees also suggested that instead of providing full payment after the wetland is created and evaluated (as is the case with the RDP), part of the payment should be given in advance, e.g. 75% is given at the start within the LOVA and LONA programmes (Table 1), to motivate landowners and make them feel more secure. For these two programmes, the remaining 25% is given after final approval by the CAB.

Several interviewees mentioned issues with administrative processes for wetland creation as landowners had to either notify (wetlands <5 ha) or obtain permission for creation (wetlands >5 ha) from the CABs and Land and Environment Courts. Interviewees believed that the basis for making the final decision as to whether a wetland was approved or not varied between counties, e.g. permission granted in one county might not be granted in another. Because of these perceived inconsistencies in the way regulations are interpreted and applied, interviewees felt it was difficult to stay updated on decision-making processes in each county, and to motivate landowners who often experienced the permit process as difficult. The advisors suggested the need for less complex and more standardised processing of applications among CABs.

Several advisors noted that discussions with landowners about wetlands and the financial support system focus mainly on nutrient retention, excluding landowners with other objectives. Interviewees suggested the need for a more holistic approach to wetland implementation. While one advisor mentioned that multiple benefits of wetlands have received greater recognition since the summer 2018 drought, in practice, the view on wetland functionality was still relatively narrow. As part of a holistic view on wetlands, some interviewees highlighted the importance of assessing where wetlands have existed historically in the landscape, as restoring and rewetting such areas was seen as more efficient than extensive excavation in new locations.

Some advisors mentioned opposing interests, particularly agricultural drainage associations, as a challenge to the implementation of wetlands. A drainage association is a form of joint property unit in a previously ditched and drained area. Any changes to the land must be agreed to by all association members, which can result in lengthy legal processes. This is particularly problematic in cultivation-intensive landscapes, where the number of drainage associations is high, and thus may limit possibilities for locating new wetlands. Interviewees suggested that advisors, consultancy companies and CABs would need more experience in handling drainage associations in the context of wetland implementation. Advisors mentioned that it is easier to work with smaller catchments or single landowners with large land holdings. Cultural heritage issues could also lengthen the process, or stop it completely, if expensive archaeological excavations are needed to exclude ancient remains. Another issue noted by some advisors is the fact that almost half of all agricultural land in Sweden is leased, which makes it difficult for either the lease holder or landowner to make long-term investments such as wetlands.

4. Discussion

Agri-environmental advisory services have been introduced in many countries to disseminate knowledge and motivate landowners to change agricultural practices and implement mitigation measures including wetlands. Such services may help to improve the economic performance of farms (Nordin and Højgård 2017; Cawley *et al.* 2018; Krafft *et al.* 2021). Our study has explored the perceptions of Swedish agri-environmental wetland advisors and confirmed their influential role in building trust and increasing landowners' knowledge about wetland creation. However, they also perceive barriers to their work, both within the advisory service and the institutional environment. We also point to some potential solutions that advisors suggest for improving the wetland creation system.

Interaction with landowners is crucial, especially given the voluntary nature of wetland creation and the need for landowners' willingness to act. For these reasons, advisors identified the importance of maintaining a good relationship with landowners, showing respect and building trust, a key component of environmental action (Young *et al.* 2016). Multiple interviewees highlighted the need for dialogue and for considering landowners' interests and motivations. The importance of mutual learning suggests that such a "bottom-up" or "participatory" approach can contribute to better uptake of environmental measures (Mills and Winter 2000; Sheath and Webby 2000; Ingram 2008; Klerkx and Jansen 2010). Furthermore, on-site visits not only help to build trust and good relationships between landowners and advisors (Ingram and Morris 2007) but are also valuable for mutual learning. Such visits offer advisors an in-depth understanding of the site and landowner's perspective, as landowners are experts regarding their own land and its management. Therefore, it is vital to have enough time during advisory visits for thorough discussions and dialogue. This, and the opportunity to gather more data and provide more detailed advice could result in more optimal wetland location, optimise wetland design and increase cost-efficiency (Djodjic *et al.* 2022). Unfortunately, many interviewees felt that the available time was too short and they identified the need for a more thorough, complete and clearer support chain from advice to finished wetland and follow-up visits. According to GN guidelines, a "wetland planning" field visit should motivate the landowner by suggesting wetland design and explain main nutrient retention processes and additional values (biodiversity, recreation, increased wildlife, irrigation etc.), looking at maps and give rough cost estimates. However, it should not include project management and wetland construction. If different advisors are involved in the construction phase, new contacts and trust must be built with landowners. A more robust and more complete support chain could facilitate trust building between landowners and advisors, a prerequisite for smooth collaboration (Sutherland *et al.* 2013). Long-term support and follow-up visits have previously been identified as essential for landowners to feel confident in proceeding with wetland creation (Hansson, Pedersen, and Weisner 2012). Only about a quarter of the GN members who received "wetland planning" advice eventually constructed a wetland (Greppa Näringen 2022). This is consistent with a survey of Swedish farmers showing that 30% were interested in wetland creation (Franzén, Dinnézt, and Hammer 2016). The same study also showed that prior knowledge of the EU Water Framework Directive (WFD) increased farmers' willingness almost threefold. Hence, it would be important to introduce the idea of potential wetland creation to general agri-environmental advisors, so that they can mention such possibilities during an initial visit.

Wetland implementation is dependent not only on landowner needs and wishes, but also on available funding, i.e. the size of financial subsidies influences landowner interest in wetland creation (Graversgaard *et al.* 2021). The majority of advisors identified the complexity and lack of continuity in the financial support system as serious barriers to wetland implementation. This assertion is supported by Swedish catchment officers, who stress that access to financial support is by far the most important factor influencing the tendency of actors to implement measures (SwaM 2021). Higher compensation (i.e. higher cost limit) and percentage coverage of costs incurred both significantly increase landowner willingness to create wetlands (Franzén, Dinnézt, and Hammer 2016). Until recently, the cost of most wetlands funded by RDP were not fully covered (Geranmayeh *et al.* 2023). Neither were the Finnish wetlands fully funded under the RDP earlier (Berninger, Koskiaho, and Tattari 2012). However, since 2023, all approved Swedish wetlands will get 100% compensation from RDP, as is the case in Denmark (Graversgaard *et al.* 2021). On the other hand, in Poland and other Baltic states, wetlands are not funded as an AES (Thorsøe *et al.* 2022). Lack of stable funding demotivates landowners and can reduce their trust in authorities and advisors, as occurred when the Swedish government suddenly withdrew RDP funds in 2013 and in 2020. The number of RDP-financed wetlands drastically decreased during 2013–2020, as only 263 wetlands were constructed compared to 1,451 wetlands during the previous RDP programme period 2007–2013 (Geranmayeh *et al.* 2023). Short-term funding is an important challenge for environmental governance (Folke *et al.* 2007; Sjöblom 2009), and there is a need to re-think funding strategies to ensure both the environmental action itself (i.e. wetland creation) but also proper long-term maintenance and monitoring (Herrick, Schuman, and Rango 2006). Our study confirms that ensuring continuity in funding has important implications, as trust in advisors and authorities, as well as funding, is needed to encourage landowners to participate in agri-environmental programs (Carolan 2006; Sutherland *et al.* 2013; Taylor and van Grieken 2015).

Our study revealed a lack of consistency in the assessment of applications for wetland creation by different grant managers and between regions, which makes it difficult to assess the possibility of receiving compensation before a complete application has been received. To complete an application costs time and money that the farmer does not want to incur before being notified whether it is possible to obtain support at all. Furthermore, the wetland advisors testify to too lengthy grant management, due to cultural heritage issues and drainage associations that can take several years. Even shorter management of 10 months can be a long time for farmers to wait for reimbursement if they do not receive any payment from the grant at the start of the work, only at the end. In addition, there is a risk of not getting all expense items approved in the end or a risk of deductions because the CAB does not approve the accounting. Hoffmann and Wärnbäck (2018) claim, in an opinion article, that many farmers cannot afford to use the RDP funds; hence some farmers finally withdrew their application to construct a wetland. Therefore, interviewees suggest, as an improvement for the RDP, that a part of the expected costs should be given at the start, together with a long-term financial system with a simplified application process with clear and similar assessment criteria, as well as providing information on drainage association praxis etc. Previous studies have shown that what promotes pro-environmental behaviour is landowners' perception of low risks and costs (Knowler and Bradshaw 2007; Blicharska and Rönnbäck 2018); thus, to gain support for activities

such wetland creation and restoration it is crucial to minimise effort and costs for them. The risk-taking is lower for landowners, and they were significantly more willing to create a wetland than leaseholders (Franzén, Dinnéztz, and Hammer 2016). This becomes a challenging obstacle, especially in countries with a large share of farmland under lease, considering that two thirds of the Swedish agricultural land is farmed under lease. Taking the risk reduces with long-term commitments such as wetland creation. Due to the long-term commitment, there is also a need to ensure wetland function maintenance over time. Since the 1990s, more than 15,000 ha of wetlands have been implemented for different purposes in Sweden and Denmark, respectively (Graversgaard *et al.* 2021). However, GN only provided “wetland maintenance” advice 430 times; thus this should be better promoted by both general and wetland advisors, or could even be made mandatory if a wetland was created. In addition, long-term payments for maintenance are crucial to enable long-term sustainable wetlands.

Furthermore, despite the large investments in wetland creation, very little money has been set aside to follow up long-term performance of wetlands and the effect of maintenance. This has led to very few wetlands that have been properly monitored long-term and there are very few studies on wetland design to promote multi-functionality (Hambäck *et al.* 2022). Thus, it is difficult to give advice on best design and how to benefit multi-functionality and trade-offs. Raising general awareness amongst wetland advisors, catchment officers and CABs on trade-offs and synergies of wetland multifunction, as well as the importance of wetland placement in delivering different types of benefits is important if they are to use this knowledge to motivate landowners to create wetlands. Therefore, there is a need for improved monitoring of multifunction to prevent pollution swapping. This can further facilitate creation of multifunctional wetlandscapes, i.e. landscapes with a set of interconnected wetlands designed for delivery of particular ecosystem services.

Sharing knowledge and experiences among different stakeholders is critical to navigate through the immense amount of agri-environmental information available today (Mills and Winter 2000). Building trust with landowners is also facilitated when advisors provide accurate and realistic information. The establishment of personal trust bonds between land managers and advisors is critical in the provision of advisory services (Juntti and Potter 2002; Sutherland *et al.* 2013; Taylor and van Grieken 2015). If landowners and farmers trust the information source, they are more likely to adhere to the content shared (Carolan, 2006; Taylor and van Grieken 2015). The results also showed that advisors believed their extensive experience increased their credibility, which is an additional factor that is assumed to promote trust (Sutherland *et al.* 2013). Educating new wetland and general advisors, as well as continuing to learn new techniques, designs and locations for multipurpose wetlands are important. Increased communication between advisors and CABs from different regions is also something that could increase knowledge and trust between actors. Earlier studies have shown that landowners are more willing to create wetlands that can provide additional environmental benefits, e.g. aesthetic values, opportunities for hunting and fishing, and other personal benefits (Söderqvist 2003; Asah and Blahna 2012; Hansson, Pedersen, and Weisner 2012; Grammatikopoulou, Pouta, and Myyra 2016). Interviewees also suggested that it is important to recognise the diversity of interest among farmers, as this can determine their engagement in voluntary water management measures (Blackstock *et al.* 2010). An evaluation of LOVA projects also showed the importance of a long-term and holistic perspective when introducing measures to reduce eutrophication (SwaM 2021).

Moreover, if advisors and catchment officers were able to provide information about what could be gained through multi-functionality, this could encourage landowners towards broader support of wetlands on their land. Increased understanding of wetland functions among landowners can further motivate them to implement wetlands (Graversgaard *et al.* 2021).

Even though, GN advisory, as its name “focus on nutrients” indicates, focuses primarily on wetlands for nutrient retention, the “Wetland planning” advisory service also includes finding suitable locations for biodiversity wetlands. Furthermore, there are several funds with different purposes available in Sweden. Of these, only the RDP is generally available. For a landowner to obtain a LOVA grant, they need collaboration with the municipality or non-profit organisations (such as Water councils), which can be difficult due to lack of trust towards municipalities. Farmers mostly trust other farmers, then CABs and then, the least, municipalities (Franzén, Dinnézt, and Hammer 2016). A catchment approach, with catchment officers showing good examples from other farmers and playing an important role to bridge landowners and municipalities would help to improve the landowners’ trust for municipalities and increase the collaboration and usage of available funds. A preliminary evaluation of the effectiveness of the 20 new catchment officers hired in Sweden in 2020 showed that despite the pandemic restricting opportunities for farm visits and meetings, they were catalysts for implementation of measures (SwaM 2021), promoting new applications worth over 250 million SEK, which is more than four times the cost for their employment. Thus, continued funding for catchment officers would promote further wetland implementation. Furthermore, the catchment officers could also promote multi-functionality, as other funds for wetlands providing a wider range of benefits such as climate change, floods, drought and recreation are available for them (Table 1). When compared to the Danish wetland implementation system that, since 1998, has shifted and narrowed its focus towards nitrogen reduction, the Swedish policies have had a more multifunctional focus (Graversgaard *et al.* 2021). Another difference is that the Danish system has mostly been top-down: municipalities decide where to implement large wetlands and only then do they contact the relevant landowners. Both the multifunctional focus and bottom-up approach have led to equal share RDP wetlands for nutrient reduction and biodiversity, respectively, during 2007–2020 in Sweden (Geranmayeh *et al.* 2023).

4.1. Conclusions

Our findings confirm previous academic literature. In countries where policy implementation builds on voluntary participation, farm advisors play an important role to inform and motivate landowners to undertake environment enhancing activities. Agri-environmental advisors can encourage farmers to create or restore wetlands, by not only providing information and advice, but also developing relationships that support trust and increase farmers’ motivation. Advisors encourage and support implementation of wetlands particularly by listening to landowner motivations (recreation, hunting, ice-skating etc.) that often differ from the policy focus on nutrients. While relatively expensive, farm advisory services seem to be effective in supporting broader uptake of wetlands and should thus be maintained. However, even after more than 20 years of advisory service and over 30 years of subsidies, several institutional and practical challenges must be addressed to allow for increased implementation of wetlands on private land. Specifically, less complicated administrative processes and long-term financial

and technical support are needed. Better collaboration between authorities managing different funds, increased education and awareness raising for advisors and government staff as well as longer time for the advisory visit and mandatory follow-up visits focusing on wetland maintenance should improve outcomes. Newly introduced catchment officers could be a catalyst for implementation of any nature-based solutions, particularly through their help in navigating the grant system and ability to use all available funds, promoting holistic multifunctional perspectives that align with landowners' motivation. Such a comprehensive approach requires both institutional changes and a transition to longer-term thinking about not only wetland projects, but also other mitigation measures and nature-based solutions implemented by other landowners such as municipalities, overcoming administrative short-termism common in environmental decision making.

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Supplemental data

Supplemental data for this article can be accessed [here](#).

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