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Multi-Actor Platforms in the Water–Agriculture Nexus: Synergies and Long-Term Meaningful Engagement

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Abstract: Solutions to current complex environmental challenges demand the consultation and involvement of various groups in society. In light of the WFD's requirements of public participation, this paper presents an analysis of the establishment and development of nine different multi-actor platforms (MAPs) across Europe set up as arenas for long-term engagements to solve water quality challenges in relation to agriculture. The MAPs represent different histories and legacies of engagement; some are recent initiatives and some are affiliated with previous government-initiated projects, while other MAPs are long-term engagement platforms. A case study approach drawing on insights from the nine engagement processes is used to discuss conditions for enabling long-term multi-actor engagement. The perceived pressure for change and preferred prioritization in complying with mitigating water quality problems vary within and among the MAPs. The results show that governmental and local actors' concern for water quality improvements and focusing on pressure for change are important for establishing meaningful multi-actor engagement when concerns translate into a clear mandate of the MAP. Furthermore, the degree to which the MAPs have been able to establish relationships and networks with other institutions such as water companies, agricultural and environmental authorities, farmers, and civil society organizations influences possibilities for long-term meaningful engagement.

Keywords: water governance; agriculture; multi-actor approach; engagement; participation; trust; social networks

1. Introduction

It is acknowledged that, to solve today's complex environmental challenges, the consultation and involvement of various groups in society including actors from the industry,

farmers, civil society, and politicians are needed [1–3]. While scientific knowledge is important for knowledge-based policy development, combining science and local knowledge from stakeholders is necessary for developing more inclusive approaches and locally targeted solutions [4,5]. In parallel with this recognition, stakeholder participation as a norm has been adopted by global institutions, i.e., UNCED, OECD, and the World Bank, and included in governance and conceptual frameworks such as the Integrated Water Resources Management (IWRM), the EU Water Framework Directive (WFD), Environmental Impact Assessments, and the Aarhus Convention (UNECE). Theoretical frameworks have also been developed to better understand the strengths and weaknesses of different participatory approaches in environmental matters [1,6]. However, debates continue over what are best practices for meaningful participatory approaches [7,8], as well as the possible benefits in terms of outputs and outcomes from enhanced stakeholder participation [9–11].

Practices of involvement typically referred to short-term involvement, with a distinctive top-down approach [12]. Public participation described in the WFD implies a shift in water governance across Europe, aiming for continuous involvement associated with the water management cycle [13]. The WFD requires participation during key stages of the planning process: when developing a work program to produce a river basin management plan, in prioritizing what are the most significant water management issues, and in drafting the river basin management plan. The directive states that “Member States shall allow at least 6 months to comment in writing on those documents in order to allow active involvement and consultation” [14] and that “Member States shall motivate for more active participation” (ibid.). The emphasis on participation by the WFD stands out from other EU directives that are important for governance of water and agriculture, i.e., the Nitrate Directive, the Sustainable Use of Pesticides Directive, and the Drinking Water Directive, as these do not address participation. In the WFD, however, participation is only specified in general terms, while no practice regarding type of actors or involvement on levels of governance are referred to. Access by local actors to platforms where perspectives can be presented and discussed is not regulated in the WFD or in other EU legislations [15]. The discretion perspective of the WFD allowing total freedom for Member States to decide the participatory approach adapted to the local context may reduce the effectiveness of the participation principle of the directive [16,17]. According to Jager et al.’s [18] study on WFD implementation, “broad engagement of ‘all interested parties’, including the general public, communities, and stakeholders, at all stages of the planning process has not materialized”. Other authors have demonstrated that the engagement platforms established with reference to the WFD vary in terms of their functionality, stakeholder representation, and opportunities for long-term engagement [17–19]. However, access to actors’ knowledge and perspectives is promoted by coordination platforms on different levels of governance, which is important for tailored and effective policy implementation [20–22]. There is a need for more research on how different multi-actor platforms with varying contexts and settings evolve, and how this may be associated with structural input factors such as economic resources, specified mandates, and connections to the government system.

In light of the WFD and the common implementation strategy for participation referring *inter alia* to continuous and ongoing participation as important for successful engagement [13], we discuss in this paper conditions promoting the long-term engagement of stakeholders. The paper provides an analysis of the establishment and development of nine different multi-actor platforms (MAPs) across Europe set up as arenas for long-term engagement aiming to solve water quality challenges in relation to runoff from diffuse agricultural sources. The MAPs represent different histories of engagement; some are new initiatives and some are affiliated with previous government-initiated projects, while other MAPs refer to long-term engagement platforms. To analyze the situation in the nine MAPs, we present MAP characteristics, as well as the MAP participants’ perspectives on the problem situation and their perspectives of synergies and added value of the engagement. Furthermore, risks challenging long-term engagement identified by MAP participants are presented. Factors and conditions required for enabling meaningful long-term multi-actor

engagement are frequently underestimated. To improve the outcomes of participatory processes, there is a need to advance the understanding of conditions promoting long-term engagement platforms. The concept of meaningful participation is used to discuss frames and conditions important for enabling long-term multi-actor engagement. While several articles focus on end results of participation for environmental status or for democratic rights [23,24], this paper discusses the different conditions that are important for the establishment of lasting multi-actor engagement platforms.

Multi-Actor Platforms—Added Benefits?

Multi-actor approaches have become important alternatives to the more technoscientific avenues to environmental policy, with the purpose of increasing societal involvement in research and policymaking [25]. Multi-actor approaches refer to arenas organized for the interaction between different groups of actors and stakeholders including authorities, experts, and representatives, in our cases, from land and water user groups. Hence, this also implies the inclusion of a participatory approach, ranging from very low levels of involvement to high levels of involvement [6,26]. These different levels of involvement are closely related to the outcome of participation concerning democratic processes, trust building, collaboration, and long-term relationships [27]. Where policies impact people's everyday practice, work, and/or economic situation, as is the case for farmers in agricultural areas, active involvement to avoid inefficiency, protests, and conflict is particularly important. Multi-actor approaches aim for "more demand-driven innovation through the genuine and sufficient involvement of various actors . . ." [28]. The vast literature assessing such approaches indicates the impacts of improved decisions and better environmental performance. Engagement processes can ensure that produced knowledge is scientifically valid and relevant [29], and that this can contribute to democratic rights if engagement is representative and transparent, with legitimate processes [30]. Moreover, ensuring the inclusion of multiple perspectives can lead to maximizing benefits and minimizing losses amongst stakeholders and actors. Benefits are often associated with social learning, emphasizing the engagement's process dimensions. Such gains can be expected but may not be immediately realized. Yet, studies have also shown the possible pitfalls and limitations of such approaches [1,31,32]. One challenge is to ensure appropriate representation of relevant actors, which can be practically difficult or not financially viable [2,33]. Another risk is unequal power dynamics influencing the quality of the engagement process and its outcomes, as groups and individuals with more resources are typically overrepresented and, thus, exert more influence on the agenda and the discourse. Care should be taken to ensure that participatory processes do not reinforce existing power imbalances [6,34,35]. Unequal power relations also impact the sense of meaningful engagement and the stakeholder endurance, which can be difficult to sustain over time [36,37]. The WFD mandates management in a participatory fashion, as well as the development of river basin management plans and programs of measures. Several studies, however, have described the continuation of centralized decision-making realities of one-way information flows and limited delegation of power to decentralized levels [38–40]. The WFD has been a strong influence for establishing multilevel governance in a nested system including platforms for stakeholder participation [38]. However, as noted by Huitema et al. [34,41], contested boundaries, a lack of transparency between sector institutions, and problems of vertical and horizontal interaction are challenges that need to be addressed by the river-basin institutions.

2. Conceptual Approach

To study multi-actor approaches and conduct analysis of the establishment and development of nine different MAPs, we developed a conceptual approach based on the literature illustrating how long-term and successful multi-actor engagement is constituted by four elements: (1) meaningful engagement, (2) a defined pressure for change to work toward a common goal, (3) the social network and social interplay, and (4) the need of

added value for the participants in the MAPs (Figure 1). In the next sections, we elaborate on these four dimensions.

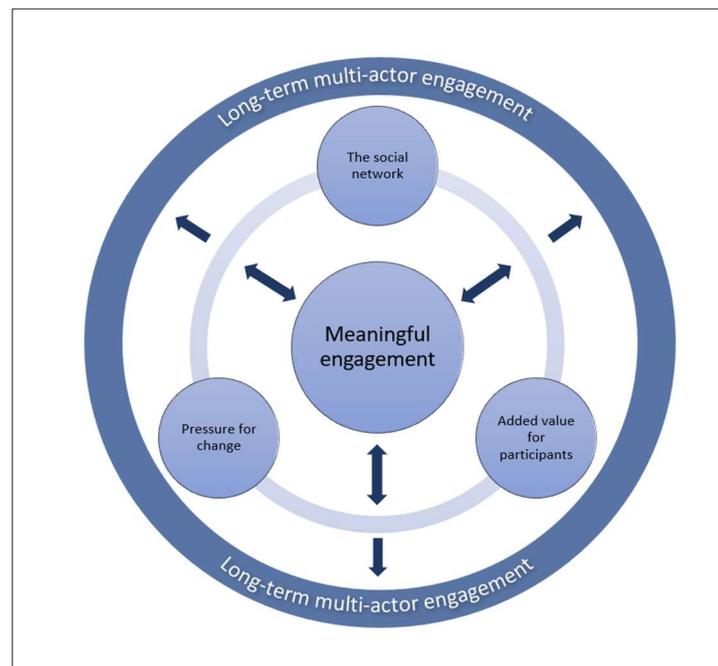


Figure 1. Key factors for long-term multi-actor engagement.

2.1. Meaningful Engagement

It can be expected that actors will not participate unless participation is experienced as meaningful. Meaningful engagement is defined as the right to be heard and the possibility to contribute to setting objectives [25,29,42,43]. Other factors known to have an impact on engagement are, for example, available time for participation, economic resources, and well-designed processes [7]. Refusal to participate might be a choice if there is risk of confrontation and conflict, or if actors' understanding of the problem situation differs (Ibid.), all to the detriment of meaningful engagement.

2.2. Pressure for Change

A pressure for change to mitigate diffuse water pollution from agriculture reflects a sense of urgency among local people and/or the government. This will have an impact on actors' views on participating in problem solving, thereby perceiving the engagement as meaningful [44]. Media, local or otherwise, can also be effective in providing a sense of urgency for bottom-up action and change. The degree that there is a mutual understanding of the main problem and objectives impacts the sense of pressure. Furthermore, actors who disagree with the objectives may choose not to engage, as they expect few achievements toward what they experience as more important objectives. While bottom-up concern is important for engagement, pressure for change reflected in mandates, policies, and regulations, representing political anchoring in the paper, are equally important [6,45]. Koontz and Newig [38] argued that it is the government that has the authority to initiate and regulate for collaborative planning between formal and informal sectors. The importance of top-down anchoring is also reflected in a study of multilevel governance networks associated with the Water Framework Directive in Norway by Hovik and Sandkjær Hanssen [46], where they argue for political anchoring and connections to the government system for water quality achievements, as implementing measures for improved ecological status of water is highly political.

2.3. MAPs and Social Networks

Due to the inherent nature of MAPs, as a platform where activities happen, it is important to analyze the broader social network to better understand what drives successful and long-lasting MAPs. Social network theory refers to the study of a network consisting of a set of nodes or actors and the ties between these nodes [47]. The nodes can be individuals, organizations, or institutions [48]. Ties may refer to personal relationships, or ties can reflect long-term policy practice and practice regulated by law. Social network analysis has been applied, *inter alia*, to study farmer knowledge exchange [49], to determine social capital and collaboration among actors [50], and to identify key stakeholders in governance and land-use decisions [51].

Within the social network theory context, we understand the MAP as a node where ties to other nodes, such as authorities and civil society organizations on horizontal and vertical levels, can be developed. It is assumed that nodes directly connected to the MAP reflect flows of information, important for vertical and horizontal communication of knowledge and coordination. We draw on these aspects of social network theory by focusing on the relations of MAPs with other institutions: whether the MAP is embedded within a formal governance structure, and whether the relationships (ties) make available financial resources for organizational purposes and implementation of measures. The emphasis of social network theory on relations among actors is in our study used to reflect on characteristics of well-established and long-lasting engagement platforms. The emphasis on social networks in this paper follows the increasing focus on network governance and its role for processes of social learning [41,46,52]. In line with Pahl-Wostl's [41] approach to analyzing environmental governance regimes, the relationship between formal state and informal nonstate institutions in networks needs to be considered in the analysis of meaningful and long-term multi-actor engagement processes.

3. Materials and Methods

In this study, we analyzed nine European initiatives to facilitate multi-actor engagement aimed at solving water quality challenges related to agricultural production. These initiatives have all been case studies in the FAIRWAY- Farm systems management and governance for producing good water quality for drinking water supplies project running from 2017–2021. The specified objective was to establish long-lasting platforms for engagement and cooperation between actors of different sectors and levels, including farmers, advisors, drinking water companies, scientists, and policymakers from the drinking water and agricultural sector, under the assumption that multi-actor interaction will ultimately improve water quality. The project's approach to multi-actor platforms can be described as action-based research where project partners contributed by taking part in developing the platforms, while taking part in the assessment and evaluation of this process [53]. A workshop was convened for project partners on how to establish and nurture MAPs for constructive engagement, which was organized according to key dimensions of engagement processes, adapted from Warner and Verhallen [33]. The aim was to critically assess the process of participation to identify opportunities and bottlenecks for meaningful engagement, shed light on challenges and how they have been addressed, and explore the future sustainability of the engagement platforms beyond the lifetime of the project.

To analyze the planning, implementation, and development of specific multi-actor processes, we conducted a case study analysis drawing on qualitative data, documentation, and insights from the respective nine engagement processes. Case study methods are well suited for situations involving complex events and processes, allowing the researcher to develop explanations regarding how outcomes are impacted by local conditions [54,55]. Case studies can be especially useful for researchers to understand complex phenomena in situations where multiple factors are potentially important and need to be considered [56].

3.1. Data Collection

The main data for our analysis constituted series of surveys carried out in 2019. These were done by national project partners in respective local MAPs on the basis of a common set of questions concerning the performance and functioning of the MAPs and aimed at harvesting lessons and best practices. The survey questions were tailored to the respective context of each MAP and used as part of an online survey or a structured interview. In some cases, follow-up interviews were also carried out. Respondents were active MAP members, in most cases, farmers, farmers' organizations, farm advisors, and government officials from local to regional level, while some also included representatives from waterworks, drinking water companies, and water catchment associations. This exercise was the basis for a qualitative (nonstatistical) analysis, identifying key patterns in an inductive fashion. A presentation of findings and a preliminary analysis of these data topics as synergies, trust, shared goals, and available resources (adapted framework from Warner and Verhallen [33]) can be found in Sundnes et al. [57]. Achievements gained are listed and further elaborated in the results. In total, there were 106 respondents across the cases, ranging from 5–29 per case.

An additional source of data was represented by "engagement plans" developed in all MAPs as part of the FAIRWAY project. These are important for understanding historical and contextual factors, description of relevant participants, and plans for the MAPs within the project timeframe. Particularly for the newly established MAPs, the plans provide important insights into the process of platform development. Project partners' interactions with MAP participants in meetings during the period from 2017/2018 to 2021 also generated important insights into the respective processes. For the more established engagement platforms with a longer history, we also drew on relevant documents and secondary literature pertaining to these particular MAPs.

3.2. Case Studies

Nine MAPs were set up to facilitate local and/or regional engagement processes to solve certain water quality challenges in the following countries: Denmark, England, Germany, the Netherlands, Northern Ireland, Norway, Portugal, and Slovenia (Table 1). The cases were selected to provide a range of experiences related to engagement processes in different contexts. Some of the MAPs were set up through the FAIRWAY project, while others have a longer history of engagement and were brought into the project according to their characteristics as engagement platforms. In all cases, a central coordinator was responsible for the running of the MAP. This coordinator also participated in the project's trainings, discussions, and evaluations of the engagement processes. The coauthors of this paper participated in respective MAPs as coordinators or participating researchers.

Although the engagement platforms vary according to the context and the kinds of actors they involve, they have clear commonalities. All the MAPs engaged with the local-/district-level government. Some also engage with regional and national authorities. In all the MAPs, farmers participated either as individuals or through farmers' associations, while, in some MAPs, agricultural advisors also participated. All MAPs engaged with relevant waterworks, drinking water companies, and/or water catchment associations/boards where applicable. All MAPs organized annual stakeholder meetings, while targeted activities, workshops, meetings, and field visits were facilitated according to the engagement plans of the respective platforms.

The MAPs also differed in several respects. The size of the case areas varied due to both institutional settings and water system characteristics, ranging from a few hundred km² to tens of thousands km². The nine areas covered different types of drinking water resources, pedoclimatic zones, types of farming, land use, legal frameworks, and governance approaches used. Hence, comparing these engagement processes offers a pan-European view on experiences with local governance arrangements for the protection of drinking water resources from agricultural pollution. Inspired by the framework developed by Sabatier et al. [35] for understanding a collaborative watershed initiative, Table 1 provides an overview of the cases, with details on pre-existing contextual factors and the history

of engagement for each case. While some cases addressed the quality of drinking water from surface water sources, others concerned groundwater. Some MAPs addressed issues pertaining to nitrates and/or phosphorus, while others dealt with pesticides or all of these issues. In some cases, there was a high level of conflict; in others, the tensions were less visible or absent. Some of the platforms had an official and formal mandate, while others were looser associations around more or less common challenges or problems. The characteristics of the respective MAPs and the development of the platforms are described in Section 4.

Table 1. Case area characteristics.

Country	Case Study Context	History of Engagement
Denmark, Aalborg municipality	<p>Pressure: Drinking water comes from groundwaters, which are vulnerable to pollution from nitrate and pesticides. Measures are implemented by voluntary agreements with farmers since 1998 including compensation. Farmers are required to implement measures according to actions plans; expropriation can be used.</p> <p>Status: Drinking water quality is at risk.</p>	<p>A “groundwater board (Grundvandsradet)” including 20 members that represent agriculture, environment, nature, forest, groundwater, etc. has been maintained by the municipality since 2011. This water cooperation is responsible for negotiation of agreements with farmers.</p>
England, Anglian region	<p>Pressure: Pesticide and molluscicide use lead to contamination of surface water, along with a lack of water treatment options. Measures include a knowledge exchange campaign. In a vulnerable catchment, there is also a campaign on product substitution, including financial incentives.</p> <p>Status: Drinking water quality is at risk.</p>	<p>Since 2015, the Anglian Water (private water supply company) catchment adviser has adopted a catchment-based approach through knowledge transfer/exchange to farmers and the wider industry, as well as product substitution. Farmers rely on advisers and government campaigns, as “catchment-sensitive farming”.</p>
Germany, Lower Saxony federal state	<p>Pressure: There is farm manure surplus in a region within the state. Drinking water is mainly sourced from groundwater wells.</p> <p>Measures include fertilization law, farm manure application techniques, discussions on inter-regional manure transport, and manure treatment.</p> <p>Status: Water quality is at risk in manure surplus regions.</p>	<p>Round table discussions initiated by municipalities on nutrient management and water protection have been organized in districts since 2017. Chairpersons are farmer representatives; participants are both agricultural and environmental representatives and local and regional authorities.</p>
Netherlands, Overijssel province	<p>Pressure: Dairy farming causes nitrate and pesticide leaching toward groundwaters. Drinking water is sourced from groundwater wells. Measures include reducing nitrate and pesticide by better nutrient management and targeted pesticide use.</p> <p>Status: Shallow groundwater nitrate standards are not met.</p>	<p>The province and the water company Vitens initiated the “Farmers for Drinking Water” project in 2011; as part of this, farmers have been invited to regional meetings to facilitate implementation of measures. The water company contributes with agricultural advice, agricultural accounting, regional rural development, etc.</p>
Netherlands, Noord-Brabant	<p>Pressure: Pesticides from agriculture and urban areas threaten the groundwater in several areas. Measures include the prevention of pesticides in rural and urban areas, and water purification measures.</p> <p>Status: Drinking water quality is at risk.</p>	<p>The province, water company, and the water boards initiated an engagement project in 2012. The agricultural organization contributes by facilitating communication to their members and links to agricultural education.</p>
Northern Ireland, Derg catchment	<p>Pressure: There is runoff from agriculture and forestry, with a focus on pesticide use and impact on drinking water quality. Drinking water is sourced from surface water. Measures include a water utility-led land incentive scheme to improve drinking water.</p> <p>Status: A final tranche of measures were implemented, and monitoring is continuing. Drinking water quality is at risk.</p>	<p>The national-level Water Catchment Partnership has involved the national government and NGOs with an interest in water management existed since 2013. A “Source to Tap” project in the Derg catchment was led by NI Water (Northern Irish water utilities) working with stakeholders to deliver a land incentive scheme to improve drinking water quality.</p>

Table 1. Cont.

Country	Case Study Context	History of Engagement
Norway, Vansjø/Morsa catchment	Pressure: Nutrients from agriculture and sewage from dispersed settlement posed a high risk to surface water quality in early 2000. Lake Vansjø is a drinking water source. Measures include intensive monitoring, with a focus on all contributors, as well as tailored agreements with individual farmers for environmental practices. Status: Water quality has improved but is still at risk in certain areas.	There has been a long history of actor collaboration in the area since the 1970s. The Morsa project was established in 1999 to improve poor water quality, engaging local and national politicians. Forms of collaboration among inhabitants, farmers, and local, regional, and sectoral authorities have been ongoing, although collaboration has primarily been between authorities at different levels and municipalities.
Portugal, Baixo Mondego	Pressure: There is an excess of nutrients caused by fertilizers such as manure and wastewater sludge. Drinking water is sourced from groundwater. Measures include national legislation and policy. Status: Some drinking water sources exceed nitrate standards and other limits of pollutants coming from agriculture.	There has been previous engagement with individual farmers in projects. There has been no previous multi-actor engagement platform in the catchment involving authorities, water company, and farmers.
Slovenia, Dravsko Polje	Pressure: Agriculture impacts water quality. Drinking water is sourced from groundwater. Measures include a water protection zone, while water companies mix water from shallow and deep wells to reach an acceptable quality. Status: Abstracted water in the lower parts of a shallow aquifer is polluted with nitrate (>50 mg/L).	There has been previous engagement with individual farmers in projects. There has been no previous multi-actor engagement platform in the catchment involving authorities, water company, and farmers.

4. Results

Considering the case context and engagement history of the different MAPs (Table 1), we present the nine cases in three categories related to stages of MAP development: MAPs at an initial stage of establishment in areas with no previous multi-actor engagement, MAPs representing ongoing multi-actor engagements, and MAPs referring to engagement platforms established more than 10 years ago. Furthermore, for each of the nine MAPs, the following elements are presented with information about MAP establishment and development: (i) the aim of the MAP, (ii) participants' understanding of the problem and objectives, (iii) participants' perceptions of synergies or added value associated with engaging in the MAP, (iv) achievements, and (v) risks challenging long-term continuation of the MAP (Table 2).

Table 2. MAP characteristics and developments Country, case study.

	MAP Characteristics					MAP Development: Strategy, Achievements, Learning Points, and Risks Challenging Long Term Engagement
	MAP Establishment and Stakeholders	Aim and MAP Mandate	Shared Understanding of the Problem	Synergies Associated with MAP	Economic Resources Available for MAP	
Denmark, Aalborg municipality	MAP initiated in 2017 including the water works, the municipality, farmers, farmer advisory org., Agri-Nord, SEGES. Facilitation: The waterworks, municipality.	Aim: Improve collaboration and contribute to common understanding of the pressures and processes. Mandate: Project supported by the municipality and the waterworks.	No shared understanding of the need for additional groundwater protection between the farmers and the Water Collaboration Aalborg.	Low level of synergies associated with the MAP. Farmers received some economic compensation from implementing measures.	Economic resources available for compensating farmers when they implement measures.	Strategy: Separate meetings were conducted with farmers and other actors to understand perspectives and to find a common space for dialogue. Achievements: Common platform for communication enabled in 2021. Learning points: Agronomic advice being individual and free of charge for farmers; transparent approach; compensation should be indemnified and fair. Risk: Conflicts.
England, Anglian region	MAPs initiated in 2017 with Anglian Water (AW), ADAS, Environment agency, farmers, agronomists, agricultural industry. Facilitation: Univ. of Lincoln, AW, catchment advisor.	Aim: Develop bottom-up approaches to farmer engagement to meet their and the water company's needs. Mandate: MAP to be facilitated by the AW catchment adviser for continued engagement.	Initially different understanding of what is the problem of focus, the farmers focus on their problem with weeds, while the water company focus on water quality.	A focus on solutions affecting farmers, AW was able to develop a greater presence in the catchment. This created farm trials and projects of high synergy to both parties as they had been co-developed.	External funding was generated to develop MAP activities. In kind provided by AW, otherwise no resources. Continuation will be through AW catchment advisor.	Strategy: Focus on farmers' challenges. Field demonstrations; expertise in both farming and environmental protection. Achievements: Common knowledge-base, shared understanding, networks for continued engagement. Learning points: Understand farmers' issues for meaningful engagement; priorities of water companies may differ from farmers' – work to solve farmers' issues first to gain trust. Risk: Lack of funds for long-term continuation.
Germany, Lower Saxony	MAP initiated in 2017—including representatives of district authorities for water and agriculture and local advisory services. Facilitation: A farmer representative is the chairperson.	Aim: Discuss viable compromise how farm manure surplus in the northwest by transfer to the southeast could work. Mandate: Support by municipalities and the federal state, no mandate to formally agree on measures.	Shared understanding on the need to reduce diffuse nitrate pollution from agriculture. Not all actors agree on inter-regional manure transport to reduce environmental pressure in the northwest.	High synergy level as all actors are very interested in the topic.	No formal legitimization of the MAP - hence there is no continuous external funding.	Strategy: Trust-building factors, official and informal meetings. Achievements: Varying perception of the success -some see the MAP as an information source, but not solving the actual issues. Learning points: Transfer of knowledge is ranked as the most important trust-building factor; increased farmer participation give legitimacy to the MAPs being achievements; need to tailor to particularities in the different districts. Risks: Weak mandate and lack of funds.

Table 2. Cont.

	MAP Characteristics					MAP Development: Strategy, Achievements, Learning Points, and Risks Challenging Long Term Engagement
	MAP Establishment and Stakeholders	Aim and MAP Mandate	Shared Understanding of the Problem	Synergies Associated with MAP	Economic Resources Available for MAP	
Netherlands, Overijssel province	MAP initiated in 2011. Farmers, agricultural contractors, municipalities, water company. Facilitation: The province and the water company Vitens.	Aim: Platform to discuss current situation, agree on measures and evaluate the implementation of these measures. Mandate: Provided by province and water company.	Broad consensus on the need to improve groundwater quality (lower nitrate levels) by improving the efficiency of the use of nutrients through a mutual gain approach.	MAP represents a network of people; Farmers use MAP to also discuss other issues and potential solutions such as the drought-issue.	Funds for the MAP and associated activities are provided on a continuous basis by the province and the water company.	Strategy: Creating a network for knowledge exchange. Individual advise on farm management in combination with economic impact. Achievements: Exchange of knowledge; new insights by actors; a trust-building platform between farmers, the province and the water company; Learning points: voluntary approach and measures may not be enough to meet the water quality standards. Risk: Continuity dependent on budget provided by actors.
Netherlands, Noord-Brabant province	Ongoing MAP initiated in 2011 includes: water boards, water company, agricultural org., local and regional authorities, farmers. Facilitation: Water company and agricultural organization.	Aim: Reduce pesticide in surface and ground waters. Mandate: Provided by the water company, provincial authorities and water boards to discuss measures and solutions.	Common understanding on the need to reduce pesticide use, and/or use pesticides “responsibly” to improve drinking water quality.	Access to advice and demonstration of new measures; insights into the complexity of pesticide regulations.	Funds have been available by means of a joint collaboration between water boards and the water company; agricultural organization contributes with in-kind resources.	Strategy: Building trust over time, collaboration to find solutions, include a variety of relevant local actors. Achievements: Reduced pesticide use possible for certain crops; MAP serves as basis for sharing perspectives and decision-making. Learning points: visualization of environmental impact important; trust-building involves mutual understanding among actors. Risk: Continuity of MAP depends on available resources and voluntary engagement.
Northern Ireland, Derg catchment	MAP initiated in 2017 builds on the Source to Tap project team and the Water Catchment Partnership, AFBI, Irish water, Northern Irish Water, Ulster University, Rivers Trust, East border regions.	Aim: Protection of drinking water by addressing pesticide use; comply with regulations on pesticide use. Mandate: By national, regional, local authorities, associated with requirements of the WFD, the ND and DWD.	Shared understanding of need to protect drinking water by reducing pesticide use. Also emphasized need for awareness raising at the national level and at the local level - communicate impact on their drinking water.	Access to information on best practice on sustainable land management or nutrients management and the MAP contribute to community engagement/involvement and raise awareness.	Resources available through projects Source to Tap, SCAMP and through NIWater. Insufficient funds for measures, slow implementation.	Strategy: Build relationships between partners; monitoring and evaluation of a farmer incentive scheme. Achievements: Increased knowledge and awareness, understanding of farmer’s perspectives, relationship between water company and landowners, reduced pesticide levels. Learning points: Patience needed to see results, building trust takes time, information need to be targeted. Risks: Possible lack of funding, changing national policies; change of staff to less dedicated staff.

Table 2. Cont.

	MAP Characteristics					MAP Development: Strategy, Achievements, Learning Points, and Risks Challenging Long Term Engagement
	MAP Establishment and Stakeholders	Aim and MAP Mandate	Shared Understanding of the Problem	Synergies Associated with MAP	Economic Resources Available for MAP	
Norway, Vansjø/Morsa	The MAP established in 1999, incl. municipalities, political representation, a secretariat, water company, working groups, representatives from NGOs incl. farmers. Facilitation: Secretariat.	Aim: Improve the water quality and environment of the catchment. Mandate: By catchment municipalities, national authorities. Associated with implementation of the WFD.	A common understanding and awareness of problems achieved in the MAP – associated with monitoring efforts over decades. Some differences in political priorities at different governance levels.	Knowledge exchange and possibility to influence discussions.	Financial resources available from municipalities, from national and regional authorities for organization. Also for measures since 1999.	Strategy: Involvement by means of four thematic working groups (sewage, agriculture, environmental monitoring and the coastal area). Achievements: Proven and efficient measures that show results. Learning points: Political representation, a secretariat and thematic groups are cited as key elements to achievements. Risk: Few risks challenging long term engagement.
Portugal, Baixo Mondego	MAP established in 2018 including national, basin and regional authorities, farmers' associations and farmers. Facilitation: Researchers familiar with actors in the region.	Aim: Platform for exchange of information between farmers and the public, for dissemination and transfer of knowledge. Mandate: Informal, by national, regional authorities, farmer association.	Shared understanding that aquifers have too much nitrate. Varying perspectives of purpose of MAP, some on practices for improved water quality, others on economic performance of agriculture.	Synergies in learning, but otherwise low levels –experienced as a concern for continued activity. Limited extent able to influence the priorities of the map.	Increased knowledge of farm management and current agricultural practices in the area.	Strategy: Contribute with increased knowledge-base, solving differences by means of open dialogue and informal meetings. Achievements: More interaction between actors; better understanding of other points of view - only partly regarding agriculture practices. Learning points: Changing practices takes time and depend on technology, funding, increased knowledge. Risk: Lack of funding and common goal a challenge for MAP continuation.
Slovenia, Dravsko Polje	MAP established in 2018 with ministries, drinking water company, agricultural comp., agri. advisors, municipalities, farmers. Facilitation: Project researchers and local agriculture advisory service.	Aim: Solve problems of farming in the water protection buffer zones. Mandate: Given by the presence of authorities, but no real mandate to implement changes.	The actors reflect different goals: farmers/agri. comp./advisers – proper financial support or new land; water companies – less emissions, trust with farmers; municipalities - clean drinking water; Ministries – measures agreed with farmers, trust.	Outside of the MAP - low level of synergy about MAP future. The MAP reported contributing to improved synergy. Synergies could be improved if ministries would recognize local MAP as partner in communicating local issues.	Increased knowledge of farm management and current agricultural practices, regarding measures and subsidies. The MAP could become part of agri. adviser public service paid by Ministry for agriculture.	Strategy: Meetings for knowledge exchange and to discuss focus and priority of MAP. Achievements: Better communication between stakeholders, address a common issue. Learning points: MAP discussions need to be considered by decision makers; formal meetings are taken more serious by actors. Risk: Politicized issues, poor cooperation between gov. agencies and ministries, insufficient emphasis on the need for solving the problem.

4.1. MAPs at an Initial Stage of Establishment

The MAPs in Portugal, Slovenia, and Denmark were established in the period between 2017 and 2018 in collaboration with local and regional actors, and water companies, facilitated by a research team. In Portugal and Slovenia, no previous platforms for engagement among farmers, water companies, and authorities existed, while, in the Danish case, a previous engagement platform with farmers and other actors had been ongoing since 1998. The MAPs in Portugal and Slovenia were established for exchange of information, to enable dialogue, and to better understand different perspectives of farmers and local authorities. The long-term objective of the MAPs is to help farmers change their agricultural practices for improved surface and groundwater quality. In both cases, MAP participants in general shared an understanding that runoff from agriculture to water resources is a problem that needs to improve for the benefit of groundwater and surface water quality. Some participants, however, indicated that there were different views on the problem situation and the objectives of the platform. This became apparent when discussing the need for changing farming practices. In both MAPs, improving the economic performance of agriculture was raised by some as a main objective, in addition to improved water quality. In the Portuguese MAP, this was addressed when discussing how to create conditions for developing the circular economy in the agricultural sector. Participants in this MAP further argued that changing practices is dependent on technology, funding, and increased knowledge.

In the Slovenian case, it was emphasized that “more initiative is needed from the government”; it was explained that, when funds are unavailable for new technology, farmers can only make a limited contribution to solve the issue. Regarding the strategy for establishment and development of the MAPs, both the Portuguese and the Slovenian MAPs highlight a strategy of open dialogue with many actors to identify agriculture–water-related topics that need to be discussed and solved in the coming years. Formal and informal meetings were organized to build trust and to improve interaction among actors. The MAP participants concluded that a rather limited number of actors in the platform, a maximum of 15 in the Slovenian case, was preferable. The Slovenian MAP participants emphasized that it was important to include all relevant stakeholders while still limiting the total number of participants to facilitate actual dialogue and a feeling of being heard. Synergies and added value of engaging expressed by the participants were increased learning and understanding of different perspectives, corresponding to the overall stated achievements of a better understanding of actors and communication between actors within the MAP. Regarding risks for long-term continuation of the engagement, participants in both these MAPs emphasized that the lack of funding and lack of common goals represent risks. It was also stated that acknowledgement and recognition by the government through formal meetings is important. In the Slovenian case, it was also mentioned that an important criterion for success is the extent to which their recommendations are considered by the decision-makers, and that politicized issues, change of government staff, and poor coordination among national-level authorities are risks for continuation.

The Denmark Aalborg MAP was established with the mandate from authorities to enable dialogue about groundwater protection in the Aalborg area. The strategy for establishing the MAP was, firstly, to gain a better understanding of the situation and the different actor perspectives by means of facilitating bilateral meetings and, secondly, to provide a forum for achieving a more mutual understanding of water quality pressures. The aim was to find common ground between the groundwater board and farmers on the need for additional groundwater protection. The Aalborg MAP was established after several years of farmer engagement as part of a governance system of voluntary agreements with compensation with farmers to reduce nutrient discharge from agriculture, organized by the municipality and the local waterworks. According to informants engaging in the MAP, however, the previous engagement process regarding the voluntary agreements was loaded with conflict. There was disagreement among actors on the process of how measures in agriculture were implemented to protect water quality, and farmers in the area felt discontent with the compensation levels in the voluntary agreements, as they saw

few or insufficient synergies for their benefit. This resulted in an initial distrust between actors, representing a barrier for establishing the MAP. While trust between actors was not achieved during the first years of engagement in the MAP, currently, after several bilateral meetings and workshops, partners are again interacting. Some key lessons were learned through interviews with actors in this case. Agricultural advisory services that are individual and free of charge were highlighted, as well as the need for a larger “toolbox” of measures to be implemented. Lastly, it was emphasized that land consolidation, sufficient farmer compensation, and information to farmers and other stakeholders are key for a successful engagement process.

4.2. MAPs Representing Ongoing Multi-Actor Engagements

Platforms for engagement among farmers, waterworks, and authorities already existed in the cases of England, Northern Ireland, and Germany as part of pre-existing government initiatives for improved water quality. In the cases of England and Northern Ireland, MAP meetings were organized and facilitated by researchers in collaboration with water companies and local/regional authorities. In Germany, the farmers representatives chaired the meetings with administrative help of the agricultural Chamber of Agriculture, a hybrid organization for farm advisory and discharging tasks of public administration.

The MAP in England was established by researchers supported by the Anglian Water (AW) catchment adviser and consultancy ADAS. It is associated with a knowledge transfer program initiated by AW and local authorities in 2017, including incentives to reduce the use of pesticides for slug control. Initially, actors did not share an understanding of the problem, and their needs and priorities did not match. Farmers focused on the blackgrass weed problem, while the water company and authorities focused on pesticides causing poor water quality. The MAP aimed to develop a farmer engagement process to improve pesticide management through a “bottom-up approach”. Central to this strategy were interactive events that included field demonstrations for practical learning, discussions, and experiments. MAP participants stated that benefits of engaging were access to agronomic knowledge and practical advice on best practice from farming industry actors. Several new partnerships and collaborations, such as field demonstrations, trials, and a collaborative stewardship project were developed after the events, extending the network of the MAP. Continued engagement was facilitated by the catchment adviser. Achievements of the MAP are associated with trust-building, strengthening relationships, and communication, knowledge, exchange, and gained credibility by working with the farmers to address their issues for future long-term co-beneficial collaboration. Lack of external funds, possible reliance on individuals, and a time-demanding process were emphasized as risks for long-term continuation of the MAP.

The Northern Irish MAP was established in 2017, seeking to raise user awareness of the risks associated with pesticide contamination of surface water through educational events, as well as financial incentives encouraging the adoption of best practices. The MAP consists of scientists, local water utilities, and organizations with an interest in developing community-based solutions to surface water quality challenges and engages with the local farming community. The MAP participants are all aware of the problem of pesticide contamination, but views on the problem and potential solutions vary according to their individual experiences. One strategy to encourage engagement in the MAP and build trust between participants was sharing water quality monitoring data gathered in the catchment and linking this to information on pesticide persistence and mobility in the environment. Stakeholders observed that this allowed them to understand that “mitigation schemes do not fix the problem immediately” and that building trust within a multi-actor platform takes time. Other achievements noted by participants were that the MAP encouraged behavioral change reducing pesticide use, and that engagement improved between water companies and landowners. Uncertain financial funding for impact assessments, to assist farmers in adopting new measures and for dedicated facilitation of the MAP, is considered

a risk to its long-term continuation. Another challenge to getting the right stakeholders involved is the lack of legal compulsion for organizations to engage with the MAP.

The MAP in Germany involves “roundtable” discussions on nutrient management and water protection”, being practiced in the area since 2017 by local and regional authorities, advisors, and farmers. The MAP has a mandate from federal state- and local-level authorities to address surplus organic manure in one region by improving inter-regional manure transport while also reducing nitrate pollution from agriculture within predefined conditions. Yet, the mandate was limited as the MAP was not able to influence the development of regulations targeting fertilization practices. The MAP participants in general had a mutual understanding of the problem as there was agreement on the overall aim of reducing diffuse pollution. However, disagreement occurred when discussing what could be done to enable inter-regional transport. The MAP strategy has been to organize mostly formal meetings with room for informal talks in breaks and after the meetings, sometimes followed up by bilateral meetings. The aim is to understand perspectives and build trust in combination with knowledge transfer to find viable compromises by identifying the potential and limits to the measure of transferring surplus farm manure from the northwest to the southeast. Added value and synergies from the engagement being expressed included getting information on manure processing and increased knowledge of regional nutrient management and on suitable measures. The main achievement was enabling a common understanding of the situation. The farmers’ representatives expressed appreciation for the opportunity to raise agricultural issues in front of the authorities. The lack of a strong mandate and funding to implement measures was a barrier for further achievements. Risks for long-term continuation were the lack of clear legitimization of the MAP and, as a consequence, no funding to implement concrete measures.

4.3. MAPs with a Long History of Engagement

The multi-actor engagement in Norway, Netherlands Overijssel, and Netherlands Noord-Brabant (hereafter Netherlands O and Netherlands N-B) were established more than a decade ago. The first engagement platform preceding the current MAP in Norway was established in 1999 by eight municipalities in response to drinking water quality concerns. The engagement platform represented a continuation of different engagement processes by municipalities and regional authorities since 1977 [58,59]. The current MAP, established in 1999, includes a board of majors and other user interests, as well as a secretariat including an employed manager, and it is structured by thematic working groups. Funding for a general manager responsible for coordination of the MAP is based on a shared contribution by the municipalities, as well as some national support. Initially, during the early 2000s, there were relatively high conflict levels among actors about the causes for declining water quality in Lake Vansjø [58]. The initial strategy associated with the engagement platform at this time was to build trust among actors in the MAP by making available scientific and knowledge-based information about the situation in the lake. Furthermore, a high frequency of both formal and informal meetings with different actors within and outside of the platform, also involving the local media, was part of the strategy. National government attention to the problem was ensured, with subsequent funds for research projects and a monitoring program. The MAP primarily consists of local and some county and state regional authorities, with representation from stakeholders such as the farmer organization and the water company. Achievements in improved water quality conditions are closely related to political anchoring, an active secretariat, and effective policy mechanisms. The risk that the MAP will not continue in the long term is low, as the engagement platform is embedded in the Norwegian governance approach to WFD.

The MAPs in Netherlands O and N-B were both established in 2011 for improved drinking water quality, through initiatives by the water company and with contributions from the provinces and the agricultural organizations. The focus in Netherlands O is on nitrate and pesticide leaching toward groundwater in the recharge areas of vulnerable abstraction sites, while the Netherlands N-B case is specifically focused on reducing pesticide

use considering national and European regulations and laws. Actors in both MAPs express a broad consensus on the central problem: improving surface and groundwater quality by improving the efficiency of the use of nutrients and by reducing the impact of pesticides (Netherlands N-B) through a mutual gain approach. The strategy of the engagement in both MAPs represents a variety of different types of activities, including knowledge exchange and individual farm management advice on practical issues associated with, for example, catch crops and lower nitrogen levels in manure. MAP participants point to benefits of knowledge sharing, gaining relevant insights and a feeling of being heard, including an opportunity to also discuss other related issues, such as drought. Achievements mentioned include increased awareness of nutrients in farm and soil management and enhanced communication between farmers and the water company. Farmers in Netherlands O are increasingly using the project to discuss other related issues. Risks identified for long-term continuation of the MAPs were a lack of structural measures, such a clear mandate and anchoring in the governance structure, as well as a lack of financial incentives.

5. Discussion

Meaningful Engagement Strategies and Social Network Factors Promoting Long-Term Multi-Actor Engagement

In all the MAPs, it is evident that the participants through the engagement processes have reached some degree of mutual understanding of the problem. However, the emphasis on and priority in attending to water quality problems vary within and among the MAPs. The varied perception of pressure for change among informal and formal sectors in the cases has implications for the likelihood for continuous long-term engagement. National government and local actors' concern for water quality and pressure for change seem to be important conditions for establishing meaningful multi-actor engagement [44,60] when such concerns translate into a clear mandate of the MAP. In line with Fraser et al. [61], Reed [1], and Reed et al. [6], the case studies presented in this paper show that top-down anchoring links discussions in engagement platforms to national and regional policy developments. Such anchoring is important, as it is the government that has the authority to initiate collaborative planning between formal and informal sectors and to acknowledge collaborative planning results [46]. Furthermore, when the government initiates collaborative planning between actors, funds for organizing and coordinating the engagement platform may follow.

In Portugal and Slovenia, where the MAPs represented new platform initiatives for policy discussions among water works, authorities, and farmers, MAP participants emphasized in interviews and surveys a need for increased involvement by the national government for stronger formal support. While formal support and top-down anchoring is needed, the German MAP illustrates that only when top-down anchoring reflects a strong mandate can long-term meaningful engagement be expected. A perceived weak and limited mandate, as was the case for the German MAP, challenges meaningful engagement, since the possibility to impact decision making is often equally limited [59]. Initiatives to establish MAPs for communication and collaborative efforts represent only a first step for enabling negotiation and problem solving among governmental and nongovernmental stakeholders for improved water quality status. Indeed, in line with results by Vitálišová et al. [62], the MAP in Norway illustrates that, when there is a clear mandate supported by financial resources, in this case, provided by a formal governance structure and the water management cycle of the WFD, long-term engagement is facilitated. In this MAP, political anchoring and vertical coordination occur by means of representation from national governance levels in regional and local multi-actor platforms or networks important for communication and transfer of knowledge [41,46].

The level of concern was in some MAPs influenced by diverging understandings of the problem situation among actors and/or by other pressing issues, such as the blackgrass weed in the English case. To promote engagement in a situation where pressure for change varies among actors, the case studies show that there is a need to address local actors' concerns, e.g., weeds harming agricultural yields in the English MAP or economic performance

of agriculture being a prioritized objective in the MAPs in Portugal and Slovenia to enable synergies and added value of engagement. Furthermore, Kochskämper et al. [39] showed in their paper the importance of local participation, as this provides added outcomes of the engagement on learning and enhanced understanding.

In the Danish MAP, farmers' lack of concern for the pollution situation was not due to not wanting better water quality, but due to a disagreement regarding the understanding of the problem. The farmers disagreed with the water works and the authorities that it is the farmers' responsibility alone to address the problem. The strategy of the MAP to improve the engagement process was to increase the understanding of the different actors' perspectives and to improve trust and confidence among the participants. Improving confidence among actors about the situation can also be achieved by communicating monitoring results to actors, a strategy exemplified in the Northern Irish MAP and in the Norwegian MAP. An efficient monitoring program also provides information on other diffuse pollution sources [59]. In general, the increased acknowledgment of different perspectives on the water–agriculture complex was flagged as an important achievement of the MAP processes, being an important contribution toward creating an enabling context for collaboration and engagement. In accordance with Sabatier et al.'s view [35] that successful collaborative approaches require varied strategies for meaningful engagement, these cases illustrate the use of techniques such as identifying win–win solutions, acknowledging farmer's problems, and knowledge-based and collaborative learning. Prutzer et al. [63] argued that, to meet the multitude of obstacles to collaboration and trust, in processes with social learning ambitions, a supportive context is key. In accordance with this argument are the studies that show that active and visible platform coordinators and making use of a diversity of strategies are important for the development of trust and for supportive engagement approaches [1,46,64]. Yet, building confidence and trust in a conflict situation requires extensive efforts over time and approaches for enabling a mutual understanding of the problem situation.

The degree to which the MAPs have been able to establish relationships and networks with other institutions such as water companies, agricultural and environmental authorities, farmers, and civil society organizations seems to influence the possibility for long-term meaningful engagement. The MAP itself can be described as a network since participants may be institutions and/or organizations at different governance levels [46]. Typically, however, long-term MAPs as represented by the Norway Vansjø and Netherlands Overijssel and Noord-Brabant MAPs have been able to establish relations with other institutions and actors that provide access to policy information and economic resources. These networks were established over several years as part of developing trust among MAP participants, and between MAP coordinators and other external actors at higher governance levels, as well as end-users. In accordance with other authors, development of such networks with high cohesions requires skills, time, and resources [46,64,65]. In contrast, for the MAPs in the other case countries, most typically for the MAPs in Portugal and Slovenia that are rather recent establishments, time did not allow for the development of such network links. Regarding the MAPs representing ongoing multi-actor engagement, i.e., the cases in England, Northern Ireland, and Germany, some network connections were established. However, the challenge of enabling long-term funds for coordination of the MAPs was not solved. Across MAPs, participants identified uncertainty and a lack of funds for coordination of the MAP, as well as not being considered by policymakers as risks challenging long-term engagement. Hence, obstacles to engagement for the development of trust and collaboration can also be of an external organizational, financial, and administrative nature [66]. In line with Koontz and Newig [38] and Emerson et al. [67], an important criterion for long-term meaningful engagement is for collaborative efforts such as MAPs to reside within a broader governmental regime.

6. Conclusions

The paper discussed the conditions and factors promoting long-term engagement by drawing on experiences from nine MAPs across Europe. Participants in these MAPs highlighted synergies and added value from contributing, and they identified challenges for developing long-term engagement platforms. It can be expected that actors will not participate unless participation is experienced as being meaningful by the different types of stakeholders, defined by Pirk et al. [43] and others as the right to be heard and the possibility to contribute to setting objectives. We argue that a meaningful engagement platform is furthermore dependent on both top-down and bottom-up pressure for change for improved water quality. Pressure for change is, however, dependent upon a common understanding of the problem situation among actors. Bottom-up engagement needs to involve end-users to identify local concerns, while dialogue and sharing experiences contribute to trust and to increased understanding of different perspectives. It can be expected that, for engagement platforms to be meaningful, actors' concerns, such as farm management practices, drinking water quality, and legal and administrative requirements, need to be acknowledged and addressed. Furthermore, strategies for meaningful engagement need to involve top-down anchoring and a clear mandate that provides possibilities to have an impact on policy discussions.

While stakeholder participation has been established as a norm in governance frameworks and by global institutions, normative rules for participation processes, such as the need for engagement at different levels of governance, still remain to be included in European legislation. As the WFD is the only directive that refers to participation as essential for its successful implementation, this directive takes a special role among directives in regulating the involvement of end-users to identify tailored and relevant measures to meet water quality objectives. The current engagement status in Member States shows varied levels in terms of the function and impact of engagement with stakeholders. While the discretion perspective of the WFD is important for national adaptation, this perspective will not be violated by specifying the need for engagement processes that involve local end-users, as well as the need for financial, and administrative support from higher governance levels.

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