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The human side of ecosystem restoration

Identifying community engagement strategies that support the long-term success of European wetland restoration projects

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Abstract

European wetlands are highly valuable ecosystems, and their rapid decline renders them a priority for ecosystem restoration efforts. Although successful ecosystem restoration requires the engagement of local communities, little is known about effective community engagement strategies in European wetland restoration projects. By interviewing restoration practitioners, this research explored community engagement strategies used by nine successfully completed EU LIFE-funded wetland restoration projects across eight European countries.

Interviews were analysed using qualitative content analysis, guided by a literature-based interdisciplinary set of community engagement principles. The analysis led to the formation of a new conceptual framework for community engagement in European wetland restoration projects, which groups the identified community engagement strategies into six themes: (i) **connect** with the local community by creating networks, partnerships, personal relationships, ensuring visible leadership, and early and broad stakeholder involvement; (ii) **empower** the local community by creating a common vision, creating structures for representation and participation, managing power dynamics, and facilitating bottom-up initiatives; (iii) **learn** from and **teach** to the local community by adapting to the local context, exchanging knowledge, and building capacity and resources; (iv) **integrate** restoration activities into the local community by creating locally relevant benefits and local events; (v) **demonstrate** the success of restoration activities and use focal species for restoration; and (vi) **persist** in the local community by creating successor projects and committing to long-term collaboration with the local community.

Moreover, using the perspectives of restoration practitioners, this research identified the community engagement strategies which were considered most important in supporting the long-term success of European wetland restoration projects. Using theoretical underpinnings, these may build resilience in the social-ecological wetland systems. Overall, these findings may guide practitioners and policymakers to enhance the long-term success of future wetland restoration efforts in Europe and possibly beyond, for the benefit of the planet and its people.

Keywords:

Wetlands, ecosystem restoration, community engagement, EU LIFE

Executive Summary

Biodiversity loss and climate change are taking place at an unprecedented rate and scale, and are negatively impacting planetary and human well-being. To counter these trends, initiatives have arisen around the world to restore ecosystems. Among the most valuable but rapidly disappearing ecosystems in Europe are wetlands, here defined as permanently and seasonally inundated terrestrial habitats, including lakes, rivers, and mires. A key ingredient to support the long-term success of ecosystem restoration efforts is to engage local human communities. However, little is known about how local communities can effectively be engaged in the context of European wetland restoration projects. Addressing this knowledge gap is therefore crucial to make current and future European wetland restoration efforts successful and long-lasting.

This research aims to explore community engagement strategies previously used in successfully completed European wetland restoration projects, in order to identify overarching community engagement strategies which were effective across multiple projects. Additionally, this research aims to explore the perspective of restoration practitioners on the community engagement strategies that they consider most important for the long-term success of wetlands restoration projects, which may build resilience in these social-ecological systems.

Research Question 1: What community engagement strategies were used by restoration practitioners to build local community support for European wetland restoration projects, which were funded by the EU LIFE programme and completed between 2012 and 2016?

- **Supporting Question**: What are the broad community engagement typologies used in the different wetland restoration projects?

Research Question 2: In the perspective of restoration practitioners, what community engagement strategies were most important to ensure the long-term success of restoration projects and to build resilience in the social-ecological system of European wetlands after these wetlands were restored as part of the EU LIFE programme and completed between 2012 and 2016?

To answer these questions, this research used a comparative multiple-case study design, and conducted semi-structured interviews with nine restoration practitioners of EU LIFE-funded European wetland restoration projects across eight European countries. First, using the Wheel of Participation framework (Reed et al., 2018), the broad community engagement typologies were identified in order to answer the Supporting Question. Secondly, through a literature review, an interdisciplinary analytical framework was created to analyse the interviews. This analytical framework was based on two sets of community engagement principles, derived from the fields of environmental management and healthcare, which have empirically been found effective to engage communities. In turn, EU LIFE project documentation and the analytical framework guided the qualitative content analysis of the interview transcripts, and the community engagement strategies used in the EU LIFE projects were identified to answer Research Question 1. Furthermore, the output of the qualitative content analysis was used to answer Research Question 2, in combination with theoretical underpinnings from social-ecological systems literature.

The **Supporting Question** can be answered as follows: seven EU LIFE projects used a top-down approach to engagement, i.e. the coordinating beneficiary initiated and led the community engagement activities. In contrast, two EU LIFE projects used a combined top-down and bottom-up approach, where the community engagement activities were initiated by the local community (bottom-up), although subsequently led by the coordinating beneficiary (top-down). Furthermore, the mode of engagement ranged from consultation to deliberation to co-

production. Overall, deliberation, co-production, or a combination of these two was applied most frequently in the EU LIFE projects.

Research Question 1 can be answered as follows: the qualitative content analysis of the interview resulted in the creation of a new conceptual framework, containing 17 overarching community engagement strategies which were used across EU LIFE projects (see Figure 4-1). Grouped in six themes, the analysis identified that in order to engage local communities, EU LIFE projects: (i) **connect** with the local community through building local networks and partnerships, personal relationships, ensuring visible leadership, and early and broad involvement of the community, (ii) **empower** the local community by creating a common vision, creating structures for systematic representation and participation, managing power dynamics, and facilitating bottom-up initiatives, (iii) **learn** from and **teach** to the local community through adapting to and understanding the local context and history, exchange and integrate knowledge, and build capacity and resources, (iv) **integrate** restoration activities into the local community, by creating locally relevant benefits which create a local interest in maintaining healthy wetlands, and organise locally relevant events around restoration activities, (v) **demonstrate** the successes of restoration activities to the community, and use a focal species to make restoration activities tangible, and (vi) **persist** in the local community by creating successor projects, and committing to long-term collaboration with the local community. Although the EU LIFE projects used unique combinations of the identified community engagement strategies, the observed overlap in community engagement strategies across projects confirms the presence of overarching effective community engagement strategies across contexts and geographies. Furthermore, this research suggests that these engagement strategies might be applicable to contexts beyond EU LIFE-funded European wetland restoration projects.

Research Question 2 can be answered as follows: there were differing opinions amongst restoration practitioners on which of the 17 identified community engagement strategies were considered most important for the long-term success of wetland restoration projects. However, strategies that were found most important by at least one restoration practitioner were to: (i) create locally relevant benefits as a result of the restoration activities, (ii) build personal relationships with key stakeholders to gain their support, (iii) build local networks and partnerships with the local communities, (iv) facilitate bottom-up initiatives for restoration, (v) create structures for systematic representation and participation, (vi) communicate success of the restoration activities, and (vii) use a focal species to demonstrate restoration success. Notably, creating locally relevant benefits was identified as the most important community engagement strategy by four EU LIFE projects. Here, the restoration of ecosystems led to the creation of benefits that were of interest for the local community; for instance, through a voluntary stewardship agreement between farmers and the coordinating beneficiary, the farmers were provided with services (e.g. soil nutrient analysis) if they implemented production methods which protected the wetlands. Based on theoretical underpinnings, these community strategies may build resilience in the social-ecological system and thereby safeguard the future of the wetlands.

The **practical implications** of this research include the use of the new conceptual framework on community engagement to aid restoration practitioners and policymakers to evaluate and design effective community engagement strategies in current and future EU LIFE-funded European wetland restoration projects. The community engagement strategies present in the conceptual framework (see Figure 4-1) have previously been applied in overall successful wetland restoration projects, and therefore may contribute to the long-term success of wetland restoration projects. However, causal links between the community engagement strategies and the wetland restoration projects' success cannot be drawn from this comparative study.

Using the perspective of the interviewed restoration practitioners, this research may additionally guide restoration practitioners and policymakers on the most important community engagement strategies for the long-term success of EU LIFE-funded European wetland restoration projects. This may support practitioners in their allocation of resources towards particular community engagement strategies, and help policymakers to shape wetland restoration efforts on a large scale. In turn, enhanced success of European wetland restoration efforts may support achieving the 2030 EU Biodiversity Strategy's ecosystem restoration objectives.

Moreover, this research recommends policy changes within the EU LIFE programme. First, this research recommends future EU LIFE projects to include a broader, systematic set of socioeconomic indicators to measure the socioeconomic impacts of ecosystem restoration projects and to demonstrate their success and impact on human well-being. Currently, the link between restoration activities and socioeconomic impacts has been poorly documented, and strengthening this link may increase the social and political support for ecosystem restoration efforts. Second, this research recommends legislative changes to the legal requirements of coordinating beneficiaries during the After-LIFE project phase of EU LIFE-funded ecosystem restoration projects to support the long-term success of restoration projects. Lastly, this research recommends experimentation with a bottom-up landowner-based model for wetland restoration as observed in one of the studied EU LIFE projects; this approach may aid scaling up ecosystem restoration efforts within the EU.

Several **future research opportunities** have arisen as a result of this research. First, one can explore the generalisability of this research's conceptual framework on community engagement strategies (see Figure 4-1) in contexts beyond EU LIFE-funded wetland restoration projects, by assessing community engagement strategies used in non-European or non-wetland restoration projects. Although this research has found initial indications that this conceptual framework may be applicable outside of the context of EU LIFE wetland restoration project, this is yet to be systematically tested. Second, the collected data allows for the exploration of potential trade-offs and synergies between the use of different community engagement strategies, which may further guide the future development of effective community engagement strategies in EU LIFE-funded European wetland restoration projects. Third, the findings of this research may be used to identify how different community engagement strategies can be operationalised in different contexts. Lastly, this research's findings allows further interdisciplinary research on community engagement in the context of ecosystem restoration, as its findings enable other disciplines, e.g. sociology, to identify the potential drivers of success within these community engagement strategies in the context of European wetland restoration projects.

In **conclusion**, this research has identified the main community engagement typologies and has created a conceptual framework for the engagement of communities in overall successfully completed EU LIFE-funded European wetland restoration projects. Furthermore, it has explored restoration practitioners' perspectives on the most important community engagement strategies for the long-term success of EU LIFE-funded European wetland restoration projects. These insights may guide restoration practitioners and policymakers to enhance the long-term success of current and future European wetland restoration projects, and thereby contribute to protecting biodiversity and mitigating climate change.

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1 Introduction

"To restore stability to our planet, we must restore its biodiversity, the very thing we have removed."
Sir David Attenborough, A Life On Our Planet

1.1 Problem definition

Throughout the world, biodiversity is declining (Díaz et al., 2019; Secretariat of the Convention on Biological Diversity, 2020); combined with rapid climate change, these trends are negatively affecting the natural world and human well-being (Bellard et al., 2012; Pecl et al., 2017). To address these negative trends, large-scale initiatives have arisen, including the United Nations Decade on Ecosystem Restoration for 2021-2030 (United Nations Environment Agency, 2019) and the 2030 EU Biodiversity Strategy (European Commission, 2020a) to provide an impetus to scale up the restoration of ecosystems, i.e. to "[assist] the recovery of an ecosystem that has been degraded, damaged, or destroyed" (Corlett, 2016, p. 454). Collectively, through restoring ecosystems, these initiatives aim to halt biodiversity loss and contribute to climate mitigation (Strassburg et al., 2020).

Amongst the ecosystems to be restored are wetlands, which, for the purpose of this research, are defined as permanently and seasonally inundated terrestrial habitats such as lakes, rivers, and mires (hereafter "wetlands") (Ramsar Convention on Wetlands, 2018). Wetlands are characterised by high degrees of biodiversity and carbon sequestration rates (Millennium Ecosystem Assessment, 2005; Villa & Bernal, 2018), and hold high economic value due to their provision of ecosystem services (Costanza et al., 2014). However, wetlands have degraded strongly, particularly in Europe, where two-thirds of the continent's wetlands have been lost during the 20th century due to human activities, such as agricultural industrialisation and the overexploitation of freshwater resources (Silva et al., 2007).

While the restoration of wetlands requires the change of human activities, ecosystem restoration should benefit both the planet and its people to generate societal support for restoration (Aronson et al., 2020; Cao et al., 2020; Suding et al., 2015), rather than creating a win-lose outcome. This requires the engagement of local communities in the restoration process, i.e. the active collaborating with *inter alia* landowners, farmers, and local governments, to achieve beneficial outcomes for the local communities while restoring wetlands (McCloskey et al., 2011; Ramsar Convention on Wetlands, 2002).

Community engagement plays a key role in the successful restoration of ecosystems both during and after the project period (Egan et al., 2011; Höhl et al., 2020; Reid et al., 2017). Many previous restoration projects' failure has been in part attributed to an insufficient understanding or incorporation of human aspects into restoration projects' phases due to ineffective community engagement (Davenport et al., 2010; Druschke & Hychka, 2015; Egan et al., 2011, 2011; Höhl et al., 2020; Wortley et al., 2013). This led to a lack of interest of local communities in managing and protecting these ecosystems, resulting in the continued degradation of the ecosystem after the completion of the restoration project. In social-ecological systems thinking (Berkes & Folke, 2000), insufficient resilience was built into the social-ecological system of local communities and wetland ecosystems, leading to the system's relapse from a restored to a degraded state. In contrast, building resilience in social-ecological systems through restoration is considered key to ensure the long-term success of restoration projects (Gann et al., 2019).

Although guidelines and principles have been developed to effectively engage local communities in restoration and environmental management (e.g. Gann et al., 2019; Ramsar Convention on

Wetlands, 2002; Reed, 2008), community engagement continues to be one of the main barriers to successful ecosystem restoration in Europe (Cortina-Segarra et al., 2021). Furthermore, the engagement of communities has been predominantly explored in forest ecosystem restoration projects (e.g. Höhl et al., 2020; Holl, 2017; Lazos-Chavero et al., 2016; Mansourian & Vallauri, 2012), while wetlands have received comparatively little attention. As wetlands provide different ecosystem services compared to forests ecosystems (Ramsar Convention on Wetlands, 2018), the path to effectively engage local communities may differ between these ecosystem types.

Overall, this demonstrates a lack in our understanding of how to successfully restore valuable yet rapidly degrading wetlands, and how to support the long-term success of restoration efforts. Hence, by examining successfully completed European wetland restoration projects, this research aims to identify the community engagement strategies that may contribute to the long-term success of European wetland restoration efforts.

1.2 Aim and research questions

1.2.1 Research aim

This research aims to explore how communities have previously been engaged in European wetland restoration projects, to identify overarching patterns of how past successful projects have effectively engaged local communities. Furthermore, this research aims to understand restoration practitioners' perspectives on how communities can best be engaged to ensure that European wetland restoration projects are successful in the long-term. In social-ecological terms, this research aims to understand how resilience can be built to ensure that restoration achievements are maintained after the project's completion and to prevent continued degradation after restoration. On both management and policy levels, the findings of this research may inform and guide future European wetland restoration efforts, and may increase their effectiveness in achieving long-term restoration success.

1.2.2 Research questions

Research Question 1: What community engagement strategies were used by restoration practitioners to build local community support for European wetland restoration projects, which were funded by the EU LIFE programme and completed between 2012 and 2016?

- **Supporting Question**: What are the broad community engagement typologies used in the different wetland restoration projects?

Research Question 2: In the perspective of restoration practitioners, what community engagement strategies were most important to ensure the long-term success of restoration projects and to build resilience in the social-ecological system of European wetlands after these wetlands were restored as part of the EU LIFE programme and completed between 2012 and 2016?

1.3 Scope and delimitations

This research explores the community engagement strategies of nine EU-based wetland restoration projects that were financially supported by the EU LIFE programme, and the perspectives of these projects' restoration practitioners, thereby adhering to the definition of wetlands described in section 1.1. The exploration of community engagement strategies was limited to engagement activities involving local stakeholders, which were defined by the

restoration practitioners at the start of the interviews, and included *inter alia* landowners, farmers, the local government and other local authorities, local businesses, and citizens. While the focus of this research is on EU LIFE projects, two non-EU LIFE projects were incorporated in this research to assess the generalisability of this research's findings; these two projects took place in Romania and the United States. All restoration projects were completed between 2012 and 2016. Exploring completed projects allows for the selective evaluation of projects that had a strong community engagement component, and to obtain the perspective of the restoration practitioner on (i) how successful these projects are considered nowadays, (ii) to identify lessons learnt, and (iii) to explore how and to what extent community engagement may have played a role in leading to the present-day state of the wetland and the community.

Furthermore, the EU LIFE projects' coordinating beneficiaries (i.e. coordinating restoration organisation) bear responsibility for the restored wetland for five years after the project's completion, as part of the After-LIFE phase of EU LIFE projects. Therefore, this continued involvement of the restoration practitioners after project completion increases the EU LIFE projects' suitability to achieve the research aim.

Through semi-structured interviews with restoration practitioners and a mixed deductive-inductive qualitative content analysis, this research identifies community engagement strategies and obtain restoration practitioners' perspectives, and is supported by the use of a literature-based interdisciplinary analytical framework on community engagement. Additionally, in the case of EU LIFE projects, this analysis was supported by the use of publicly available standardised project documentation from the EU LIFE project website.

1.4 Ethical considerations

This research was not funded by any party, and nobody, other than myself, was in a position to affect the analysis, findings, and conclusions. While my supervisor Laszlo Pinter guided me throughout this research, the eventual shape of the outcomes was determined by myself. Furthermore, the research design has been reviewed against the criteria for research requiring an ethics board review at Lund University and has been found to not require a statement from the ethics committee.

Moreover, obtaining the voluntary consent of participants was a prerequisite for their participation in this research, and were informed prior to the interview that they could withdraw their consent at any point in time by informing me. Furthermore, their consent was requested in written form via email prior to any data collection and was re-confirmed orally at the start of each interview. All participants were offered to have their names and affiliations be anonymised for whichever reason.

Additionally, this data was only used to produce a research thesis to obtain an MSc degree in Environmental Science, Policy and Management through the MESPOM programme. Any other use of this data shall occur only after all participants' consent to this purpose has been confirmed. In such case, participants will again be asked whether they consent to the use of the interviews' contents, their names, and their affiliations for the envisioned additional use of this data. Lastly, data collected from interviews is stored in a password-protected folder on a USB drive and kept offline. By 1 June 2023, all personal data will have been deleted.

1.5 Audience

Understanding effective community engagement strategies will help to efficiently allocate future academic efforts across disciplines towards the improvement of the restoration of European

wetlands. Given the highly interdisciplinary nature of ecosystem restoration which occurs at the interface between social science and natural science, disciplines from e.g. restoration ecology to behavioural economics, social psychology, political science, and cultural anthropology may use these findings to understand the human dimensions of European wetland restoration and compare the findings of this research to those of restoration projects in other contexts. Additionally, this research applies a literature-based academic lens of community engagement strategies with a practitioners' view on wetland restoration, which may yield guidance for both practitioners in the field and expand on existing frameworks on community engagement in ecosystem restoration.

Furthermore, this research aim is of interest to restoration practitioners: a pilot study conducted prior to the start of this research highlighted the interest from employees of several international ecosystem restoration-focused NGOs in exploring community engagement strategies of successful European wetland restoration projects. For these and other practitioners, the findings from this research may help to allocate resources towards particular community engagement strategies that may increase the likelihood of ensuring the long-term success of European restoration projects.

Moreover, the result of this research may improve the effectiveness of future European wetland restoration projects, by implementing community engagement strategies that have previously been associated with successful restoration projects. Such *post-hoc* evaluations of restoration projects have recently been mentioned as an opportunity to learn more about effective ecosystem restoration approaches to shape future restoration endeavours (Fischer et al., 2020).

Lastly, this research may provide insights in how EU policies may facilitate scaling up ecosystem restoration efforts across the EU based on the findings of this research. For instance, the identification of fundamental community engagement strategies may become requirements for EU LIFE projects to support the successful restoration of wetlands, to support restoration efforts in line with the UN Decade on Ecosystem Restoration and the European Green Deal.

1.6 Disposition

Chapter 1 presents the problem definition, the research aim and associated research questions, the scope of this research, the ethical considerations, and the intended audience.

Chapter 2 describes the concept of ecosystem restoration, explores the current state of wetlands, and the concept of community engagement. It is subsequently followed by an exploration of the social-ecological systems concept and related terminology, as well as a brief overview of the EU LIFE programme and the identified knowledge gap. It is concluded by an overview of the analytical frameworks that are used for exploring community engagement strategies in this research.

Chapter 3 explores the research design, the data collection methods, and provides an overview of the collected materials and the method of analysis. This is followed by a discussion about the methodological limitations of this research.

Chapter 4 explores the findings of this research, which start with a brief overview of the community engagement typologies used in the studied restoration projects, followed by an in-depth analysis of the community engagement strategies identified in the restoration projects, based on the analytical framework. This chapter is concluded with an exploration of the practitioners' perspectives on the most important community engagement strategies for the long-term success of wetland restoration projects.

Chapter 5 interprets and discusses the main findings of this research, how they relate to the current literature, and highlights new insights. Furthermore, it reflects on the analytical framework used, the generalisability of these findings, and several insights from this research. Lastly, it discusses the limitations of this research.

Chapter 6 concludes this research by answering the research questions, the contributions to existing literature, the practical implications of the findings, and opportunities for future research.

2 Literature review

This chapter starts by presenting a background of ecosystem restoration efforts and the importance of wetland restoration. It continues by providing an overview of the concept of community engagement in general and community engagement strategies applied in ecosystem restoration efforts. Subsequently, it touches upon basic social-ecological systems concepts, it provides a brief overview of the EU LIFE programme, and it presents the identified knowledge gap. Lastly, relevant theories and conceptual frameworks are explored.

2.1 A brief background of ecosystem restoration and wetlands

This section first explores the general concept of ecosystem restoration and the difficulty of defining ecosystem restoration success. It continues with providing examples of current ecosystem restoration initiatives around the planet, and discusses general approaches to restoring ecosystems and the social benefits of restoring ecosystems. It concludes with a section on the definition of wetlands as used in this research, and the reasons to restore them.

What is ecosystem restoration? The Society for Ecological Restoration (SER) defines ecological restoration as the "process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed" (Gann et al., 2019, p. 7). For the purpose of this research, the term "ecosystem restoration" is used interchangeably with "ecological restoration". Although restoration may suggest the full recovery of lost ecological functions, full recovery is often not achieved due to irreversible ecological changes and ongoing environmental changes (Suding et al., 2015). Hence, recent literature has suggested using a forward-looking approach to ecosystem restoration, which acknowledges on-going and anticipated changes in the human and natural environment, and incorporates these into the restoration of ecosystems (Choi et al., 2008; Corlett, 2016; Perring et al., 2015).

Defining ecosystem restoration success. There has been considerable debate on what determines success in ecosystem restoration practice (reviewed by Evju et al., 2020; Ruiz-Jaen & Mitchell Aide, 2005; Wortley et al., 2013), and methods applied to measure indicators and evaluate success differ strongly between projects (Evju et al., 2020). Overall, the evaluation of ecosystem restoration success seems a product of the restoration objectives. A review by Evju and colleagues (2020) showed that out of 104 studies on ecosystem restoration projects, there were two which used an evaluation that incorporated both ecological and socioeconomic attributes; overall, restoration projects have predominantly been evaluated using solely ecological attributes. However, the use of both socioeconomic and ecological attributes has been incorporated in some restoration guidelines, which may provide an impetus to future restoration projects to use integrated evaluations of ecosystem restoration success (Gann et al., 2019; Hanson et al., 2015) and the use of the Social Benefits Wheel may support the tracking of socioeconomic goals of the restoration project (Gann et al., 2019). Overall, given the large differences between ecosystem restoration projects, their restoration objectives, and approaches to using indicators, defining ecosystem restoration success remains complex and strongly depends on the particular restoration project studied.

Restoration initiatives. Throughout the world, numerous local to global-scale restoration initiatives have emerged in recent years (reviewed by Gann et al., 2019). High-profile examples include the global UN Decade on Ecosystem Restoration (2021-2030) to protect and restore ecosystems around the planet, the Bonn Challenge to restore 350 million hectares of forest by 2030 (Gann et al., 2019), and the EU Green Deal and EU Biodiversity Strategy for 2030 (European Commission, 2019, 2020a). Global targets for nature protection guide these

initiatives, such as those developed by the Convention on Biological Diversity (Secretariat of the Convention on Biological Diversity, 2020), and the UN Sustainable Development Goals.

Approaches to ecosystem restoration. The approach to ecosystem restoration can broadly take three different forms, all of which require the elimination of the cause(s) of degradation (Gann et al., 2019). The first approach is natural regeneration, where damage is relatively low, and which requires few human resources to achieve, such as changing grazing schemes. The second approach is assisted regeneration, where damage is intermediate and requires the correction of abiotic and biotic variables to ensure recovery, which requires an intermediate degree of human resources, such as building habitat features or removing invasive species to support recovery. The third approach is reconstruction, where damage is high and recovery requires a high degree of human resources to achieve restoration, such as the reintroduction of all or many lost biota, in addition to removing the causes of degradation. A restoration project may require the use of all three approaches or a selection of them, dependent on the spatial scale of the ecosystem and the degree of damage (Gann et al., 2019).

The social benefits of restoration. Ecosystem restoration, if effectively applied, may directly contribute to the restoration of ecosystem services (Gann et al., 2019), which, in the case of wetlands, are *inter alia* food production, the regulation of hydrological regimes, flood control, carbon sequestration, the provision of educational and recreational, and nutrient cycling (Millennium Ecosystem Assessment, 2005; Wardrop et al., 2011). Overall, the provision of these ecosystem services as a result of ecosystem restoration can increase human well-being (Cao et al., 2020; Gann et al., 2019; Millennium Ecosystem Assessment, 2005).

What are wetlands and why do they need to be restored? Following the Ramsar Convention's definition, wetlands include a diverse array of ecosystems, namely "permanently or seasonally inundated freshwater habitats ranging from lakes and rivers to marshes, along with coastal and marine areas such as estuaries, lagoons, mangroves and reefs" (Ramsar Convention on Wetlands, 2018, p. 11). However, for the scope of this research, wetlands are limited to lakes, rivers, and mires (which include bogs, fens, marshes, and swamps), and include both freshwater and non-freshwater.

Since 1970, *c.* 35% of wetlands have been lost around the globe, *c.* 25% of wetland species are threatened with extinction, and wetlands are being lost at a higher rate than forests (Ramsar Convention on Wetlands, 2018). Different regions have lost wetlands to different extents: half of the wetlands in the USA, China, and Australia have been lost during the 20th century (Gibbs, 2000; Moreno-Mateos et al., 2012), while two-thirds of European wetlands have been lost in the same time frame (Silva et al., 2007). The loss of European wetlands is predominantly attributable to human activity, *inter alia* wetland drainage for agricultural production, conversion of wetlands to forestry, the blocking of water flow and overexploitation of groundwater resources, and the pollution of wetlands with agricultural and industrial effluents with high in nutrient and pesticide loadings (Silva et al., 2007).

Despite this loss, wetlands are considered highly valuable for their provision of ecosystem services, ranging from the provisioning of water and food, to the regulation of water flows, carbon sequestration, the importance for cultural heritage, recreation and tourism (Table 2-1) (Ramsar Convention on Wetlands, 2018). Consequently, wetlands are regarded as one of the more valuable terrestrial ecosystems on our planet, exceeding the value of temperate and tropical forests per hectare (Costanza et al., 2014; de Groot et al., 2012). Their rapid decline, combined with their importance for human well-being, biodiversity, mitigating climate change, and economic value, render the restoration of wetlands a priority.

To identify which wetlands and other ecosystems could be restored, modelling studies have demonstrated the wide range of restoration opportunities around the globe (Brancalion et al., 2019; Strassburg et al., 2019, 2020). However, while the identification of such opportunities is the first step towards planning ecosystem restoration projects, the effective restoration of identified ecosystems necessitates the integrated use of social and natural sciences to understand the social, economic, and environmental conditions on a local scale, as the foundations of effective restoration (Bennett et al., 2017; Fischer et al., 2020; Gann et al., 2019).

Table 2-1 Overview of ecosystem services provided by wetlands.

Services	Comments and examples
PROVISIONING	
Food	production of fish, wild game, fruits, and grains
Fresh water	storage and retention of water for domestic, industrial, and agricultural use
Fibre and fuel	production of logs, fuelwood, peat, fodder
Biochemical	extraction of medicines and other materials from biota
Genetic materials	genes for resistance to plant pathogens and ornamental species
REGULATING	
Climate regulation	source of and sink for greenhouse gases; influence local and regional temperature, precipitation, and other climatic processes
Water regulation (hydrological flows)	groundwater recharge/discharge
Water purification and waste treatment	retention, recovery, and removal of excess nutrients and other pollutants
Erosion regulation	retention of soils and sediments
Natural hazard regulation	flood control, storm protection
Pollination	habitat for pollinators
CULTURAL	
Recreational	opportunities for recreational activities
Educational	opportunities for formal and informal education and training
Aesthetic	many people find beauty or aesthetic value in aspects of wetland ecosystems
Spiritual and inspirational	source of inspiration; many religions attach spiritual and religious values to aspects of wetland ecosystems
SUPPORTING	
Soil formation	sediment retention and accumulation of organic matter
Nutrient cycling	storage, recycling, processing, and acquisition of nutrients

Source: Adapted from Millennium Ecosystem Assessment 2005.

2.2 Exploring the concept of community engagement

This section initiates by defining community engagement, followed by an explanation of the importance of community engagement in ecosystem restoration.

What is community engagement? The involvement of communities in activities and projects can be described and analysed using different concepts, such as community engagement and community participation. Within the scientific and grey literature, these definitions may overlap (e.g. Head, 2007; McCloskey et al., 2011) or be used interchangeably (e.g. Reed, 2008), and the meaning of these concepts may vary between contexts (Head, 2007; McCloskey et al., 2011; Reed, 2008), and are used across many fields, including business, environmental management, and healthcare (Head, 2007; McCloskey et al., 2011; Reed, 2008; Sterling et al., 2017).

In this research, community engagement is defined using the Centres for Disease Control and Prevention's (CDC) definition:

> "[…] the process of working collaboratively with and through groups of people affiliated by geographic proximity, special interest, or similar situations to address issues. It is a powerful vehicle for bringing about environmental and behavioural changes that will improve the health of the community and its members. It often involves partnerships and coalitions that help mobilize resources and influence systems, change relationships among partners, and serve as catalysts for changing policies, programs, and practices" (Centers for Disease Control and Prevention, 1997, p. 9).

This definition emphasises an ongoing relationship and the building of partnerships and coalitions in the long-term. In contrast, community participation usually describes relatively short-term activities or single events of community involvement, such as the use of focus groups, referenda, public opinion surveys, and referenda (Rowe & Frewer, 2000, 2005). In this research, participation and engagement are considered equivalent in their meaning, and both adhere to the definition provided by the Centres for Disease Control and Prevention above.

Furthermore, while the concept of community is difficult to define (Head, 2007), this research adheres to the definition provided above, i.e. "groups of people affiliated by geographic proximity, special interest, or similar situations to address issues" (Centers for Disease Control and Prevention, 1997, p. 9), which can exert influence or are impacted by a decision (*sensu* Freeman, 1984). The community, therefore, includes *inter alia* local government, landowners, local residents, for-profit and non-profit organisations, and government agencies.

Why is community engagement important for restoration? There are many barriers to the effective restoration of ecosystems, *inter alia* a lack of funding, low political priority for restoration, and overcoming legal obstacles (Cortina-Segarra et al., 2021). One of the main barriers to ecosystem restoration is ineffective engagement of the local communities (Cortina-Segarra et al., 2021), which is found highly important for the successful restoration of ecosystems both during and after the project period (Höhl et al., 2020; Reid et al., 2017). The ineffective engagement of communities has previously contributed to the failure of restoration projects in wetlands and other ecosystems (Davenport et al., 2010; Druschke & Hychka, 2015; Höhl et al., 2020; Lu et al., 2005; Pettersson & de Carvalho, 2020; Wortley et al., 2013).

The benefits of community engagement are manifold, *inter alia* (i) increasing the quality of the decision-making process and the decisions, (ii) the building of trust amongst stakeholders and organisers, (iii) improved support for implementation as a result of stakeholder ownership, (iv) a reduction in implementation costs, and (v) improved monitoring of the achieved results (Egan et al., 2011; Reed, 2008; Sterling et al., 2017). Furthermore, community engagement and participation are seen as key to the long-term success of conservation projects (Berkes, 2004) and helps to build resilience in social-ecological systems (see below) (Biggs et al., 2012; Lebel et al., 2006; Olsson, Folke, & Berkes, 2004). Collectively, effective community engagement is a key success factor for the restoration of ecosystems.

2.3 Community engagement in ecosystem restoration

As demonstrated by the previous section, effective community engagement is an essential component of ecosystem restoration projects. This section explores several community engagement lessons from past ecosystem restoration projects throughout different stages of a restoration project.

Assess the problem. First, it is essential to understand the cause of environmental degradation to address it effectively and to restore an ecosystem; this requires a transdisciplinary approach (Cao et al., 2020) and the integration of different types of knowledge (Aronson et al., 2020; Berkes, 2004). A thorough understanding allows for the effective addressing of the cause of degradation; the inability to address this has previously led to the failure of ecosystem restoration efforts (e.g. Cao et al., 2020).

Set restoration objectives. Reaching agreement amongst stakeholders on the goals of restoration, and on what successful restoration entails through open deliberation has previously been associated with successful restoration outcomes (Cao et al., 2020; Höhl et al., 2020), and the building of community support and commitment (Davenport et al., 2010; Druschke & Hychka, 2015; Lazos-Chavero et al., 2016). Similarly, successful projects tend to be comprised of a strong network of diverse stakeholders, including both scientists and non-scientists, and continuous communication throughout the project (Ahn & Schmidt, 2019; Druschke & Hychka, 2015; Ebberts et al., 2018; Le Roy et al., 2019). Additionally, successful projects are characterised by the early engagement of the local communities in the restoration project (Davenport et al., 2010), while lack of early involvement has previously led to project failure (Höhl et al., 2020). On the other hand, as previously noted, communication such as awareness campaigns can positively influence the support of local communities for restoration efforts (Pettersson & de Carvalho, 2020).

A collaborative approach to design and implementation. An overarching lesson from restoration projects is a collaborative approach by involving stakeholders in the design and implementation of restoration projects, as this (i) builds local capacity, (ii) creates local buy-in of the project's objectives, (iii) enables the involvement of local communities in decision-making and implementation to produce a sense of ownership of the restoration project, (iv) and helps to build trust between the local communities and the authorities (Barrett et al., 2019; Druschke & Hychka, 2015; Ebberts et al., 2018; Höhl et al., 2020; Scholte et al., 2016; Silva et al., 2007). However, a highly collaborative approach (i.e. co-production) does not guarantee success (Booth & Halseth, 2011; Trimble et al., 2014) and its applicability is dependent on the local context.

Moreover, community support can be built in several ways: first, by integrating the project into the local discourse of the community and for restoration practitioners to engage themselves with the local community through participating in community events to build networks and relationships (Davenport et al., 2010). Second, the sharing of responsibility in planning and implementation can further create community support, but this requires the mediation of power differences between different actors (Barrett et al., 2019), which may be done through the use of a facilitator (Reed, 2008). If power dynamics are not effectively addressed, collaborative partnerships between practitioners and local communities can collapse (Barrett et al., 2019). Inadequate engagement of local communities in project planning and engagement has previously led to conflicts between implementing authorities and local communities (Pettersson & de Carvalho, 2020), and the continued degradation of ecosystems (Höhl et al., 2020).

Monitoring. The incorporation of local communities in monitoring activities has been shown to promote long-term ownership and buy-in of restoration projects by the local communities in

multiple ecosystem types, including wetlands (Druschke & Hychka, 2015; Kittinger et al., 2016; Le Roy et al., 2019). However, the monitoring of socioeconomic attributes in their projects was often limited to *a priori* assessments, without following up on the realised socioeconomic impact of restoration (Mansourian & Vallauri, 2012; Wortley et al., 2013), which may negatively impact the outcome of the restoration project (Davenport et al., 2010; Pueyo-Ros et al., 2019). Overall, monitoring can be an important part of community engagement, but it must be done effectively in order to positively influence the restoration project.

Governance structures. Furthermore, for the effective engagement of communities, one study suggests that engagement is supported by established governance structures to increase transparency in the decision-making process and the distribution of responsibilities in restoration projects. Such a structure may link the restoration activities with monitoring and collective learning to increase restoration success (Ebberts et al., 2018). Furthermore, established governance structures can empower local communities (Lu et al., 2005) and may build ownership over the project (Druschke & Hychka, 2015), especially if this is combined with explicit long-term commitment to the restoration cause by all partners (Ebberts et al., 2018).

Evaluate outcomes. In addition to the lack of socioeconomic indicators used in restoration projects (Evju et al., 2020; Mansourian & Vallauri, 2012), a complicating factor is that stakeholders' roles, perceptions, and needs change over time, which changes the decision-making landscape for local communities. However, this stakeholder dynamism can be managed through continued evaluation of stakeholders' roles, perceptions, and needs throughout the restoration project (Lazos-Chavero et al., 2016).

Overall, while these studies discuss the use of community engagement systems throughout the project phase of wetland restoration, none have explored the relation between community engagement strategies and the long-term success of ecosystem restoration, which hints at an opportunity for future research.

2.4 Social-ecological systems, resilience, and adaptation

This section explores social-ecological systems thinking and its main concepts by applying it to a hypothetical wetland ecosystem and its surrounding farming community. Moreover, this section discusses the importance of resilience in social-ecological systems for long-term restoration success, and how resilience may theoretically be built.

Social-ecological systems and its concepts applied to wetlands. In this research, social-ecological systems (SESs) are defined as complex, integrated systems in which humans are part of nature (*sensu* Berkes & Folke, 2000). The SES concept provides a way to understand and study the dynamic interactions between society and the environment, and can be applied to the observed interactions between a local community and their surrounding wetlands. For instance, in case of a drought, a farmer of the local community may extract water from a nearby wetland to water their crops and thereby safeguard the crop yield. Subsequently, the reduced water level in the wetland may lead to the reduction of waterfowl populations, which translates into reduced waterfowl hunting opportunities for the hunters present in the local community. This illustrates how the social and ecological components of an SES affect each other dynamically.

These dynamic interactions are shaped by two main characteristics of an SES: resilience and adaptability. Here, resilience describes the capacity of an SES to bounce back from a disturbance, while not changing the system's core functioning (Walker et al., 2004), i.e. the ability to successfully deal with change (Brown, 2016). The example above described a non-resilient SES, as water extraction by the farmer changed the functioning of the SES, i.e. reduced

waterfowl and hunting opportunities. In contrast, a resilient SES would mean that, in the case of a drought, the extraction of water by the farmer neither reduces the number of waterfowl nor the number of waterfowl hunting opportunities, and the SES maintains its core functioning.

Furthermore, adaptability describes the degree to which humans can influence the resilience of an SES (Walker et al., 2004) and which can change the functioning of an SES. Using the same scenario, an example of an adaptation would be the farmer changing their crops to drought-tolerant species. As a result, the farmer will not have to extract water from the wetland in case of a drought, and they will therefore not negatively impact the waterfowl population and hunting opportunities.

Building resilient SESs in the face of environmental change. The concepts of SES, resilience, and adaptation have been applied to the field of ecosystem restoration (Fischer et al., 2020; Kittinger et al., 2016; Krievins et al., 2018; Palmer et al., 2005; Zellmer & Gunderson, 2009). Overall, effective ecosystem restoration requires resilient and adaptable SESs (Fischer et al., 2020). In other words, once the restoration project has been completed, the achievements of restoration, such as increased population sizes of waterfowl, should be maintained, and the SES should not return to a degraded state. Such long-term success of the restoration project requires the SES to be resilient. However, despite SES-related concepts having been applied to ecosystem restoration, *post-hoc* evaluations of restoration projects using a social-ecological perspective have not yet been explored, and may guide future restoration endeavours (Fischer et al., 2020).

There are several ways to build resilience and adaptability in SESs: Biggs and colleagues (2012) outline seven principles to do so, which include *inter alia* (i) broadening participation of stakeholders within the SES, and (ii) learning and experimentation to build resilience and adaptability in an SES. The principles of Biggs and colleagues (2012) thereby emphasise the direct importance of engaging communities to broaden participation and enable learning and experimentation to build resilience and adaptability in SESs.

However, it must be noted that, for instance, simply broadening participation may not contribute to the resilience of the SES: Reed and colleagues (2018) emphasise the importance of tailoring the degree of participation to the local context to achieve successful outcomes, which is supported by the failure of highly participatory environmental projects (Booth & Halseth, 2011; Trimble et al., 2014). A thorough understanding of the local context, to which the community engagement strategies are tailored, is likely to lead to more successful outcomes of restoration projects (Reed et al., 2018) and may help to build resilience and adaptability in SESs to safeguard the achievements of restoration projects.

2.5 The EU LIFE programme

The focus of this research is on projects that were funded by the EU LIFE programme. This programme was initiated in 1992 and is the largest financial instrument of the EU to co-fund environmental projects that support the implementation of the Birds and Habitats Directives to reduce biodiversity loss through ecosystem restoration (EASME, 2020). The EU has thus far invested €2.85 billion into the EU LIFE programme, spread over more than 1,754 LIFE projects. Funded projects are planned and implemented under the responsibility of the project coordinators, who maintain responsibility for what happens at the restored site for five years after the project has ended, i.e. the After-LIFE project phase (A1). Through the After-LIFE project phase, the EU LIFE programme emphasises the importance of maintaining the restoration achievements after the project has been completed (European Commission, 2020b). While some of these projects have been reviewed previously (Silva et al., 2007), none have

specifically utilised a community engagement focus on the success of wetland restoration projects within the EU LIFE programme.

2.6 Identified knowledge gap

This literature review has reviewed the concepts of ecosystem restoration, wetlands, community engagement and several strategies, as well as the social-ecological systems (SES) concepts and the EU LIFE project. Overall, it shows that while community engagement strategies in wetland ecosystems have been explored, there has not been an explicit focus on the long-term success of wetland restoration projects, that build resilience in the SES. Furthermore, the EU LIFE programme has a focus on the long-term success of ecosystem restoration projects, including wetlands, but has not been thoroughly examined on their long-term success in relation to the applied community engagement strategies. Overall, this hints at a knowledge gap in the relation between community engagement and long-term success in EU LIFE-funded wetland restoration projects.

2.7 Relevant theories and frameworks to understand community engagement strategies in wetland restoration projects

The literature review reviewed the current knowledge about community engagement in wetland restoration projects, and identified a knowledge gap. To address this gap, this section will explore the Wheel of Participation to understand the broad community engagement *typologies* applied in the wetland restoration projects. Furthermore, to explore the community engagement activities in more depth, two sets of community engagement principles will aid the analysis of community engagement *strategies* applied in wetland restoration projects.

Note that in this research, the term 'community engagement principles' is used to refer to sets of community engagement strategies which were identified in the literature. In contrast, 'community engagement strategies' may refer to those derived from literature or this research's analysis.

2.7.1 Community engagement typologies: from the Ladder to the Wheel

This section discusses well-known community engagement typologies to broadly describe observed engagement approaches. Subsequently, the Wheel of Participation and its main components are explained.

Exploring and comparing community engagement typologies. The types of community engagement have been described in numerous ways, such as the seminal Ladder of Citizen Participation by Sherry R. Arnstein (1969), which typifies engagement from "manipulation" to "citizen control", or the Community Engagement Continuum (Figure 2-1) (McCloskey et al., 2011) which ranges from "outreach" to "shared leadership". While these typologies are useful to identify the type of engagement used in a particular case of interest, there is no universally accepted community engagement typology, and the right type of community engagement depends on the social-ecological and governance context in which it is applied (Sterling et al., 2017).

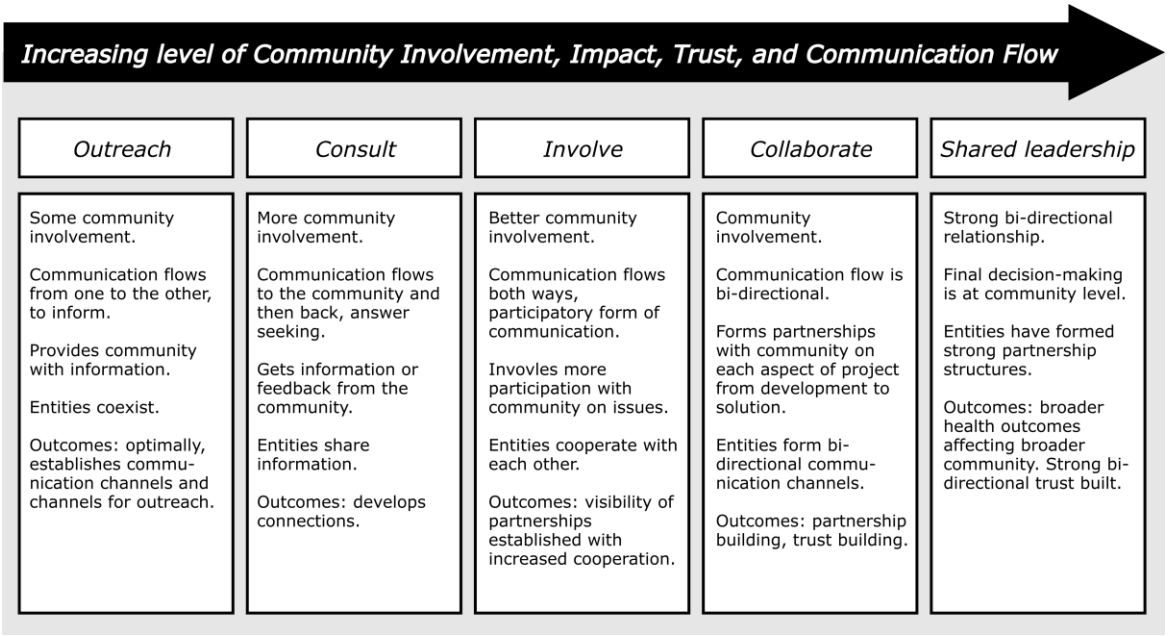

Figure 2-1 The Community Engagement Continuum.

Source: Adapted from McCloskey et al., 2011.

A different community engagement typology approach was taken by Reed and colleagues (2018), who produced a Wheel of Participation (Figure 2-2). This typology of community engagement has two main components. First, it describes the agency of community engagement, i.e. whether projects were initiated in a bottom-up or top-down manner. Second, it describes four modes of engagement from a low to a high degree of collaboration, i.e. communication, consultation, deliberation, and co-production.

The Wheel of Participation is a departure from other typologies of community engagement, such as the Ladder of Citizen Participation (Arnstein, 1969). While the Ladder of Citizen Participation may suggest a hierarchy of preferred engagement typologies – with forms of co-production, which are higher on the Ladder, being preferred over one-way communication or consultation, which are lower on the Ladder – the Wheel of Participation highlights that there is no such hierarchy. Instead, it notes that the community engagement typology that is best suited to a restoration project depends on the local context (Reed et al., 2018). In other words, a higher degree of engagement does not guarantee more successful outcomes, which is supported by empirical evidence (e.g. Booth & Halseth, 2011; Trimble et al., 2014). Hence, the community engagement strategy should be adapted to the local context. Overall, the Wheel of Participation helps to broadly understand the types of community engagement applied in an ecosystem restoration project.

The components of the Wheel of Participation. Through different combinations of agency and modes of engagement, the Wheel of Participation describes four typologies of community engagement. The first type of engagement is top-down one-way communication and/or consultation. Here, engagement is started and led by the organisation that holds the decision-making power, where either decisions are made by the organisation and are communicated to the community, or the community is consulted about decisions, while the engaging organisations continue to hold the decision-making power.

The second type of engagement is top-down deliberation and/or co-production. Here, engagement is started and led by the organisation that holds the decision-making power, where the community can engage in two-way deliberation prior to the decision-making. Alternatively, the community can co-produce the decisions and methods of implementation with the engaging organisation, while the engaging organisation continues to hold responsibility for the implementation.

The third type of engagement is bottom-up one-way communication and/or consultation, where engagement is started and led by the community and the community communicates with decision-makers to influence them in opening up the decision-making process to have the community contribute to the decision-making, or the communities gain enough influence to overrule previous decisions made by the decision-making body, e.g. through petitions.

The fourth type of engagement is bottom-up deliberation and/or co-production, where engagement is started and led by the community and there is either two-way deliberation on the decisions with the other stakeholders (e.g. local government) and decisions are made together, or the decision is collectively produced by the community and other stakeholders, and is owned and implemented by the community and other stakeholders.

Notably, most projects employ a combination of different modes of engagement, such as a combination of communication, consultation, and deliberation, dependent on the type of decision made. Hence, while the Wheel of Participation may attempt to describe discrete typologies of community engagement, there is a continuum between the abovementioned typologies.

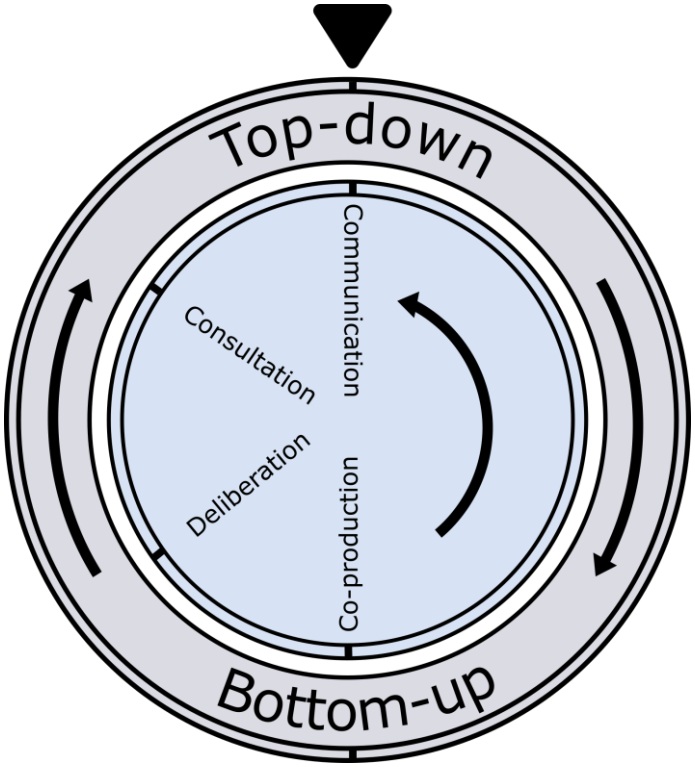

Figure 2-2 The Wheel of Participation, which shows the different possible combinations of agency (initiator/leader) of engagement (top-down and bottom-up) and the modes of engagement (communication, consultation, deliberation, and co-production).

Source: Adapted from Reed et al., 2018

2.7.2 Towards principles of community engagement

Moving away from broad descriptive typologies, this section explores in more depth the ways through which communities can be engaged across contexts. Subsequently, this section presents and compares lessons learned on engaging communities in the fields of environmental management and healthcare.

Finding community engagement lessons across contexts. Studies highlight the importance of tailoring the community engagement methods to the local context in order to increase the chances of successful restoration, and that community engagement strategies cannot be copied directly from one context to the next (Miller & Hobbs, 2007; Reed et al., 2018). There are, however, overarching principles on community engagement; these are based on empirical data and can be used as guidelines irrespective of the local context. Several sets of principles for community engagement exist in both scientific and grey literature across the fields of environmental management, research, and healthcare (e.g. Dare et al., 2014; Durham et al., 2014; Hesselink et al., 2007; Newman & Rubincam, 2014).

Principles of community engagement have previously been developed in the field of ecosystem restoration, e.g. by IUCN (Keenleyside et al., 2012), WWF (Mansourian & Vallauri, 2012), the World Resources Institute (Hanson et al., 2015), and the Society for Ecological Restoration (Gann et al., 2019). However, none of these studies are dedicated to the engagement of communities as they encompass the entire restoration process, and they therefore have limited analytical depth and limited suitability to achieve this research's aim. Furthermore, exploring community engagement principles beyond the field of ecosystem restoration may yield valuable insights from other disciplines that are not yet known to the field of ecosystem restoration.

Principles of community engagement from the field of environmental management. One of the most highly cited community engagement principles in the field of environmental management was developed by Mark S. Reed (2008; >1800 citations on Web of Science as of May 2021). This article is based on a literature review of empirical data and highlights eight principles for community engagement: (i) to communicate and agree on objectives with stakeholders at the start, (ii) to adapt methods to the local context, (iii) apply a philosophy of empowerment, equity, trust, and learning, (iv) analyse and represent stakeholders systematically, (v) ensure early and ongoing stakeholder participation throughout the process, (vi) employ highly skilled facilitation, (vii) integrate different types of knowledge, and (viii) create institutional structures for participation. This set of principles has subsequently been used in the fields of *inter alia* environmental sciences, ecology, conservation, economics, geography, and regional urban planning, based on a Web of Science analysis of the citing literature.

Principles of community engagement from the field of healthcare. Beyond the field of environmental management, the field of healthcare has produced many principles and experiences that are focused on community engagement (e.g. McCloskey et al., 2011; Newman & Rubincam, 2014; Sapienza et al., 2007). Specifically, the field of healthcare is the largest contributor to the scientific literature on community engagement (Web of Science search on 18 May 2021: "Community Engagement" resulted in *c.* 12,200 articles in healthcare out of 33,837 articles, versus *c.* 3100 articles in environmental studies). Consequently, the field of healthcare may have accumulated community engagement insights that have not been found in the field of environmental management. The set of principles produced by McCloskey and colleagues (2011) was selected for three reasons. First, it was peer-reviewed and produced by the Department of Human Health & Services of the USA government, and chaired by leading USA-based research universities in collaboration with the National Institutes of Health. Second, there is a pre-existing overlap between the principles developed by McCloskey and colleagues (2011) and the principles developed by Reed (2008) (see below). Third, the publication has accumulated

over 50 citations in the past decade, which is more than other published principles of community engagement in the field of healthcare.

The principles by McCloskey and colleagues (2011) are: (i) to communicate and agree on objectives with stakeholders at the start, (ii) to adapt methods to the local context, (iii) to respect the self-determination of the community, (iv) to respect and understand the degree of diversity within the community, (v) to create partnerships with the community, (vi) to build networks and relationships with the community, (vii) to build capacity and resources in the community, (viii) ensuring the engaging organisation lets go of control, and (ix) the engaging organisation commits to long-term collaboration with the community.

Comparing the principles by Reed (2008) and McCloskey and colleagues (2011). Despite having been developed for different fields, these two sets of principles overlap partially: the first two principles, i.e. to 'communicate and agree on objectives with stakeholders at the start' and to 'adapt methods to the local context' are both mentioned in these sets of principles (albeit differently phrased in the original articles). Furthermore, regarding the third principle, 'apply a philosophy of empowerment, equity, trust, and learning' by Reed (2008) and 'respect the self-determination of the community' by McCloskey and colleagues (2011), both principles highlight empowerment, i.e. respecting the self-determination, of the community. Additionally, regarding the fourth principle, 'analyse and represent stakeholders systematically' by Reed (2008) and 'respect and understand the degree of diversity within the community' by McCloskey and colleagues (2011), both principles relate to respecting and representing the diversity of stakeholders present within the community.

Although it is an assumption that remains to be tested with empirical data, the observed overlap between the different sets of community engagement principles strengthens the suggestion that these community engagement principles may complement each other. To what extent these sets of principles can be applied to the context of wetland restoration is unknown; however, using community engagement principles from outside the field of ecosystem restoration may yield new insights into the approach to community engagement, as interdisciplinary research approaches have previously yielded new insights and have enriched our knowledge (Aboelela et al., 2007).

Hence, this research combines the sets of community engagement principles developed by Reed (2008) and McCloskey and colleagues (2011). The use of this novel interdisciplinary analytical framework allows the description of what community engagement principles are used in the field of wetland restoration and which ones are deemed most important to ensure the long-term success of restoration efforts from the perspective of restoration practitioners. However, these sets of principles may be unable to describe the full variation of community engagement strategies applied in the wetland restoration projects; this issue is further addressed in chapter 3.

3 Research design, materials, and methods

The literature review shows that little is published on community engagement strategies in the context of European wetland restoration projects, despite their demonstrated importance for the success of restoration projects (e.g. Davenport et al., 2010). Additionally, little is known about the relation between community engagement strategies and the long-term success of European wetland restoration projects. Therefore this research aims to shed light on this by exploring previously completed European wetland restoration projects to find overarching patterns of successful community engagement. This section explores the methodology applied to achieve the research aim.

3.1 Research design

This research uses a comparative multiple-case study design, which facilitates the discovery of overlapping patterns and enhances the generality of findings (Verschuren, 2003) in the context of community engagement in wetland restoration projects, and uses qualitative research methods to achieve the research aim. Given the complex, interdisciplinary nature of this context (see Literature Review), case studies are an effective research strategy for the description and exploration of such subjects (Blaikie & Priest, 2019; Verschuren, 2003). A similar research design has previously been applied to explore USA-based wetland restoration projects (Druschke & Hychka, 2015). Furthermore, this research utilises an information-oriented selection of case studies, (Flyvbjerg, 2006), in order to specifically sample and evaluate past wetland restoration projects with a community engagement component, which took place across different geographies and contexts and in a particular time frame, to identify overarching community engagement lessons.

This research design allows for an in-depth exploration of cases, while being limited to small sample sizes (Blaikie & Priest, 2019). Regardless of sample size, case study research does allow for generalisations to be made (Flyvbjerg, 2006). Likewise, this research relies on the experiences and perspectives of a small sample of restoration practitioners, in addition to project documentation and literature-based analytical frameworks, in order to make generalisations on community engagement strategies in ecosystem restoration projects.

Nine case studies ('projects') were selected from the EU LIFE programme. Additionally, to assess the generalisability of findings, two non-EU LIFE projects were included in the analysis (see section 3.2.2). Data on restoration projects was collected via in total 12 interviews, accompanied by EU LIFE project documentation when available (see Table 3-1). Furthermore, to achieve the research aim, two literature-based analytical frameworks on community engagement were used: (i) the Wheel of Participation (Reed et al., 2018) was used to describe the broad community engagement typologies used in the projects, and (ii) two sets of community engagement principles from different disciplines were combined to yield a new, interdisciplinary analytical framework for the analysis of community engagement strategies (see section 3.3). Overall, these allowed for the exploration of the community engagement applied in European wetland restoration projects.

Ultimately, the research questions were answered through a mixed deductive-inductive qualitative content analysis of the interviews, guided by the analytical frameworks described above, and, in the case of EU LIFE projects, supported by the use of project documentation for the cross-verification of claims made in the interviews (Figure 3-1).

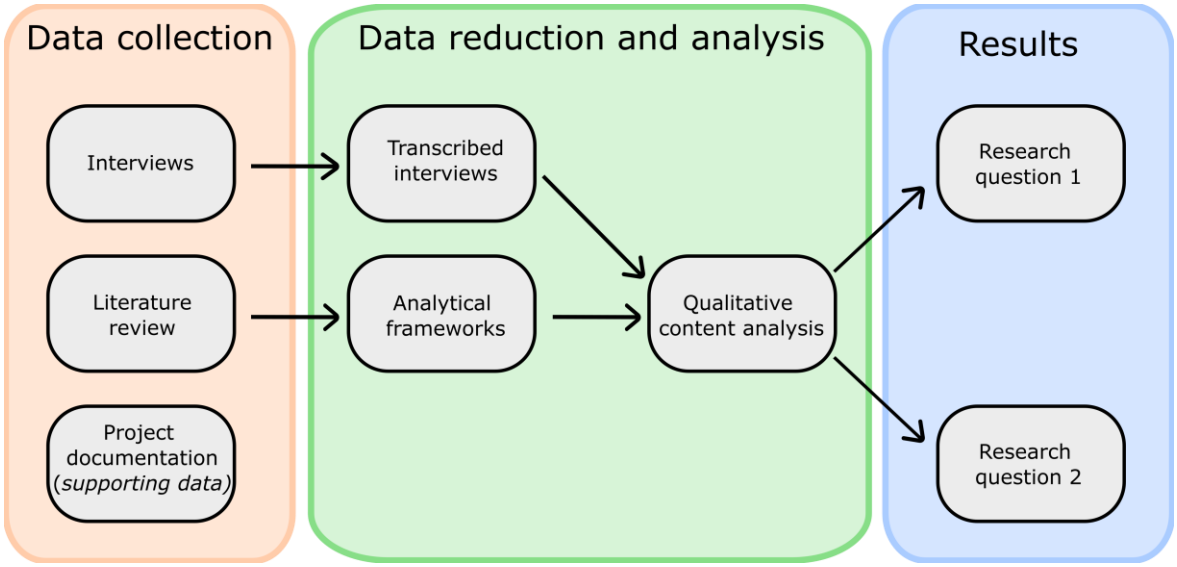

Figure 3-1 Overview of the research design. The analytical frameworks displayed includes the Wheel of Participation and the principles on community engagement, of which the latter were used to build the initial coding sheet for the qualitative content analysis. Note: project documentation was used for supporting the claims present in the interview, and were not part of the deductive qualitative content analysis.

3.2 Data collection methods and collected data

Below, an overview is given of the collection of data through a literature review, interviews with restoration practitioners, and EU LIFE project documentation.

3.2.1 Literature review

Both scientific peer-reviewed articles and grey literature published by research organisations were used for the literature review. Scientific peer-reviewed articles were found using Web of Science v5.35, by querying different combinations of the following keywords. *wetland*, restor*, ecosystem*, ecolog*, soci*, commun*, stakeholder*, particip*, engage*, environment*, success*, factor*, long-term, social-ecologic*, system** (asterisks indicate wildcards). Grey literature was found using search engine DuckDuckGo, through different combinations of the following keywords: *wetland, restoration, social-ecological, ecosystem*, *community, engagement, principles, socioeconomics.*

First, collected articles were categorized and filtered based on relevance to the different research questions using keywords present in articles' titles and abstracts. Secondly, a synthesis matrix was iteratively developed based on the content of the identified literature to cover the different topics discussed. Phenomena discussed in multiple articles were used as input for the synthesis matrix topics.

3.2.2 Selecting projects

Rationale for project selection. EU LIFE projects were selected as cases due to four reasons. First, the EU LIFE programme publicly publishes the project documentation of these projects in a standardized manner, thereby allowing for the in-depth understanding of restoration projects and allows for the cross-verification of information collected through interviews and project documentation. Second, these projects were conducted within the EU, thereby limiting the geographical variation of the projects that are examined. Third, these projects are partially funded by the EU LIFE programme, and therefore have a similar funding mechanism. Fourth,

the EU LIFE programme includes an After-LIFE project phase, which requires the coordinating beneficiary, i.e. the recipient of the EU funds and coordinator of the restoration project, to be responsible for the restored ecosystem for five years after the project ended, which ensures that the restoration practitioners of the coordinating beneficiary remained up-to-date on the long-term successes and failures of the restoration project after project completion. Overall, these common factors improve the comparability between projects and their usefulness in identifying community engagement strategies associated with long-term restoration success.

Despite the abovementioned advantages of using EU LIFE projects, such an approach would limit the variation present in the data predominantly regarding geographic scope and funding mechanism. As a result, this may reduce the generalisability of this research's findings outside of the EU LIFE context. To assess this generalisability, two non-EU LIFE wetland restoration projects with a clear community engagement component were selected and included in this research.

Sample design. EU LIFE projects were obtained from the EU LIFE online portal (European Commission, 2021). An initial selection of 391 case studies with the keywords "wetlands" and "wetlands ecosystems" was reduced to 79 cases by selecting projects which were finalised between 2012 and 2016. This time frame was chosen as it allowed for the evaluation of projects several years after their recent completion. Subsequently, projects were selected from different EU countries and were contacted in case the project description on the EU LIFE online portal clearly incorporated a community engagement component as part of the project activities, and if projects had at least a Full Technical Report, Layman Report, or an After-LIFE Conservation Plan available in English on the EU LIFE online portal. This reduced the number of projects to 13, out of which 9 projects agreed to be interviewed for this research. These 9 projects represent a large range of socioeconomic and political contexts and histories, which was expected to help the identification of overlapping community engagement lessons for wetland restoration. Additional projects were not contacted due to time constraints. 2 non-EU LIFE projects were obtained using a snowballing sampling technique (Blaikie & Priest, 2019), resulting from contact with an NGO involved in wetland restoration. An overview of the studied projects can be found in Table 3-1.

3.2.3 Interviews

This research obtained the perspectives and experiences of restoration practitioners that were involved in the wetland restoration projects through in-depth interviews. While acknowledging that restoration projects involve many stakeholders, this research interviewed one restoration practitioner per project (except for the USA-based project, see below), who was part of the project management team. This was decided, as members of the project management team had been involved throughout the project phase, and therefore are likely to have a good overview of the entire project. This approach may have led to a practitioner-centred view of the community engagement strategies and the success of the wetland restoration projects; however, time constraints did not allow for the in-depth exploration of each project by interviewing several members of the local communities while exploring the same number of projects. Nevertheless, interviewing the restoration practitioner may yield the broadest overview of the project in a single interview, including its successes and failures, from which conclusions on community engagement strategies across restoration projects can be drawn.

Table 3-1 An overview of the studied wetland restoration projects. This table includes the project codes, which are used throughout this study to refer to the case studies. Abbreviations used for the collected documentation: FTR (Full Technical Report), LR (Layman Report), AL (After-LIFE Conservation Plan).

Country	EU LIFE code	Project code	Organisation interviewed	Funding	Year completed	Collected documentation	Interview date
Spain	LIFE10 NAT/E/000 563	A1	Fundación Global Nature	EU LIFE	2016	LR, AL	15/02/2021
Finland	LIFE09 NAT/FI/00 0563	A2	Finnish Wildlife Agency	EU LIFE	2015	FTR, LR, AL	16/02/2021
Greece	LIFE09 NAT/GR/0 00323	A3	Nature Conservation Consultants LLC	EU LIFE	2014	FTR, LR, AL	17/02/2021
Lithuania	LIFE07 NAT/LT/00 0530	A4	Nature Heritage Fund	EU LIFE	2012	FTR, LR, AL	19/02/2021
Ireland	LIFE07 NAT/IRL/0 00342	A5	Inland Fisheries Ireland	EU LIFE	2014	LR, AL	22/02/2021
Slovakia	LIFE07 NAT/SK/00 0707	A6	BROZ	EU LIFE	2015	FTR, LR, AL	25/02/2021
Sweden	LIFE08 NAT/S/000 266	A7	Ume/Vindel River Fishery Advisory Board	EU LIFE	2015	FTR, LR, AL	03/03/2021
Lithuania	LIFE09 NAT/LT/00 0233	A8	Baltic Environmental Forum Lithuania	EU LIFE	2015	FTR, LR, AL	10/03/2021
Hungary	LIFE07 NAT/H/000 324	A9	Hortobágy Environmental Association	EU LIFE	2013	FTR, LR, AL	12/03/2021
Romania	NA	B1	World Wildlife Fund Romania	Non-EU LIFE	2016	Presentation	10/02/2021
USA	NA	B2.1	The Nature Conservancy	Non-EU LIFE	2016	Manuscript	08/02/2021
		B2.2	Penobscot Restoration Trust			NA	05/03/2021

Specifically, semi-structured interviews, consisting of 9 pre-defined questions (see Appendix A), were conducted with restoration practitioners of the EU LIFE and non-EU LIFE projects. Semi-structured interviews allow for a more in-depth understanding of the perspective of the practitioners and the case study than written answers to questions (Bengtsson, 2016), while semi-structured interviews allow for additional flexibility in exploring unexpected findings during an interview (Blaikie & Priest, 2019). Interviews were held with either the restoration practitioners or their assistants in the case of EU LIFE projects. In the case of the non-EU LIFE project in Romania, the interview was conducted with a restoration practitioner who was locally present throughout the restoration project on behalf of the coordinating NGO. In the case of the non-EU LIFE project in the USA, two interviews were conducted: one with two social researchers affiliated with partner organisations of the restoration project who assessed the social impacts of the restoration project, and one interview with the executive director of the project. The latter interview was required as the former did not yield all answers to the interview questions, including questions related to research question 2. Throughout this research, the interviewees are referred to as 'restoration practitioners'.

Interviews lasted *c.* 60 minutes and were conducted and recorded via Zoom v5.0. Although written consent for recording and use of the interview for this research was obtained prior to each interview, consent was orally re-confirmed at the start of the recording of each interview in addition to a brief ethical statement by the interviewer (see Appendix A), thereby following standard interview recommendations (Bengtsson, 2016). While offers to anonymise names and affiliations of the restoration practitioners were declined, the names of the practitioners have not been used. Overall, 12 semi-structured interviews were conducted: one interview per EU LIFE project, one with a Romanian non-EU LIFE project, and two with a single USA-based project.

3.2.4 Project documentation

Documentation was obtained for each EU LIFE project through the EU LIFE online portal (European Commission, 2021). The project documentation availability varied between EU LIFE projects, resulting in having access to one or multiple of the following standard EU LIFE documents: the Layman Report (a report for the general public), the Full Technical Report (a technical description of the projects' activities), and the After-LIFE Conservation Plan (a technical description of the planned activities after the completion of the restoration activities). All available documents per project were used to prepare for interviews, and to cross-verify. An overview of the collected project documentation can be found in Table 3-1.

3.3 Data analysis methodology

Interviews were automatically transcribed *verbatim* using the speech-to-text engine DeepSpeech v.0.93 (Mozilla, 2020), and transcripts were manually corrected using the software oTranscribe (Bentley, 2019). These software packages were chosen as they are open source and can run offline, thereby providing a high level of privacy and data security while increasing the efficiency of the transcription process.

Data reduction and analysis of the transcribed interviews was conducted using a **mixed deductive-inductive qualitative content analysis**, i.e. a deductive qualitative content analysis with an unconstrained matrix *sensu* Elo and Kyngäs (2008). In a deductive qualitative content analysis *sensu* Elo and Kyngäs (2008), the interview statements are labelled using 'codes' that are pre-defined in a coding sheet. However, while a deductive qualitative content analysis with an unconstrained matrix uses a pre-defined coding sheet, it allows for new codes to emerge from the interview data and for the coding sheet to be iteratively edited. Hence, the data analysis

method applied in this research is a mixture of deductive and inductive qualitative content analysis.

The analytical framework used in this research, i.e. the coding sheet, was the result of merging the two sets of community engagement principles developed by Reed (2008) and McCloskey and colleagues (2011) (see Appendix B). However, the terminology used for some of the community engagement principles was very broad in its content, e.g. "apply a philosophy of empowerment, equity, trust, and learning" (Reed, 2008). In contrast, others could be grouped together to form a new code, e.g. "respect the community's self-determination" and "let go of control" (McCloskey et al., 2011), as they are both related to managing power dynamics. As another example, while "build networks and relationships with the community" includes the building of relationships, the original description did not specify the building of personal relationships (see McCloskey et al., 2011), while this was specifically mentioned in several EU LIFE projects. Hence, to improve the accuracy and reduce the ambiguity of the coding process, the initial coding sheet was revised and edited iteratively as the interview data was coded (see Appendix C). This revised coding sheet was subsequently used to code all interviews, and formed the basis of the new conceptual framework for community engagement in European wetland restoration projects (see Figure 4-1). A similar methodology has previously been conducted to obtain practitioners' and stakeholders' perspectives on wetland restoration projects in the USA (e.g. Davenport et al., 2010; Druschke & Hychka, 2015).

This analysis allowed for the identification of community engagement strategies used in the restoration projects by coding the interviews with the coding sheets. Coding was performed using NVivo 1.4.1 (Houghton et al., 2017) as this aids the drawing of connections within and between interviews while increasing transparency, and followed the procedure described by Elo & Kyngäs (2008). Rather than using latent qualitative content analysis *sensu stricto* (Bengtsson, 2016; Elo & Kyngäs, 2008), the interviewees' words were interpreted to assess whether and how their statements fit into the analytical framework, and whether their statements would require the creation of a new code. To increase the validity of the findings, data triangulation (Blaikie & Priest, 2019) was performed by cross-checking made statements in the interview with the project documentation to assess the reliability of interview statements and to verify claims. Lastly, to increase the validity of the findings and the trustworthiness of the codes, two peer researchers independently coded 1000 words of one interview with the revised coding sheet, which showed a high degree of overlap with the coding performed by the author.

Research Question 1 and the **Supporting Question** are answered using a combination of the Wheel of Participation (Reed et al., 2018), the community engagement principles and the outcome of the qualitative content analysis, while **Research Question 2** is answered using the outcome of the qualitative content analysis combined with theoretical, literature-based underpinnings.

4 Findings

This chapter presents the findings from the qualitative content analysis of the interviews, with the support of project documentation, in four different sections. First, it gives a brief overview of the explored case studies and their success. Second, using the Wheel of Participation (Reed et al., 2018), the community engagement typologies are identified. Third, it presents a new conceptual framework for the community engagement strategies used in EU LIFE-funded European wetland restoration projects. Lastly, this chapter explores the perspectives of the restoration practitioners on the most important community engagement strategies for the long-term success of restoration projects.

4.1 Explored wetland restoration projects

This section provides a brief overview of the type of wetlands that were restored in each project, and includes an impression of the present-day success of the restoration projects from the perspective of the interviewed restoration practitioners.

A1 Spain: 27 seasonal saline wetlands in the Spanish salt steppes were restored. The most sensitive parts of the wetlands were purchased by the coordinating beneficiary, and restoration activities were implemented with help of the local community members, through both hiring and volunteering. The NGO taught local farmers to produce organic crops and were engaged through land stewardship agreements. The project is considered successful, as the flora and fauna are recovering, the tourism sector is growing and is active around the wetlands, and the local communities are now taking care of the wetlands, e.g. through neighbourhood associations. The NGO is up-to-date with the state of the wetlands as they continue their work in this area (A1).

A2 Finland: 48 sites of several freshwater wetland types were restored on private lands, covering 340 hectares, while the original plan was to restore 30 wetland sites covering 200 hectares. Landowners submitted site proposals for freshwater wetland restoration, after which the coordinating organisation selected suitable sites. Planning and implementation took place in co-production with the landowners. The projects is considered successful nowadays as more wetlands were restored than planned, and the waterfowl reproduction rate is currently more than three times higher than before (A2).

A3 Greece: Seasonal freshwater wetland restoration on the Greek island of Skyros was part of an integrated restoration plan which involved the restoration of several habitats and species, including the Skyrian horse and the Eleonora's Falcon. The restoration plan was proposed by the local communities and co-produced with the coordinating beneficiary and the local municipality. There was high support of locals to restore and protect the island, and international ecotourism was developed. Regarding the restoration of the wetlands, the project was not considered fully successful, although the overall project resulted in the creation of protected zones, including the wetlands, and the protection and restoration of locally important biota. Furthermore, the local community, including the municipality, has continued to support the island's biodiversity protection. The current state of the wetlands was unknown to the restoration practitioner (A3).

A4 Lithuania: Over 1300 hectares of freshwater mires were restored whilst working together with farmers to change farming practices and to allow for wetland restoration, in addition to restoring natural water level fluctuations in two lakes. While local community members were not directly involved in the implementation of restoration activities, plans were produced collaboratively with stakeholders from the local communities. As this project was not

considered fully successful at the time of completion, a second EU LIFE project was initiated, which led to the restoration of 70% of the mires at present (A4).

A5 Ireland: By improving habitats for three species (otter, sea lamprey, and salmon) and reducing riparian invasive species in collaboration with local communities, a part of a river was restored. Planning and implementation of restoration activities were executed in co-production with the local community. Nowadays, the project is considered successful regarding the improvement of habitat for the three abovementioned species, while it is considered unsuccessful regarding the removal of riparian invasive species as this activity halted after the project ended and invasive species are spreading. After project completion, a new project was set up to work with farmers to further improve the river (A5).

A6 Slovakia: This project restored several types of freshwater wetlands, including Danube river tributaries, lakes, and marshes, as well as non-wetland habitats, such as meadows. Implementation of restoration activities took place in collaboration with landowners and other local stakeholders, and was overseen by the coordinating beneficiary. Nowadays, the restoration of the wetlands is considered successful, as it has contributed to *inter alia* the increase in target bird species population sizes, and resulted in the formation of new partnerships. In turn, this has led to the start of successor projects to ensure continuation of restoration activities (A6).

A7 Sweden: 26 tributaries of a river were restored. The project worked collaboratively with private landowners to gain access to the river for restoration works, and restoration plans were guided by the local landowners. It is considered successful, as the number of salmonids has increased since the restoration works and new restoration methods were proven effective (A7).

A8 Lithuania: The project restored freshwater wetlands and arranged for the implementation of Common Agricultural Policy-funded agri-environmental payments for the farmers. Project planning and implementation were done in collaboration with the local community members, which were part of the project steering group. The project is considered successful, as the focal species population has increased, farmers changed their production methods and are now receiving payments for applying environmentally-friendly agricultural methods. The coordinating beneficiary has started a second EU LIFE project to continue its restoration activities for the focal species (A8).

A9 Hungary: The project restored the Hortobágy sodic lakes, which is a rare habitat type in Europe. Through a water management plan which was designed *inter alia* with the support of the local government, the project improved water influx and reduced flooding in a nearby village. Together with local farmers, it created a new grazing regime on the wetlands which supports local biodiversity. Overall, the project is considered successful, as it has created socioeconomic benefits in addition to restoring the habitat, and has resulted in an increase in bird populations. The project's learnings have been used for new restoration projects in the area (A9).

B1 Romania: This project restored part of the Danube Delta wetland near the village of Mahmudia; this idea was proposed by the local community and plans were shaped collaboratively by the local community and an NGO. The implementation of the restoration project was considered technical and was performed by the coordinating organisation. The project is considered successful as bird populations have increased and ecotourism development is taking place, which benefits the local community (B1).

B2 USA: A river was restored through the removal of several hydroelectric power dams. Through collaboration between a Native American tribe and several organisations, under the

coordination of the Penobscot River Trust, the dams were removed. The project is considered a success nowadays, as the fish populations in the river have increased and can migrate up the river again and there are indications of improved social perceptions of the river (B2.1; B2.2).

4.2 Community engagement typologies of restoration projects

Using the contents of the interviews and the project documentation, Table 4-1 describes the community engagement typologies of the studied restoration projects based on the Wheel of Participation (Reed et al., 2018) (Figure 2-2). It highlights that in 7 out of 9 EU LIFE projects, the community engagement was initiated and led through a top-down manner, i.e. community engagement was started and conducted by an organisation, rather than the local community. In contrast, the two other EU LIFE projects indicated community engagement being initiated from the bottom-up, but the community engagement was subsequently led by a combination of the community and the coordinating organisation. In contrast, the community engagement in the non-EU LIFE project in Romania was started by the bottom-up, but was subsequently led by the coordinating organisation. Lastly, the non-EU LIFE project in the USA was the only project where community engagement was initiated and led from the bottom-up.

Furthermore, the EU LIFE projects showed variation in their modes of engagement: while some shared a high degree of decision-making power with the local communities and used predominantly a co-productive mode of engagement (A2), e.g. by applying a participatory approach to restoration (A3), others used combinations of engagement modes where less power was given to the local communities, such as consultation and deliberation with the local communities (A1; A6). Furthermore, several used a combination of deliberation and co-production (A4; A5; A7; A8), for example by having the local community be represented on the project steering committee. This shows a relatively high degree of decision-making power is shared with the local communities in the restoration activities for most of the EU LIFE projects. Lastly, the non-EU LIFE projects used a combination of engagement modes: where the project in Romania co-produced most of the initial restoration plans with the local communities, the technical nature of the restoration project did not allow for co-production of the implementation phase with the local community, and therefore it employed a range of community engagement modes. Local people had little to say about the eventual restoration activities, although they were represented by the local municipality, who were part of the decision-making process (B1). The USA-based project used predominantly a co-productive mode of engagement.

Table 4-1 Community engagement typologies of the wetland restoration projects, based on the Wheel of Participation (Reed et al., 2018). Agency refers to who initiated and leads the community engagement, while mode refers to the type of engagement, ranging from communication to co-production.

Project information		**Community engagement typology**	
Country	**Project code**	**Agency**	**Mode**
Spain	A1	Top-down	Consultation, deliberation
Finland	A2	Top-down / bottom-up	Co-production
Greece	A3	Top-down / bottom-up	Co-production
Lithuania	A4	Top-down	Deliberation, co-production
Ireland	A5	Top-down	Deliberation, co-production
Slovakia	A6	Top-down	Consultation, deliberation
Sweden	A7	Top-down	Deliberation, co-production
Lithuania	A8	Top-down	Deliberation, co-production
Hungary	A9	Top-down	Consultation, deliberation
Romania	B1	Top-down / bottom-up	Consultation, deliberation, co-production
USA	B2	Bottom-up	Co-production

4.3 Community engagement strategies applied in restoration projects

Six main themes for community engagement were extracted from the findings: **Connect**, **Empower**, **Learn and Teach**, **Integrate**, **Demonstrate**, and **Persist** (as shown in Figure 4-1). These were used to group the 17 identified literature- and interview-based community engagement strategies used in the wetland restoration projects, which resulted in a new **conceptual framework** (Figure 4-1). Below, each identified community engagement strategy of the conceptual framework is discussed; per section, the EU LIFE projects are presented first, after which the non-EU LIFE projects are described. This section explores the overarching community engagement strategies that have been applied by at least two wetland restoration projects.

Table 4-2 Overview of the community engagement strategies used in the studied wetland restoration projects. X indicates used strategy by project. Column 'Source' indicates the origin of the community engagement strategies: L (literature-based) or D (interview-based).

Community engagement strategies	Source	A1 Spain	A2 Finland	A3 Greece	A4 Lithuania	A5 Ireland	A6 Slovakia	A7 Sweden	A8 Lithuania	A9 Hungary	B1 Romania	B2 USA
Connect: Build local networks and partnerships	L	X	X	X	X	X	X	X	X	X	X	X
Connect: Early and broad involvement	L	X	X	X	X	X	X	X	X	X	X	X
Connect: Build personal relationships	D	X	X		X			X	X	X		X
Connect: Visible leadership	D	X		X	X	X	X	X	X		X	X
Empower: Create a common vision	L	X	X	X	X	X	X	X	X	X	X	X
Empower: Structures for systematic representation and participation	L	X	X	X	X	X	X	X	X	X	X	X
Empower: Manage power dynamics	L		X					X				
Empower: Bottom-up initiatives	D		X	X							X	X
Learn & Teach: Adapt to the local context and history	L	X	X	X	X	X	X	X	X	X	X	X
Learn & Teach: Exchange and integrate knowledge	L	X	X	X	X	X		X		X		
Learn & Teach: Build capacity and resources	L	X	X		X	X	X		X	X		
Integrate: Create locally relevant benefits	D	X	X	X	X	X	X	X	X	X	X	X
Integrate: Organise locally relevant events around restoration activities	D			X		X	X		X			X
Demonstrate: Communicate success	D	X	X	X	X	X	X	X	X	X	X	X
Demonstrate: Use a focal species for restoration	D			X		X			X			X
Persist: Commit to long-term collaboration	L	X									X	
Persist: Create successor projects	D	X	X		X	X	X		X	X	X	X

Comparing the restoration projects. Table 4-2 shows that all projects use different combinations of strategies, and none of the projects used all identified strategies. Overall, the overlap between the different projects' community engagement strategies is highlighted through their collective use of the following strategies for both EU LIFE and non-EU LIFE projects: (i) build local networks and partnerships, (ii) involve many stakeholders early on and throughout the project, (iii) create a common vision, (iv) create structures for systematic representation and participation, (v) adapt to the local context and history, (vi) create locally relevant benefits as a result of the restoration activities, and (vii) communicate success. Some differences were observed between projects, namely (i) two EU LIFE projects managed power dynamics, (ii) two EU LIFE projects used bottom-up initiatives to identify sites for wetland restoration, (iii) one EU LIFE project and one non-EU LIFE project committed to long-term collaboration, and (iv) three EU LIFE projects and one non-EU LIFE project used a focal species for restoration.

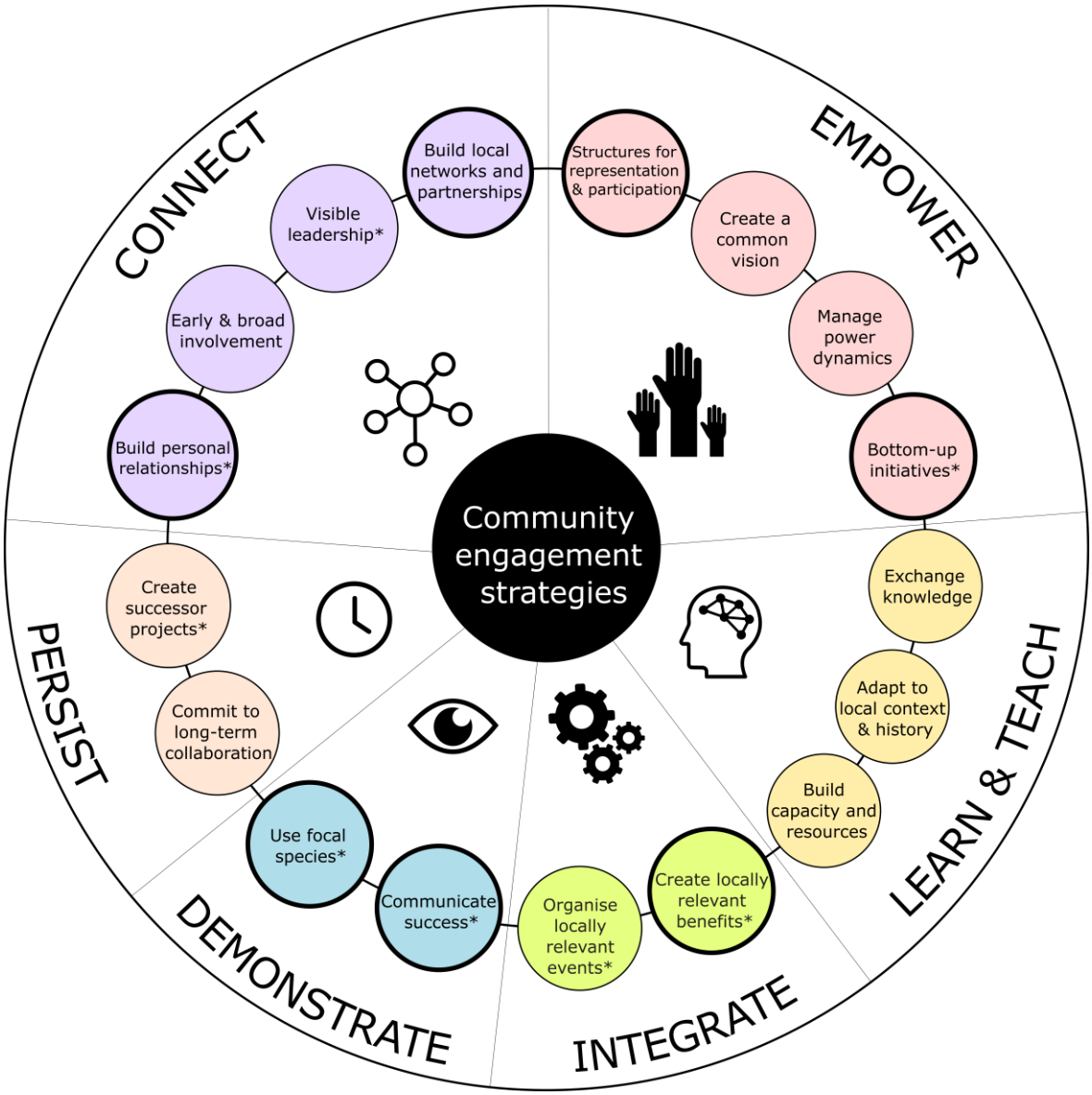

Figure 4-1 Overview of the conceptual framework on community engagement strategies found in EU LIFE wetland restoration projects, based on interviews and project documentation, and grouped in 6 themes. An asterisk (*) indicates that the community engagement strategy emerged from the interviews, and was not present in the literature-based analytical framework. Bold encircling indicates community engagement strategies that were found most important for the long-term success of restoration activities by at least one restoration practitioner.

4.3.1 Connect: build local networks and partnerships

This section explores how networks and partnerships were built between the coordinating beneficiaries and the local communities. Furthermore, it shows how these partnerships may collapse or flourish after the project phase, and how this may affect the restoration project's long-term success.

Build networks with the community. All EU LIFE projects built local networks through collaboration or consultation with local communities. Partnering with the local municipality was pointed out to be particularly important to engage local communities for several reasons. First, it allowed the project to work through a pre-existing network of trust: since local government officials interact with key stakeholders on a daily basis, there is trust between these different actors. Hence, as a newcomer, having the local government on your side helped to quickly build trust with key stakeholders (A1). Second, the local government shared knowledge on which stakeholders' interests and willingness to collaborate with the restoration project (A4). Third, they are knowledgeable about the local context, and – if they are a partner in the restoration project – tend to be highly committed to the cause (A3). Similarly, non-EU LIFE projects created partnerships and local networks as well, e.g. with NGOs and local citizen organisations (B1; B2.2).

Create partnerships with the community. In this research, partnerships are defined as a relationship between two groups of individuals to collaborate and share responsibility for the achievement of a specific objective (*sensu* McCloskey et al., 2011). All EU LIFE projects created partnerships with relevant stakeholders, such as local farmers (A1), local government (A1; A3), local community organisations (A5; A6; A7), local tourism (A3; A8; A9), local artworkers (A3), museums (A3), national park authorities (A9) and state enterprises (A6). These partnerships help to mobilize resources, build coalitions, and broaden participation in restoration activities.

Partnerships came in many varieties, e.g. sharing responsibility and costs for the implementation with local governments (A3) or landowners (A2), as well as stewardship agreements (A1). Stewardship agreements were applied in one EU LIFE project; these voluntary agreements were between the coordinating beneficiary and local farmers, through which farmers were offered services by the NGO, such as soil analyses, and in return, farmers applied environmentally friendly production methods on their land (A1):

> "**[The land stewardship] is a way how we offer services to farmers**. We support them, because they belong to our land stewardship. […] It's a **voluntary agreement**. It means that you have an agreement letter, and if you don't agree with it, you can rip it apart, and that's it. This voluntary agreement has no money involved." (A1)

In comparison with other EU LIFE projects, agreements were made to selectively support farmers who were already applying environmentally friendly production methods, e.g. through the provision of cattle or equipment (A4; A6).

Several benefits were realised as a result of these partnerships, including lower barriers to start successor projects (see section 4.3.17) (A1; A4; A6; e.g. A8; A9). Another benefit was the facilitation of collaborative learning: a partnership between the project management and local farmers led to the experimentation of grazing regimes that were beneficial for restoring the wetlands' biodiversity (A9). Overall, the creation of partnerships with local communities showed mutual commitment to the cause of wetland restoration and increased trust between local communities and restoration practitioners, while empowering local communities (A3; A5).

Similarly, non-EU LIFE projects created partnerships with local communities, e.g. through sharing decision-making power with a Native American tribe (B2.2) and by collaborating with local fishermen and local tourism business owners (B1).

Collaboration with the press. Through collaboration with the local press, all EU LIFE projects raised awareness among the local community members on the restoration project and the value of the wetlands. This involved collaborating with different press agencies and the use of multiple media types, such as TV, local newspapers, radio, documentaries, and social media. In some projects, the press helped to keep the local communities up-to-date on the progress of the restoration project (A9). Non-EU LIFE projects similarly collaborated with the press (B1; B2.2).

Success and failure of partnerships. While these partnerships may be successful during the project phase, they may fall apart during the post-project phase. One EU LIFE project mentioned the lack of responsibility taken up by the respective partners after the project had formally ended, and the lack of legal frameworks to ensure project continuation ultimately led to the halt of an invasive species control programme, resulting in the continued degradation of this aspect of the wetland (A5). The restoration practitioner suggested that a lack of leadership (section 4.3.4), a lack of a common vision (section 4.3.5), and absence of legal responsibilities were the main causes.

In contrast, other projects noted the importance of created partnerships during the project phase to start successor projects with the same partners and to maintain momentum for restoration activities (A1; A4; A6; A8; A9) (section 4.3.17).

4.3.2 Connect: early and broad involvement

This section explores when and how local communities were involved in different project phases, as well as methods in which restoration practitioners determined who is part of the local communities and who is not.

Involving local communities throughout the project. Most EU LIFE projects involved members of the local communities throughout the project's duration: through different modes of engagement – ranging from consultation to co-production – the local communities were involved in restoration planning (A2; A3; A4; A5), implementation (A1; A5; A6; A8), and monitoring, e.g. through ecological surveys (A1; A3; A5). In contrast, only two projects involved local communities in the evaluation of the restoration activities (A3; A5). Non-EU LIFE projects predominantly involved the local communities in the planning phase only (B1; B2.2).

In the excerpt below, a restoration practitioner highlights the importance of participation for the sustainability of the project:

> "[Our participatory approach] is supposed to produce planning results which are then results with the local actors, and they are formulated with their assistance. We do not prepare plans. […] it would be much easier for me if everything were to be planned from my consultancy instead of discussing them with the locals. But **the sustainability of the planning is strongly increased if you involve the locals in the various stages of the planning**." (A3)

Hiring locals and volunteering. Several EU LIFE projects involved hiring of locals (A1; A6; A9). According to the restoration practitioner, this built local ownership over the restoration activities:

> "This project is focused on investing in the area. That means that you start to **hire people to work for you in the area**. […] That is fundamental. […] [W]hen you hire some locals and put these people to work only just for one week or two days, you have the chance to explain why they are doing these activities. And these people are local […]; they create feelings of belonging to the wetland or to the forests, and so on, because 'I worked there. The work was important for me and for the others. Now I am worried about what happens in this place.' **It creates ownership**." (A1)

Several projects engaged the local community through volunteering (A1; A2; A3; A5), and noted that this was a similarly useful way of engaging local communities:

> "**Probably the most effective way we engaged was through the establishment of the [volunteer organisation]**. This was a newly established entity that was established under the auspices of the LIFE project, and we had regular, monthly conservation outings, right throughout the year. […] there was 110, 115 conservation volunteers. So, we did tree-planting, bird boxes, we put in river pads... we did everything and anything." (A5)

Another restoration practitioner corroborates on this, and noted that volunteering was beneficial for both the locals and the restoration activities:

> "Through the Hellenic Ornithological Society, which has a **network of volunteers**, […] we were able to develop a local network of people that were participating in bird surveys, but also for plants. […] They started being involved in these networks, and **this was very good for the locals, but also for the project**. And another group of volunteers were related to the Skyrian horse, because there are a lot of volunteers in Skyros: either inhabitants or visitors, that come to help the horses." (A3)

The non-EU LIFE projects did not mention the hiring of locals, although one project involved volunteers from the local community for research projects (B1).

Field visits: key stakeholders, schools, the general public. Field visits with local community members, ranging from the general public to key stakeholders such as landowners, farmers, and local government officials, were organised by several EU LIFE projects (A1; A5; A8), for example, bus tours of the wetland's surrounding area (A5). Another project described organising field trips for key stakeholders to find the focal species in the wetland to create local awareness and support for the restoration of this species (A8).

Some projects involved local schools in their engagement strategies, e.g. through having school children participate in a one-day research project on the wetland (A5) or by giving presentations at schools (A1). Organising field days for school children helps to create awareness and ownership of the wetland throughout the community, according to one restoration practitioner:

> "So [**through engaging school children, we] were trying to build a sense of community ownership of the waterbody**. […] [I]t was hugely successful, because we got feedback both from the schools, but also from the parents. And when you hear it back, you know it has gone from the school to the kitchen table and all, and then you hear it back from the parent or a grandparent […], then you know something has been achieved." (A5)

This is corroborated by a non-EU LIFE project, which organised field visits for school children (B2.2):

> "[T]he more those [human-nature] connections are multi-generational, the better, obviously, because younger people, as they grow older, they become the stewards. And, if you don't know your history, you're doomed to repeat it. **We want people to grow up with a healthy**

> **river that has its full ecological functions and all of the fishing wildlife** that goes with it. So that that's meaningful to people. So that if there's a threat - so that they don't become the threat, for one thing - and that **if there is a threat, they have some ownership over the resource**." (B2.2)

Stakeholder selection. Projects employed different ways to select stakeholders: while some mapped the stakeholders at the start of the project (A1; A4; A8; A9), others used a combination of mapping stakeholders and allowing stakeholders to select themselves (A3; A5; A6; A7). One project relied predominantly on the self-selection of stakeholders (A2), which was due to its bottom-up approach to identify wetland restoration opportunities.

Most projects were very open to self-identified stakeholders, similar to the approach described below:

> "**We considered anyone with an interest**, anyone with a vested interested or a general interest in the catchment, **was part of the community**. So we included everyone who fished, who walked, who enjoyed the river, the wider catchment, anyone who farmed, anyone who was interested in birdwatching, anyone who was interested in nature, all of the schools, all of the secondary and primary schools, a lot of the local universities as we have two... a couple of universities interested." (A5)

According to one EU LIFE restoration practitioner, an additional advantage of stakeholder self-selection may be the prevention of controversy about the restoration project (A7).

The non-EU LIFE projects used different approaches to selecting stakeholders: while one project mapped stakeholders and allowed anyone with an interest to join (B1), another used self-selection of stakeholders (B2.2).

4.3.3 Connect: build personal relationships

This section explores how personal relationships can be built, and how this may impact the collaboration between the local community and restoration practitioners to achieve the restoration objectives.

Several EU LIFE projects highlight the importance of building sincere, open relationships with the local communities, and having one-on-one meetings to build mutual understanding and social support for restoration (A1; A2; A4; A7; A8; A9). In addition to building personal relationships, one restoration practitioner identified the importance of visiting the local community members in their "own arena": to go to their homes, villages, and local schools. It allowed the locals to feel comfortable and facilitated effective dialogue to build trust, and to hear the issues faced by the locals:

> "My experience is, it's much better to involve local community if you go to their own arena in the rural part of Sweden. Often, in our villages, we have kind of a village house, it's very common, especially along a river valley. When I have all my meetings, I go there, rather than have the meeting in the city hall where we actually work […]. **I go to their own area, because they feel much more comfortable** in their own arena […]. So much more people will come there, and they feel safe, they feel much better. […] Go to them, rather than them go to me." (A7)

Lastly, one project publicly praised the restoration contributions of farmers, i.e. their key stakeholders, as part of their community engagement strategy. This, too, helped to build a sense of ownership and pride in the farmers' perspective (A8).

In contrast, while one non-EU LIFE project mentioned the building of personal relationships as part of their engagement strategy (B2.2), another non-EU LIFE project did not explicitly mention it (B1).

4.3.4 Connect: visible leadership

This section explores the importance of being visible in the local communities, from the perspective of restoration practitioners.

Multiple EU LIFE projects' restoration practitioners were regularly present on the restoration site (A1; A3; A5; A6; A8), and it was indicated that this may contribute to building personal relationships (section 4.3.3):

> "[W]e tried to **be in the area as much as we can, and communicate with them personally**, so they were involved in real-life communication and they could give their feedback to us." (A8)

The importance of visible leadership is corroborated by a non-EU LIFE project:

> "**[W]e did a lot of visits in people's homes**. I was also personally present at the sight, a lot, […] just to be present. People would come down: "What's going on?" and we'd end up talking and they'd end up saying "Oh, can you come and talk to me and my neighbours about it?" So I go to talk to them and their neighbours. […] Probably **quintessential grassroots kind of approach**." (B2.2)

Another non-EU LIFE project indicated that visible leadership is important to show commitment to long-term cooperation with the local community (section 4.3.16) (B1) and that visible leadership can be an important catalyst to create change in the community (B2.1).

Lastly, visible leadership helps to bring people together and to maintain a focus on the objectives of restoration; consequently, the absence of leadership may lead to the collapse of collaboration, as illustrated by one EU LIFE project (A5) (see section 4.3.5).

4.3.5 Empower: create a common vision

This section explores how restoration objectives were agreed upon, and why using the right phrases may help to obtain a common vision for restoration. Subsequently, the perceived benefits of creating a common vision are presented. This section concludes with an example of how a common vision may not guarantee successful restoration outcomes.

Agreeing upon restoration objectives. All EU LIFE projects used participatory processes through which restoration objectives were communicated to the local communities and through which plans were agreed upon (A1; A2; A3; A4; A5; A6; A7; A8; A9). A major component of these processes was to communicate the relevance of restoration activities to the local communities and to explain how the local communities could benefit from participation (section 4.3.12). This was done through e.g. large meetings, individual meetings, workshops, and ensuring that the relevant stakeholders were informed prior to agreeing to restoration plans (A1; A2).

Similarly, non-EU LIFE projects highlighted the importance of building a common vision (B1): one project highlighted that while restoration activities could have been implemented earlier,

the project management waited in order to make sure that all parties agreed on the restoration activities (B2.1).

Adapting language to the local context. As part of creating a common vision, several EU LIFE restoration practitioners noted the importance of speaking in a way that is relevant to, and understandable for, the stakeholders (A1; A7), which is part of adapting to the local context (section 4.3.9) as illustrated by one restoration practitioner:

> "It is extremely important that you **build trust among stakeholders by talking in their language**. Don't use just numbers and data, because they will transform the message some way. Make it understandable for them. We say '**speak with farmers with a farmer's language'**. It takes a long time to build trust, and it is easy to destroy. I think that is part of why we had success." (A7)

A common vision prevents controversy. Consequently, ensuring that all parties voluntarily agree on a restoration plan prior to implementation helps to prevent controversy about the restoration activities afterwards; a common way in EU LIFE projects to do that is to have written agreements with the local communities about the restoration activities (A2; A9). Obtaining voluntary consent without trying to convince landowners was shown to be an effective strategy:

> "We have never gone over landowners, and **we don't try to force them** or discuss with them […]. We think that through **working with good examples** they will change their mind. […] In the past when we had landowners that didn't want us to restore for some reasons, we tend to **skip that** […]." (A7)

One project was unable to prevent controversy: some locals feared an increase in biting mosquitoes with the restoration of the wetland. Through writing explanatory articles in the local newspaper about mosquitoes and wetlands, the restoration practitioners demonstrated this fear to be unfounded, and thereby swayed public opinion in favour of wetland restoration (A9).

A different working model: a nation-wide open call for wetland restoration. Rather than creating a common vision around a designated area for restoration, one EU LIFE project had a different working model, where landowners suggested sites for wetland restoration to the coordinating beneficiary. Suggested sites were subsequently evaluated regarding restoration feasibility by experts, and location-specific restoration plans were co-produced with the landowners. This voluntary bottom-up approach allowed the restoration practitioners to select sites where the goodwill of landowners and beneficial ecological conditions coexist, thereby decreasing the need to create a common vision. This approach appeared effective, as more wetlands were restored than planned (A2). The non-EU LIFE projects did not apply this approach.

Collapse of cooperation. Agreement on a restoration plan does not guarantee its implementation. One project described having an After-LIFE plan in place to ensure the continuation of the invasive species removal programme. However, after the end of the official EU LIFE project, project partners did not voluntarily take responsibility to continue the activities, and there were no legal requirements to continue restoration activities, which led to the collapse of coordinated cooperation and the proliferation of invasive species (A5). According to the restoration practitioner, the necessity of working together to restore wetlands was insufficiently understood by the project partners:

> "[…] I think that's really what is the basis of trying to ensure community resilience […] there seems to be a lack of comprehension, **a lack of understanding that we all have to pull**

> **together**. […] And **we have to work together short-term and long-term**. I think that's one of the single biggest blockages." (A5)

4.3.6 Empower: structures for systematic representation and participation

This section explores the multiple ways through which local communities were represented and could participate in the restoration projects.

Local decision-making power: variation and structures. The degree to which local community members had decision-making power in the restoration project varied between projects. Some projects empowered local community members to be part of the decision-making bodies, e.g. through having representatives of *inter alia* civil society, farmers, landowners, and the ecotourism sector on the project steering committee and guiding the decision-making. In other projects, the local community members had the opportunity to veto particular activities by not giving their consent during meetings (A2; A3; A4; A5; A7; A8). In EU LIFE projects, these decision-making bodies would be newly created, and relevant local community members would be asked to be represented on these bodies. In several other EU LIFE projects, most of the decisions were made by the project management team, while the local community was predominantly consulted, and to a limited extent included in the decision-making process (A1; A6; A9).

The non-EU LIFE projects took different approaches to create structures for representation: one project described that local communities were involved only to a limited extent in the decision-making process due to the technicality of the restoration project (B1). In contrast, another non-EU LIFE project described the importance of having a Native American tribe being represented on the governing board of the restoration project, as the tribe acted as a catalyst to bring all parties together (B2.2).

Opportunities for participation opportunities. Volunteers from the local communities contributed to restoration activities in several projects, and this has been identified as an important way in which local communities can be engaged (A1; A5). Having structures or institutions in place to allow volunteers to participate, e.g. through a partnering NGO (A3) or organised by the project management itself (A5) was found to be beneficial for both the engagement of local communities and the restoration activities (see section 4.3.2).

In addition to non-paid participation, several projects had structures in place to hire local community members (A1; A2; A6; A9). In addition to directly helping the local economy, employing local community members built a sense of ownership over the wetlands and restoration activities (see section 4.3.2).

In comparison, one non-EU LIFE project highlighted the involvement of volunteers from the local community as a means of participation (B1).

4.3.7 Empower: manage power dynamics

This section explores the importance of ensuring that local communities' self-determination is respected; similarly, it is noted that, from the perspective of restoration practitioners, letting go of control can positively impact the restoration activities. In contrast, this section concludes with an example how maintaining control may negatively impact the restoration activities.

Respecting the community's self-determination. Allowing the local community to formulate its own issues and their solutions is a key component of empowerment (McCloskey et al., 2011), which signifies the importance of the project management being able to let go of control. Focusing on EU LIFE projects, one project showed this by emphasising the need for locals to make their own decisions, rather than to force them into anything, as this may create controversy (A7) (section 4.3.12).

Letting go of control. The Finnish EU LIFE project (explained in section 4.3.5) and its bottom-up approach gave high degrees of control to local landowners. Moreover, the project management acknowledged and accepted the self-determination of landowners to turn restored wetlands into something else if they desire – as is the landowners' right. Consequently, rather than trying to control the trajectory of the wetlands after restoration, the project used a hands-off approach after restoration activities were completed, which benefited the project as it was able to restore many more wetlands than if it had used a more controlling approach (see section 4.3.8):

> "[A]fter the project ended, **[the landowners] had the full right to drain [the wetlands]** and turn it to whatever it was before. […] Once we accepted it, we don't have too big preconditions on what sites we actually start planning, because that will take time and effort and uncertainty. Then we would come up with really long planning and making everything sure that this site will be managed forever, and we get maybe 5 sites done that are perfectly well backed up from all these directions, and we used a lot of time and money for the planning and getting the details right. OK, we have **5 sites and 100 hectares** for waterfowl, great. With a little more **relaxed approach**, where we accept that some of the sites in the long-term won't be OK, with the same planning, we can make **50 sites and 400 hectares**, and even if one-quarter will be abandoned, we still have 300 hectares for waterfowl." (A2)

In contrast, not allowing the local communities to take responsibility for some restoration activities may result in conflict between the local communities and the project management, which may be rooted in a lack of trust amongst actors, despite having structures for representation and participation in place:

> "[O]ften it's also a power dynamic, where [partner agencies] don't want local communities to be involved in local work, because they feel it undermines them. […] [T]here was unbelievable **resistance to the formation and the establishment of the [volunteer group]**. […] And the reason was because people within [organisation A] felt that [the volunteer group] would undermine their work, and would take their work away from them. Which of course was never going to be the case." (A5)

Non-EU LIFE projects did not mention the management of power dynamics during the interviews.

4.3.8 Empower: bottom-up initiatives

This section explores how facilitating bottom-up initiatives may contribute to a high degree of participation and support in restoration projects.

Although the Finnish EU LIFE project has been mentioned in several contexts (see above), here it is important to note that its voluntary bottom-up landowner-based approach to wetland restoration is unique in the pool of studied EU LIFE and non-EU LIFE projects. The other projects used a traditional top-down selection of the restoration sites. The bottom-up approach reduced the effort required to create a common vision (4.3.5) and the need to manage power

dynamics (4.3.7), as the landowners may veto any restoration activities. Using this approach, the project restored 340 hectares of wetland spread over 48 sites, thereby exceeding its objective (A2).

Furthermore, another EU LIFE project facilitated bottom-up initiatives, as the local community developed the initial ideas for the protection and restoration of the island's biodiversity. The development of these ideas subsequently took place using a participatory approach which emphasises the project's co-productive characteristic. The local communities and the local government were subsequently perceived to be highly supportive of the project's restoration activities and success (A3).

One non-EU LIFE project was initiated by the local community while being facilitated by the city council, although most of the decision-making power was in the hands of the coordinating NGO and the local city council (B1). The other non-EU LIFE project was both initiated and led by the local communities, and bottom-up initiatives were facilitated by the coordinating organisations (B2.2).

4.3.9 Learn and teach: adapt to the local context and history

This section explores how different projects took into account the local context and history to ensure that their community engagement strategies were effective at building local support for wetland restoration.

Understanding and adapting to the local history and context of a community is important, since a community's history may influence if and how a restoration project can be initiated, and how a community may best be engaged. This was exemplified by one project, in which past restoration proposals by another organisation were perceived as negative and non-inclusive of the locals' perspective, which necessitated the project management to spend one year to restore trust and interest in restoration activities that involved the local community (A9). Conversely, positive engagement history allowed for new initiatives (including new EU LIFE projects) to be easily started and accepted in the same communities (e.g. A1; A4). This shows that an understanding of the local community's history and context is important to tailor the community engagement and restoration activities to effectively build local support for restoration activities.

Furthermore, the political history of a local community can strongly impact the degree to which local communities are willing to participate in common activities. In some areas, a participatory and volunteering culture may have existed for many years (e.g. A2), while in other areas the political history, such as those located in the former Soviet Union, may have led to local communities being less receptive towards collective, participatory activities (e.g. A6). While in the former case a co-productive engagement strategy may be appropriate, the latter case may better suit a communicative or consultative mode of engagement. However, such generalisations must be made with caution, as one project used a participatory approach despite the lack of a participatory culture in the country; regardless, the community engagement strategy was successful (A3).

Non-EU LIFE projects similarly adapted their approach to the local context: one project took into account the communist history into its community engagement strategies (B1). Moreover, the USA-based project noted the cultural sensitivity of the restoration project and the importance of phrasing the project 'river restoration' rather than 'dam removal' due to the local cultural heritage that parts of the local community felt regarding the dams (B2.1).

4.3.10 Learn and teach: exchange and integrate knowledge

This section explores how restoration practitioners and local communities can learn from each other to bring changes in attitudes and to benefit the restoration efforts.

Facilitating knowledge exchange and integration. Collaborative learning, creating a common vision (section 4.3.5), and building networks (section 4.3.1) allowed for the creation, exchange, and integration of different types of knowledge (A1; A2; A5; A7; A9). For instance, one project facilitated collaborative learning by setting up experiments for different grazing regimes in wetlands (section 4.3.1) (A9). Furthermore, visiting the local community in their own arena, e.g. their own villages and homes (section 4.3.3) helped project management to gain local ecological knowledge that was integrated into the restoration project's planning (A7).

Peer-to-peer learning. Rather than having the project management sharing restoration-related information with the local communities, several projects facilitated peer-to-peer learning amongst local community members (A5; A7; A8) These restoration practitioners highlighted the value of such activities in changing attitudes when local community members hear it from peers, whom they know and trust:

> "We try to work by collaboration and having other fishing management organization describing the situation how they have worked, rather than me, as an academic telling them 'this is the way you should do it'. I think **it's very important that they actually hear from other people working with the same situation**, and other types of management organisation, learning from them - rather than me just telling them." (A7)

Raising awareness about the value of nature. Raising awareness about the value of nature, and the project's activities, was done by all projects through established networks and partnerships, e.g. through the press (section 4.3.1), but also through other dissemination activities such as workshops (section 4.3.9) and field trips (section 4.3.2). According to several restoration practitioners, this led to local communities being aware of the presence of the wetlands, as well as wetlands' importance for the local communities (A1; A3; A8).

In contrast, the non-EU LIFE projects did not mention the exchange and integration of different types of knowledge.

4.3.11 Learn and teach: build capacity and resources

This section explores the ways in which local capacity and resources were built amongst the local community members, and how these activities supported the achievement of restoration objectives.

Several projects mentioned the building of capacity and resources within the local communities as part of their engagement strategies (A1; A4; A6; A9). These activities included e.g. organising workshops for farmers to teach organic agricultural production methods, and training local governments' environmental wardens in recognising indicator species for restoration (A1). Other projects provided resources to key stakeholders, such as cattle (A4; A9) and tools (A6) to support them in changing their methods of agricultural production and to thereby contribute to the restoration project.

Capacity building was organised by both the project's coordinators (A1; A2; A4; A8; A9) and co-organised by the coordinating beneficiary and its key stakeholders (A5). In one project, the project management partnered with several farmers to start pilot projects on farms with the overall objective to improve the wetland's water quality. Subsequently, other farmers were

invited to field visits which allowed for evidence-based learning so that they could learn and hear from their peers about alternative agricultural methods that simultaneously improve the wetland's water quality (see section 4.3.10). This helped to building capacity amongst farmers to change their agricultural practices (A5). Another project partnered with the national park authorities to raise the national park's warden activities; this allowed the warden to function as an on-the-ground helpdesk to assist farmers in the field with changing agricultural practices, which helped to build capacity amongst local farmers (A9). Overall, this shows multiple alternatives through which the project management facilitated the building of capacity and resources amongst key stakeholders.

While one non-EU LIFE project did not discuss building capacity and resources (B2.2), the other non-EU LIFE project has future plans to create a community-based management association for the restored wetland to ensure that locals can take over the management of the wetlands in the long term (B1).

4.3.12 Integrate: create locally relevant benefits

This section explores the various ways through which locally relevant benefits were generated, and how framing and phrasing restoration activities is important to ensure that restoration ideas resonate in the local communities and are perceived as important and beneficial to them.

Generating local benefits. In different ways, all projects cultivated a local interest in having and maintaining a healthy ecosystem through the provision of benefits, which may be financial, non-financial, or both. To illustrate, the restoration activities resulted *inter alia* in the development of ecotourism and safeguarding culturally important species (A3), collective organic production of crops which can be sold at a higher price to large retailers (A1), the provision of services to farmers in exchange for farmers implementing environmentally friendly production methods through land stewardship agreements (A1), the improvement of hunting opportunities (A2), the improvement of fishing opportunities (A7), improved flood protection (A4; A9), farmers receiving cattle in return of using environmentally friendly agricultural production methods (A4), farmers receiving agri-environmental payments in return for biodiversity-protecting production measures (A6; A8), educational and recreational value for school children, who grow up with and value a healthy wetland, thereby building ownership over the wetland (A5).

Similarly, non-EU LIFE projects created benefits such as the opportunity for ecotourism development (B1) and improved recreational opportunities including fishing (B1; B2.2).

In essence, the creation of locally relevant benefits may lead to a positive feedback loop where taking care of the wetland is rewarded with a gain in rewards of the wetland, which may make the social-ecological system more resilient in the long-term, as suggested by a non-EU LIFE project:

> "I think that **when people see the positive benefits and participate** in them, then they are likely to help maintain it, and I think that it **makes the socio-ecological landscape much more resilient** to threats later." (B2.2)

Using locally relevant messages to gain support. While all projects provided benefits to the local communities, one EU LIFE project specifically integrated the community's (cultural) values into the restoration project's activities, which helped the project to gain local support (A3). For example, the inclusion of restoring the population of a culturally significant, endangered local horse breed (section 4.3.13) helped to mobilise resources and support for

restoring its population and related restoration activities. Other attractive and locally-relevant messages that resonated with the local community's values included the protection of the island's biodiversity from the development of a wind farm, the development of an ecotourism sector rather than mass tourism, and the protection of the world's largest colony of a falcon species on the island (A3). Overall, by integrating the community's values into the restoration activities, speaking in locally relevant terms to create a common vision with the local community (section 4.3.5), and understanding the local context (section 4.3.11), the project was able to generate a high degree of support.

Another EU LIFE project operated in a country where hunting waterfowl is a common recreational activity: by highlighting the importance of wetland restoration for the improvement of waterfowl hunting opportunities, this generated interest and support for wetland restoration (A2).

In comparison, as highlighted in section 4.3.9, a non-EU LIFE project ensured the right phrasing of the restoration project to prevent controversy over the restoration activities (B2.1).

4.3.13 Integrate: organise locally relevant events around restoration activities

This section explores the use of organising events that resonate with the local communities.

Several projects created events surrounding the restoration activities, which were integrated into the local communities' cultural values and interests, e.g. organising activities related to local handcraft (A3) (linked to section 4.3.1), and horse competitions (A6). These activities were specifically linked to the local culture in order to integrate the restoration activities into the local community, and to thereby use locally existing networks (section 4.3.1) to mobilise resources and build ownership (A3).

A non-EU LIFE project applied a similar strategy by organising canoe competitions on the restored wetland, which is a locally important recreational activity (B2.2).

4.3.14 Demonstrate: communicate success

This section explores how demonstrating the success of restoration activities to local communities may impact their attitudes. This section concludes by presenting several possible obstacles to communicating restoration success, and how to overcome them.

Showing restoration's positive impacts on biodiversity and society. Demonstrating the success of restoration activities, and their positive impacts on biodiversity and society can have several impacts. First, demonstrating locally relevant positive effects of restoration activities through restored ecosystem services, such as an increase in the waterfowl population size which are important for hunting, or a decrease in the number of floods as a result of the restored wetlands, gains local communities' interests in maintaining the wetlands in good condition (A2; A9) (related to section 4.3.12).

Second, the impacts of restoration may shift the local community's baseline of the wetland, i.e. what they believe is normal to see in the wetland. For example, one project's restoration efforts resulted in the annual visit of tens of thousands of cranes and geese to the wetlands, which increased the locals' interest in the ecosystem:

> "[I]t's a very nice habitat now. So even the locals – who never used to come here – now like to come here to see birds." (A9)

This highlights the importance of shifting the baseline, although achieving full ecological restoration may not be possible (A6).

Third, demonstrating the success of restoration activities shows the restoration opportunities to the local community. One project was designed to demonstrate how wetlands can be restored in a practical and affordable way, so that landowners and hunting associations may start their own restoration initiatives elsewhere (A2) (section 4.3.17).

Fourth, one project used good examples as a way to change attitudes and engage communities without attempting to force or convince the local communities into restoration activities: "[…] we think that through working with good examples, they will change their mind. […] But they must make that decision themselves, because they are the only one who actually can do it." (A7), thereby letting go of control (section 4.3.7). In several other projects, field trips and school events were used to demonstrate the success of the project without forcing them to change their attitudes (section 4.3.2) Moreover, several projects used peer-to-peer learning (section 4.3.10) as part of demonstrating success, as the restoration practitioner found it important that local community members learn from peers that face the same situations (A5; A7). Furthermore, other projects had the project management disseminate the results of restoration efforts themselves (A4; A8) (section 4.3.4).

Fifth, demonstrating the results of restoration activities allows to build a good track record for the project management and to gain trust from the local community. Consequently, being able to show past successful restoration efforts may help to start successor projects in the same area or a different area with similar ecological conditions (A2; A7) (section 4.3.17).

Lastly, while in-person demonstrations of success was suggested to be most powerful in changing attitudes rather than through other forms of communication (A5; A7), both EU LIFE and non-EU LIFE projects alike collaborated with the press to disseminate project success to the general public (section 4.3.1).

Corroborating on previously made points in EU LIFE projects, one non-EU LIFE project additionally noted the importance of demonstrating the success of restoration activities:

> "[B]ecause the fish have come back in such a dramatic way, that's really helped local people to see the benefits of removing the dams. […] I think **the fish are one of the key elements for social sustainability**. […] [The local communities] remember the river being polluted and largely dead, and now they're seeing literally several million alewives, river herrings, coming back during their migration. […] [F]or a lot of local people, I think their support for the dam removal will continue as long as they're remembering what it was like before, when there were no fish and the wildlife was not as plentiful." (B2.1)

A component of demonstrating success: measuring progress. The demonstration of success requires the use of indicators to monitor progress towards a set objective. However, while all projects used and tracked ecological indicators, no socioeconomic indicators were used and tracked in the project (A1; A2; A3; A4; A5; A6; A7; A8; A9). For example, one restoration practitioner saw the lack of economic indicators as a missed opportunity to demonstrate success in terms that are relevant to key stakeholders (section 4.3.15):

> "[M]ost of the time, politicians and people with access to funding are only interested in the economic side of river restoration or the economic side of conservation management. So if you don't have facts and figures from an economic perspective, they're not really interested. So that's why I say, **I think it was a mistake [to not use economic indicators]**." (A5)

Notably, one non-EU LIFE project performed a social impact study of river dam removal, but this was the only restoration project that did this in a comprehensive way (B2.1).

Importance of physical visibility of wetlands. Two projects that restored seasonal wetlands discussed the importance of ensuring the wetlands' visibility throughout the year, e.g. through signs. This may help people to continue to care for the wetlands. However, if the wetland is invisible during a part of the year, people may otherwise consider it as non-valuable land and may lose interest in protecting it (A1; A3).

4.3.15 Demonstrate: use a focal species for restoration

This section explores how the use of a focal species improved local support for restoration activities in different projects.

One EU LIFE project intentionally raised awareness of a single focal species for restoration, namely a rare songbird, around which all restoration activities took place (A8). Using a focal species for restoration made the project's focus and efforts tangible to the local community. As a result of the engagement strategy – which included personal communication with farmers – the local farmers developed an interest in the protection of this bird species that was present in their fields, which led to farmers voluntarily changing their production methods to safeguard the survival of the species (A8).

A similar strategy was used by a different EU LIFE project, which centred its restoration activities around *inter alia* a local horse breed, which is of cultural significance to the local community (A3), and several riverine species (A5). Given these cultural values, this strategy helped to engage local communities and to build local support for related restoration activities (section 4.3.15):

> "When the project was selected, and started to be implemented, one of our main objectives was to help the Skyrian horse […], and this was **a message that everybody liked** on the island. So we had a number of messages, that the project carried, that were very attractive for the local community." (A3)

Similarly, a non-EU LIFE project used fish species to demonstrate the restoration success to local people:

> "[The restoration practitioners] bring people to these [fish] hatcheries, so […] the river herring, they migrate in certain periods, and then en masse […]. When this happens, there's tons of fish that come up these little streams, and **this draws quite a lot of people in**." (B2.1)

4.3.16 Persist: commit to long-term collaboration

This section explores the degree to which restoration projects commit to long-term collaboration with the local communities to restore the wetlands.

Each EU LIFE project has a 5-year After-LIFE project phase to support the long-term success of the restoration project and the sustainability of the achieved restoration results. Despite the presence of this built-in continuation of EU LIFE projects, only one EU LIFE project signalled its commitment to long-term collaboration with the local communities after the restoration project's end (A1):

> "**[W]hat we have to prove is that the engagement we did in that moment is continued.** […] [T]hese projects are not exactly our purpose. It's just a tool for the global purpose of [the NGO]. So a big project of five years or two years is only a way to continue our work in the area. So **we always are looking to obtain the funds […] to invest in the same area, and to continue working there**." (A1)

In comparison, one non-EU LIFE project mentioned their intention to create a community-led association for the management of the restored wetland, in order to pass on the management activities to the local community (see section 4.3.11), while continuing to support the communities to build local capacity and ownership over the wetland (B1). However, other projects did not signal their long-term commitment to collaborating with the community beyond the restoration project phase.

4.3.17 Persist: create successor projects

This section explores the reasons and impacts for creating new wetland restoration projects once the initial restoration project has been completed.

While few projects committed to long-term collaboration with the local communities, 7 EU LIFE projects resulted in the start of successor projects (A1; A2; A4; A5; A6; A8; A9). As projects created "good grounds" for future collaboration with the local communities (A8), this allowed for the continuation of restoration activities in the same or adjacent area, with the same or similar stakeholders. As a result of the previous engagement activities with the project management, these new projects were relatively easy to start, as one has already built trust:

> "[…] [I]t was easy for us, in [this new project], to involve farmers to work with us. […] [W]e are also working with the same farmers. And that is fantastic; it's so nice, because we have 12 years working with the same people. […] **The people know who you are; we don't need to do introductions**." (A1)

Additionally, non-EU LIFE projects started successor projects as well (B1; B2.2). These successor projects help to maintain momentum in the restoration activities in the area by keeping local communities engaged and continued visibility of the project management helps to show the organisation's commitment to collaborating with the local community (B1) (section 4.3.4).

4.4 Exploring practitioners' perspectives on community engagement strategies and long-term restoration success

This section explores Research Question 2, on the restoration practitioners' perspectives on which of the 17 identified community engagement strategies (Figure 4-1) are considered most important for the long-term success of wetland restoration projects, and which may help to build resilience in the social-ecological system.

4.4.1 Integrate: create locally relevant benefits

While all restoration projects resulted in the creation of locally relevant benefits, four EU LIFE restoration practitioners highlighted the importance of creating benefits to generate a long-term interest in the local community to maintain a healthy wetland and to continue to obtain these benefits (A1; A4; A6; A9). This took different forms: one project used stewardship agreements as a way to offer services to farmers (e.g. soil nutrient analysis) in return for farmers applying environmentally friendly production methods (A1). Other projects supported farmers through providing non-financial resources such as cattle and equipment (A4; A6; A9).

Furthermore, one non-EU LIFE project described how the restoration activities allowed for recreational, educational, and economic opportunities; this increased positive interactions between the local community and the wetland, thereby resulting in the increased interest of the local community in a healthy wetland and maintain it in a healthy state (B2.2).

4.4.2 Connect: build personal relationships

One EU LIFE practitioner mentioned the importance of building open, sincere relationships with key stakeholders, in this case, the farmers. Through these personal relationships, support was built to protect the focal restoration species, which led to key stakeholders promoting the restoration activities:

> "[T]his is the core, I would say: **the personal communication which builds the support of the farmers**, so that they continue to spread the word about it. […] [Y]ou need to show them why [nature must be protected], and you need to show them how [nature must be protected], and listen to what problems they face." (A8)

Furthermore, as part of these personal relationships, the key stakeholders were celebrated for their support and participation in achieving the restoration of the focal restoration species (related to section below):

> "[W]e had a strategy of making aquatic warbler a celebrity. Then the strategy below it was "... and **make the farmer a hero**". Not to say that the farmer is the bad guy, but all the time, when we say that the Baltic aquatic warblers are doing better […] we say that is thanks to the farmers. […] **I think it also makes farmers proud of what they are doing**." (A8)

4.4.3 Connect: build networks and partnerships

Working with the local government was key for the sustainability of the project for multiple reasons, according to one EU LIFE project (A3). First, the local government covered half of the financial costs, which increased their devotion to the restoration project. Second, the local government employed high-quality, committed staff. Third, the local government provided the project with additional networks and opportunities for collaboration, thereby creating a broad coalition of actors involved in the restoration activities.

4.4.4 Empower: bottom-up initiatives

A practitioner from an EU LIFE project indicated that a landowner's motivation is key for the long-term success of a wetland restoration project; hence, finding locations where the goodwill of the landowner is present through the use of bottom-up voluntary projects where landowners suggested sites for wetland restoration (A2). Furthermore, the best management practices were

observed where the landowners were highly motivated and, in return for their work, gained locally relevant benefits, such as increased recreational opportunities.

4.4.5 Empower: structures for systematic representation and participation

Having structures in place for the participation and systematic representation of the local community members was considered to be most important for the long-term success of one EU LIFE project (A5). It was highlighted as a method to build capacity and ownership over the wetland, in addition to allowing for a method through which the local community could actively participate in the restoration activities.

Similarly, one non-EU LIFE practitioner agreed that structures for representation and participation are most important for the long-term success of restoration projects (B1).

4.4.6 Demonstrate: communicate success

One EU LIFE practitioner works with the idea that by demonstrating success, i.e. by showing the results and impacts of restoration activities, the local community can change their minds without the need to convince the local community and thereby risking controversy (A7).

4.4.7 Demonstrate: use a focal species

The use of a focal species for restoration, and creating a celebrity out of this species among the local community members, was considered a key strategy to ensure the long-term success of restoration activities in one EU LIFE practitioner's perspective (A8). In addition to raising awareness on the value of biodiversity and this focal species (section 4.3.10) and demonstrating the positive impacts of the restoration activities on the focal species population size, the project management showed the local community what international touristic interest exists in the species; collectively, this incentivised the local community's interest to restore the focal species population.

5 Discussion

This section discusses and interprets the main findings and significance of the research and compares it to existing literature. Furthermore, it reflects on the analytical framework utilised and the newly created conceptual framework, and discusses the generalisability of the findings. Subsequently, it explores several suggestions based on this research and concludes with a discussion on the limitations of this research.

5.1 Main findings: Research Question 1

The objective of **Research Question 1** was to identify (i) the community engagement typologies and (ii) community engagement strategies used in EU LIFE-funded European wetland restoration projects. First, as part of the **Supporting Question**, this research identified the **community engagement typologies** used in the studied EU LIFE projects. In seven EU LIFE projects, community engagement was initiated and led in a top-down manner, i.e. by the coordinating beneficiaries. In contrast, two EU LIFE projects showed community engagement activities being initiated by the local communities, i.e. a bottom-up manner, after which the community engagement was led by the coordinating beneficiary, i.e. a top-down manner. The modes of engagement applied in EU LIFE projects were predominantly a combination of engagement modes, ranging from consultation to co-production, although two projects used predominantly a co-productive mode of engagement. Overall, at least some form of co-production was present in the majority of EU LIFE projects, while none of the projects used a one-way communication mode of engagement.

In comparison, a non-EU LIFE project experienced the initiation of community engagement by the local community, after which the community engagement activities were led by the coordinating organisation; this project used a combination of community engagement modes similar to those found in EU LIFE projects. In contrast, the other non-EU LIFE project's community engagement activities were initiated and led by the local communities, and used predominantly a co-productive mode of engagement, similar to two EU LIFE projects.

Second, this research has identified the main **community engagement strategies** used by EU LIFE-funded European wetland restoration projects, from which a conceptual framework was created. Despite the importance of local contexts for the use of appropriate community engagement strategies, this research identified 17 overarching community engagement strategies that were used by overall successful wetland restoration projects, and these strategies were grouped in six themes (Figure 4-1). Overall, to engage local communities, the EU LIFE projects: (i) **connect** with the local community through creating networks and partnerships, personal relationships, ensuring visible leadership, and early and broad involvement of the community members, (ii) **empower** the local community by creating a common vision, creating structures for systematic representation and participation, managing power dynamics, and facilitating bottom-up initiatives, (iii) **learn** from and **teach** to the local community through adapting to and understanding the local context and history, exchange and integrate knowledge, and build capacity and resources, (iv) **integrate** restoration activities into the local community, by creating locally relevant benefits which create a local interest in maintaining healthy wetlands, and organise locally relevant events around restoration activities, (v) **demonstrate** the successes of restoration activities to the community, and use a focal species to make restoration activities tangible, and (vi) **persist** in the local community by creating successor projects, and committing to long-term collaboration with the local community. The identification of these community engagement strategies across contexts and geographies confirms the presence of overlapping community engagement strategies in European wetland restoration projects.

A comparison of the projects' use of specific community engagement strategies show that all EU LIFE projects overlapped in the use of seven community engagement strategies, namely (i) build local networks and partnerships, (ii) early and broad involvement of stakeholders throughout the project, (iii) create a common vision, (iv) create structures for systematic representation and participation, (v) adapt to and understand the local context and history, (vi) create locally relevant benefits through restoration, and (vii) communicate the achieved success of restoration projects. Furthermore, the non-EU LIFE projects used all of these seven community engagement strategies as well, which indicates these strategies' widespread use. Furthermore, while most EU LIFE projects started successor projects, only one EU LIFE and one non-EU LIFE project explicitly committed to long-term collaboration with the local communities (see Table 4-2). Although this strategy was not across multiple EU LIFE projects, it was included in the conceptual framework as it was part of the initial analytical framework (see Chapter 3 and Appendix 2), and was additionally used by a non-EU LIFE project, signalling this strategy's importance.

EU LIFE and non-EU LIFE projects alike used unique combinations of community engagement strategies despite the overall success of the projects; this suggests that not all identified community engagement strategies are required to successfully restore wetlands. This is corroborated by restoration literature, which highlights the importance of tailoring the community engagement strategies to the local context and the non-existence of a single recipe for successful community engagement (Miller & Hobbs, 2007; Reed et al., 2018).

Evaluating the specific community engagement strategies of the conceptual framework reveals that 9 out of the 17 strategies were described by the literature-based analytical framework (based on McCloskey et al., 2011; Reed, 2008). Hence, eight additional community engagement strategies were identified based on the interview data: (i) facilitate bottom-up initiatives, (ii) create locally relevant benefits, (iii) organise locally relevant events, (iv) communicate the success of restoration activities, (v) use a focal species, (vi) create successor projects, (vii) build personal relationships, and (viii) ensure visible leadership (Figure 4-1).

All of these strategies have previously been identified in the literature. First, facilitating bottom-up initiatives has been applied in *inter alia* forest restoration initiatives (Holl, 2017). Second, creating locally relevant benefits is a common component of several restoration guidelines (e.g. Gann et al., 2019; Keenleyside et al., 2012). Third, organising locally relevant events and integrating them in the local community has previously been described as an effective strategy to build local community support in wetland restoration (Davenport et al., 2010). Fourth, communicating success has previously been described as an important part of community engagement (Druschke & Hychka, 2015) and is a component of the appreciative inquiry approach (Elliott, 1999) which uses demonstrations of success as a way to change attitudes rather than forcing through decisions. Fifth, the use of a (group of) focal species for restoration has previously been used as a means to engage communities and build support for restoring ecosystems (e.g. Casazza et al., 2016; but for a critique of this approach see Lindenmayer et al., 2002). Sixth, starting new projects in a Sweden-based wetland restoration project has been a means of maintaining momentum and local support for restoration activities (Olsson, Folke, & Hahn, 2004). Seventh, building personal relationships has been demonstrated to help build local community support and commitment to wetland restoration (Davenport et al., 2010). And eighth, visible leadership to build local community support has previously been described as an important factor in restoration efforts (Le et al., 2012). Although all of these community engagement strategies have previously been described in the literature, they were not present in either of the community engagement principles (McCloskey et al., 2011; Reed, 2008). The new conceptual framework on community engagement developed through this research has therefore enriched the original set of community engagement principles and hence contributes

to our theoretical understanding of community engagement, specifically in the context of European wetland restoration.

5.2 Main findings: Research Question 2

The objective of **Research Question 2** was to identify the perspective of the restoration practitioners on the **community engagement strategies that are most important for the long-term success** of EU-LIFE-funded European wetland restoration projects, in order to build resilience in the social-ecological system. While opinions differed amongst restoration practitioners, the community engagement strategies that were considered most important by at least one restoration practitioner were to: (i) create locally relevant benefits as a result of the restoration activities, (ii) build personal relationships with key stakeholders to gain their support, (iii) build networks and partnerships with the local communities to build support and commitment, (iv) facilitate bottom-up initiatives for restoration, (v) create structures for systematic representation and participation, (vi) communicate the success of the restoration activities, and (vii) use a focal species to demonstrate success.

The sections below discuss these community engagement strategies, and through using theoretical underpinnings they provide possible explanations on how these strategies could lead to long-term restoration success and may build resilience in the social-ecological system.

5.2.1 Create locally relevant benefits

Four EU LIFE restoration practitioners noted the importance of creating locally relevant benefits through wetland restoration activities and benefits derived from a restored wetland (A1; A4; A6; A9). These benefits involved farmers and included environmental services (e.g. soil nutrient analysis) and the provision of cattle and equipment in exchange for applying environmentally friendly agricultural production.

As these benefits may enhance the well-being of the community, this may incentivise the community to continue restoration activities or other biodiversity-protection practices to sustain these benefits. In social-ecological systems thinking, this may strengthen the positive interdependency between the social (well-being) and the ecological (ecosystem health) components of the system as a result of closer connections between humans and nature (Gann et al., 2019). This may build resilience in the social-ecological system, once the community starts to protect the restored wetland from future threats to indirectly safeguard the community's own future well-being.

In contrast, a lack of relevant benefits provided to the local communities has previously led to the continued degradation of forest ecosystems, according to a review of forest restoration projects (Höhl et al., 2020). Hence, specifically designing community engagement strategies to ensure the creation of locally relevant benefits – and ensuring the continued provision of these benefits at relatively low costs – may thereby support the long-term success of wetland restoration projects. Overall, this may lead to the formation of a 'restorative culture' (Aronson et al., 2020). Although benefits may take place in the form of Payments for Ecosystem Services (e.g. Farley & Costanza, 2010; Muradian et al., 2013), it must be noted that benefits derived from the restored wetlands in the EU LIFE projects were non-monetary.

Agreeing with the restoration practitioners of the EU LIFE-funded projects, one restoration practitioner of a non-EU LIFE project similarly indicated the importance of creating locally relevant benefits (B2.2). They highlighted the recreational, educational, and economic opportunities that arose from restored wetlands as a means through which resilience was built

in the social-ecological system. Notably, while the restoration practitioner of the non-EU LIFE project highlighted the provisioning of benefits by the restored wetland ecosystem, the practitioners of the EU LIFE-funded projects highlighted the provision of benefits by the coordinating beneficiary.

In comparison with existing literature, other studies have identified the importance of creating locally relevant benefits as part of restoration activities, e.g. economic development (Cao et al., 2020), while some highlight the importance of providing intangible benefits to the local community, such as empowerment and equity (Berkes, 2004) or cultural benefits (Davenport et al., 2010), in order to build local community support. This supports the notion that benefits need to be tailored to the local context to be effective, which similarly applies to the use of Payments for Ecosystem Services (Muradian et al., 2013), and highlights the importance of community engagement to understand the needs and wants of the local communities. However, rather than creating benefits at a local level on a project-by-project basis, higher-level legislative support may be required to facilitate the creation of these benefits on a scale larger than those of individual projects. Lastly, despite the perceived importance of creating locally relevant benefits, creating locally relevant benefits was not included in the original sets of community engagement principles on which the analytical framework was built.

5.2.2 Other strategies that were considered important by practitioners

The other community engagement strategies, which were considered most important to support the long-term success of European wetland restoration projects, were each mentioned by a single EU LIFE restoration practitioner.

Build personal relationships. First, one EU LIFE restoration practitioner highlighted the importance of building personal relationships with key stakeholders. First, the building of personal relationships – if done effectively – is likely to lead to more community members to support the idea of e.g. restoring a rare songbird species, and increased interaction (connectivity) between the restoration practitioners and the local community may build trust (Biggs et al., 2012). With every additional personal relationship being built and support gathered, the more this message will be spread through the community. This is exemplified by one of the EU LIFE projects:

> "So this is the core, I would say: the personal communication which built the support of the farmers, so that **they continue to spread the word about it**. And the same goes for recommending agri-environmental schemes, because **once they tried, they can recommend it**." (A8)

This may increase the connectivity between restoration practitioners and community members (Biggs et al., 2012), allowing for more information on the songbird species to be spread throughout the community, thereby raising awareness. Subsequently, if sufficient interest is built as a result of the increased spread of information, this can build adaptability and resilience in the social-ecological system (Biggs et al., 2012), allowing for the community to change its practices and to contribute to restoring the songbird species.

Build local networks and partnerships. Second, one EU LIFE restoration practitioner mentioned the importance of building local networks and partnerships (A3). Through the building of local networks and partnerships, the resilience of an SES can be increased (Biggs et al., 2012). Building a network allows for the inclusion of a diverse set of partners, who are able to fulfil different roles. Subsequently, if one partner falls away after a restoration project, e.g. those who maintain the integrity of a dam in order to keep an area flooded as part of the wetland,

others partners will be able to fulfil this function and compensate for the loss. Overall, this builds adaptability and resilience in the social-ecological system. Furthermore, these networks and partnerships increase the connectivity between restoration practitioners and the local community, which may additionally help to build resilience (see "Build personal relationships" paragraph above). However, it must be noted that a larger network does not necessarily build resilience and adaptability, as those depend on the quality and capacity of the members in the network and their connections (e.g. see Young et al., 2006 on random connections in networks).

Bottom-up initiatives. Third, one EU LIFE restoration practitioner found the facilitation of bottom-up initiatives to be the most important for the long-term success of wetland restoration efforts (A2). From the perspective of the restoration practitioner, this allows for the selective investment of resources in a location where there already is support and adaptability for the restoration of a wetland. Subsequently, the restoration of a wetland may lead to locally relevant benefits, such as increased hunting opportunities. In essence, this may create a positive feedback loop where motivation and commitment to restoring a wetland are rewarded with locally relevant benefits, which further cultivates motivation and commitment to maintain a healthy wetland (see section 5.2.1).

Structures for systematic representation and participation. Fourth, one EU LIFE restoration practitioner noted the importance of creating structures for systematic representation and participation (A5). In resilience-thinking, this allows for the structured broadening of participation, which is one of the principles of building resilience (Biggs et al., 2012). These structures allow the local community to work together with the restoration practitioners and allows for deliberation and the exchange of knowledge, which additionally may increase connectivity between restoration practitioners and the local community, and consequently contribute to the building of resilience (Biggs et al., 2012). Furthermore, these structures may also strengthen and grow local networks and partnerships between the practitioners and the local community, thereby creating diversity and redundancy, which helps to build resilience (see paragraph above "Build local networks and partnerships") (Biggs et al., 2012).

Other restoration studies have previously indicated the importance of structures for systematic representation and participation (Barrett et al., 2019; Druschke & Hychka, 2015; Ebberts et al., 2018; Höhl et al., 2020; Scholte et al., 2016; Silva et al., 2007), and, in combination with long-term commitment of the involved partners to restoration, this may build local ownership over the project (Ebberts et al., 2018). In turn, ownership may increase the adaptability of a system – as the local community would be more willing to act in case of a threat to the ecosystem – which may build resilience. In comparison, the importance of creating structures for representation and participation was also mentioned by one non-EU LIFE restoration practitioner (B1).

Communicate success. Fifth, an EU LIFE restoration practitioner stated the importance of demonstrating and communicating success to the local community (A7). In resilience thinking, this is similar to increasing connectivity between practitioners and the local community and thereby building resilience and adaptability (see paragraph above "Build personal relationships") (Biggs et al., 2012). Furthermore, demonstrating success may reverse a shifting baseline syndrome (Soga & Gaston, 2018): rather than accepting a deteriorated wetland as normal, the local community may start to see a healthy wetland as the new normal. Consequently, the local community may be more inclined to protect the wetland in case its aspects, e.g. biodiversity or water quality, fall below this new normal.

Use focal species. Lastly, an EU LIFE practitioner mentioned the importance of using a focal species to raise awareness and support, by turning the species into a 'local celebrity' (A8). By showing the value of the species for the local community and internationally (e.g. the rarity of the species globally, and the international ecotourism interest in this species), it built ownership amongst the key stakeholders (i.e. farmers), who started to support the restoration and protection of the focal species. It must be noted that this strategy was used in parallel with the building of personal relationships, as it requires trust between the restoration practitioners and the farmers to achieve changes in the farmers' agricultural activities to protect this species.

Although many of these community engagement strategies may have putative theoretical support, this result should be interpreted with caution, as these are perspectives of solely the restoration practitioners. These claims cannot be empirically verified without consulting the perspective of the main stakeholders of the restoration projects. Furthermore, they may be highly context-dependent: while facilitating bottom-up initiatives in a participatory culture may be successful, it may not be effective in a non-participatory culture. However, as several strategies were mentioned more than once, this suggests that several strategies are important for the long-term success of EU LIFE-funded European wetland restoration projects and these strategies may build resilience in these social-ecological systems.

5.3 Reflections on the analytical framework and the new conceptual framework for EU LIFE wetland restoration projects

This research started with an analytical framework based on an interdisciplinary set of community engagement principles derived from the fields of environmental management (Reed, 2008) and healthcare (McCloskey et al., 2011). When combined for this research, they described a larger degree of variation found in community engagement strategies in the studied projects than either set of community engagement principles would have done individually, i.e. they complemented each other. This demonstrates the valuable contribution that non-environmental fields can make to the field of ecosystem restoration and emphasises the added value of interdisciplinary research.

However, neither set of community engagement principles was sufficient to capture all the variation found in the studied projects, which necessitated the addition of eight new community engagement strategies (described in section 5.1 and Figure 4-1) to form a new conceptual framework, which allows the description of the community engagement strategies of the studied EU LIFE wetland projects.

When comparing this research's conceptual framework to a set of restoration-based community engagement principles developed by IUCN (Keenleyside et al., 2012), the IUCN guidelines overlap on many grounds: (i) create a common vision, (ii) create local networks and partnerships, (iii) create structures for systematic representation and participation, (iv) early and broad involvement of stakeholders throughout the project, (v) exchange knowledge (peer-to-peer learning, integration of different types of knowledge), (vi) build capacity, (vii) create locally relevant benefits, (viii) adapt to and understand the local context and history, and (ix) communicate success. Other features that are present in this research's conceptual framework are not present in the IUCN guidelines.

Notably, there is one unique feature present in the IUCN guidelines which is not present in the conceptual framework, namely the use of monitoring programmes to evaluate the effectiveness of participation (Keenleyside et al., 2012). However, this strong overlap indicates that the EU LIFE projects have used similar strategies as those recommended by IUCN.

Synergies and trade-offs between community engagement strategies. There are many connections between the different community engagement strategies of the conceptual framework. For instance, building personal relationships (section 4.3.3) may contribute to ensuring visible, approachable leadership (section 4.3.4), and may facilitate the exchange of local ecological knowledge and scientific knowledge (section 4.3.10). These links between strategies suggest that focusing on several community engagement strategies may lead to synergies, where the use of one community engagement strategy may help to implement one or several other strategies. These potential synergies between community engagement strategies may help to design an effective community engagement plan.

Conversely, trade-offs between the community engagement strategies of the conceptual framework may exist, as trade-offs are inherent to decision-making processes with limited resources. For instance, while the use of a focal species for restoration (section 4.3.15) may gather support from some community members, it may not resonate sufficiently with the community to enable broad and early involvement of the community (section 4.3.2). However, explorations of synergies and trade-offs were beyond the scope of this research and will depend on the local context and the project's available resources.

5.4 Generalisability of findings

Despite the difference in geography and context, there is considerable overlap between the community engagement strategies used in the EU LIFE and non-EU LIFE projects. All community engagement strategies used by non-EU LIFE projects were also used by one or multiple EU LIFE projects, which suggests the potential use of this framework outside of the EU LIFE programme. This is supported by the observed overlap between this research's conceptual framework and the IUCN ecosystem restoration guidelines (Keenleyside et al., 2012). However, this should be interpreted with caution, given the small sample size of the non-EU LIFE projects included in this research. Furthermore, this research was designed to explore overarching patterns for community engagement strategies in wetland restoration across projects; by design, the research emphasised breadth, not depth, of the analysis. Consequently, if more emphasis had been placed on the individual restoration projects through interviewing multiple stakeholders per project, it is likely that more unique differences between EU LIFE and non-EU LIFE projects would have been identified. While such an analysis was beyond the scope of this research, this may partially explain the reason for finding a high degree of overlap between restoration projects.

5.5 Improving the EU LIFE programme

A missing link: socioeconomic targets and indicators. The interviews revealed that the EU LIFE projects did not use socioeconomic targets or indicators to measure socioeconomic improvements as a result of restoration activities. However, studies have indicated the importance of having socioeconomic targets and monitoring progress towards these targets to build local support for restoration projects (Davenport et al., 2010; Evju et al., 2020; Hallett et al., 2013). In comparison, one non-EU LIFE project used a social impact study before and after the restoration works (section 4.3.14). Overall, this shows a missing link between the restoration activities and the ability to demonstrate the impact to local community, and the wider public, including funding organisations.

While some restoration projects have used socioeconomic targets and indicators to measure progress beyond ecological parameters, they are rare (Fischer et al., 2020; Hallett et al., 2013; Jones et al., 2018; Le et al., 2012; Martin, 2017; Miller & Hobbs, 2007; Shackelford et al., 2013;

Suding et al., 2015; Wortley et al., 2013). Although a basic set of socioeconomic indicators has been proposed by the Society for Ecological Restoration (Gann et al., 2019), calls for the inclusion of socioeconomic indicators in restoration projects continue (Fischer et al., 2020), with the aim to strengthen the link between ecosystem restoration activities and socioeconomic benefits.

On a positive note, the EU LIFE programme has made the measurement of some socioeconomic indicators mandatory since 2014 (European Commission, 2014), which was after the starting date of the studied EU LIFE projects. However, few socioeconomic indicators are required to be used, and they do not encompass e.g. cultural or recreational aspects, or other intangible benefits that could be derived from ecosystem restoration. Instead, to be more useful in demonstrating the link between ecosystem restoration and socioeconomic benefits, a wider range of mandator standardised socioeconomic indicators should be used, which would additionally increase comparability between projects.

However, such policy changes would require the building of capacity in order to measure such socioeconomic indicators. To overcome this barrier, the EU LIFE programme could financially support the training of the coordinating beneficiaries to ensure there is capacity to measure socioeconomic indicators and to set socioeconomic targets in future EU LIFE ecosystem restoration projects.

Scaling up wetland restoration in the EU. One of studied restoration projects employed a model of voluntary bottom-up restoration initiatives, where landowners would suggest sites for wetland restoration to the restoration practitioners after which the project management and private landowners co-produced the wetland restoration project. While acknowledging that this project took place in a country with a participatory culture, this could potentially be applied on an EU-level to support the scaling up of European wetland restoration. As indicated by the restoration practitioner of this EU LIFE project, a benefit of this approach is that sites with coexisting landowners' goodwill and beneficial ecological conditions can be selected, which is likely to increase the success rate of restoration projects. Consequently, this could help to demonstrate the positive impacts that may arise as a result of wetland restoration. Furthermore, through working with good examples, this may increase the social support for wetland restoration projects across the EU. Markedly, a similar approach is applied by the non-profit organisation Ducks Unlimited.

EU LIFE: post-project responsibility. While the EU LIFE programme has a strong focus on the long-term success of restoration projects through the After-LIFE project phase (European Commission, 2020b), there are no legal requirements for the coordinating beneficiary to follow the After-LIFE plan that is set out (A5). Hence, if there is no voluntary commitment amongst restoration practitioners and their partners to collaborate with the local community, the restoration activities may stop prematurely, leading to the potential loss of restoration success, as demonstrated by one EU LIFE project (A5) (see section 4.3.5). Strengthening the legal requirements of After-LIFE plans may enhance the effectiveness of safeguarding restoration achievements after project completion.

5.6 Research limitations

Despite this research's contributions to the field of community engagement in EU LIFE-funded European wetland restoration projects, this research has come with several limitations; below, seven relevant aspects are discussed which limit the findings of this research.

First, the findings of this research are limited to correlations; it cannot demonstrate verifiable causal links between community engagement strategies and the success of the wetland restoration projects studied. The successful restoration of ecosystems depends on many aspects, *inter alia* the legal framework, the political context, socioeconomic context, financial capacities, available human resources, and ecological conditions. Although community engagement is an important component in the path to successful ecosystem restoration, one cannot ascribe the success of a wetland restoration project solely to the use of a particular set of community engagement strategies. Furthermore, there are social-ecological factors beyond community engagement and participation that are important in building resilience in social-ecological systems (e.g. Biggs et al., 2012). However, through its design, this research has explored community engagement strategies in wetland restoration projects which were successfully completed and were, overall, considered successful several years after their completion. This allowed for the identification of community engagement strategies associated with long-term successful EU LIFE-funded European wetland restoration projects. Moreover, the identification of overarching patterns in community engagement strengthens the suggestion that the identified community engagement strategies may be important for the long-term success of these projects. Additionally, several components of these projects had not successfully been completed, which enabled this research to examine the practitioners' perspectives on failures and to understand why they may have occurred.

Secondly, to answer to the research questions, this research depended largely on the perspective and memory of solely restoration practitioners, and did not incorporate the perspectives of local community members from the restoration projects. This was a conscious decision, as the objective was to find overarching lessons for community engagement, rather than to understand a single case study, although this limited the attainable analytical depth per case study. Consequently, these perspectives may not fully represent the restoration project in all their respects. Furthermore, if different practitioners of the same projects would have been interviewed, this could have yielded different results on e.g. the most important community engagement strategies for the long-term success of restoration projects. However, the interviewed practitioners were part of the project management team, and were involved in the majority of decisions and activities surrounding the engagement of the communities. Consequently, they will have had a more broad overview of the community engagement process than other actors and stakeholders in the project. Furthermore, this research was supported by the availability of project documentation for the EU LIFE projects in order to understand the background of the project and to validate practitioners' claims where needed.

Third, rather than focusing on a specific ecosystem type, this research incorporated different terrestrial wetland types in this study, ranging from mires to lakes and rivers, and including both saline and freshwater wetlands. Each of these may provide different ecosystem services, with different implications for the local communities and the required ecosystem management activities. Consequently, different wetland types may necessitate different types of engagement. However, upon finding the knowledge gap in the field of European wetland restoration and community engagement, rather than contributing to the restoration of a single wetland type, the aim of this research was to contribute to multiple European wetland types and their restoration. Hence, by incorporating different wetland types into the research design, this research has been able to obtain lessons in community engagement across European wetland types.

Fourth, this research examined wetlands that were restored between 2012 and 2016, while wetlands' full restoration may take decades. However, this was a conscious decision, as for older EU LIFE projects it was more difficult to find publicly available documentation and to contact the relevant restoration practitioner due to changes in contact details. Furthermore, due to the After-LIFE phase of the EU LIFE projects, the coordinating beneficiaries were responsible for

five years after the wetland had been restored, which helped the practitioners to remain up-to-date on the project's status after the restoration activities.

Fifth, the degree to which a wetland was successfully restored was not quantified and compared between projects: in addition to the difficulty of standardising the success of ecosystem restoration (Ruiz-Jaen & Mitchell Aide, 2005; Wortley et al., 2013), there was no publicly available data on the present-day degree of success of the completed wetland restoration projects. Instead, this research relied on the restoration practitioner's perspective to understand the success of the restoration projects. However, most EU LIFE restoration practitioners had started successor projects in the same communities or in an adjacent area, and were therefore up-to-date on the state of the restored wetland.

Sixth, there is no set method for content analysis (Bengtsson, 2016; Elo & Kyngäs, 2008; Erlingsson & Brysiewicz, 2017; Vaismoradi et al., 2013). However, to address this limitation, the Appendix B and C present tables to improve transparency on the content analysis process. Furthermore, validity and reliability were enhanced through researcher triangulation (Blaikie & Priest, 2019), i.e. having two peer researchers perform a subset of the content analysis, using the same coding sheet (see section 3.3) (Erlingsson & Brysiewicz, 2017).

Lastly, this research has produced a conceptual framework for the community engagement of EU LIFE-funded European wetland restoration projects; however, this framework's strategies will need to be tailored to the relevant context to be successfully operationalised. This will require an in-depth understanding of the local community and the restoration project's context, and the effectiveness of community engagement efforts will additionally depend upon the individual skills of the practitioners, their team, and their partners.

6 Conclusion

This research aimed to explore the community engagement strategies through which local communities had been engaged in previously completed European wetland restoration projects. Furthermore, this research aimed to understand European restoration practitioners' perspectives on the most important community engagement strategies to support the long-term success of wetland restoration projects, and build resilience in the social-ecological system. Through achieving this aim, this research hopes to contribute to the successful restoration of current and future European wetland restoration projects. The research aim was achieved by (i) interviewing nine restoration practitioners of EU LIFE-funded European wetland restoration projects, and (ii) performing a mixed deductive-inductive qualitative content analysis of the interview transcripts, guided by an interdisciplinary set of community engagement principles and project documentation, and by answering the following research questions:

Research Question 1: What community engagement strategies were used by restoration practitioners to build local community support for European wetland restoration projects, which were funded by the EU LIFE programme and completed between 2012 and 2016?

- **Supporting Question**: What are the broad community engagement typologies used in the different wetland restoration projects?

Research Question 2: In the perspective of restoration practitioners, what community engagement strategies were most important to ensure the long-term success of restoration projects and to build resilience in the social-ecological system of European wetlands after these wetlands were restored as part of the EU LIFE programme and completed between 2012 and 2016?

The answer to **Research Question 1** is that restoration practitioners in overall successful EU LIFE-funded wetland restoration projects apply 17 overarching community engagement strategies that can be grouped in six themes: they (i) **connect** with the local community through creating networks and partnerships, personal relationships, ensuring visible leadership, and early and broad involvement of the community members, (ii) **empower** the local community by creating a common vision, creating structures for systematic representation and participation, managing power dynamics, and facilitating bottom-up initiatives, (iii) **learn** from and **teach** to the local community through adapting to and understanding the local context and history, exchange and integrate knowledge, and build capacity and resources, (iv) **integrate** restoration activities into the local community, by creating locally relevant benefits which create a local interest in maintaining healthy wetlands, and organise locally relevant events around restoration activities, (v) **demonstrate** the successes of restoration activities to the community, and use a focal species to make restoration activities tangible, and (vi) **persist** in the local community by creating successor projects, and committing to long-term collaboration with the local community. The EU LIFE projects used unique combination of these different strategies, while seven strategies were applied by all projects.

The answer to the **Supporting Question** is that seven EU LIFE projects used a top-down approach to engagement, i.e. the coordinating beneficiary initiated and led the engagement activities, while two EU LIFE projects' community engagement activities were initiated by the community, and led by the coordinating beneficiary. The EU LIFE projects used several combinations of community engagement modes, ranging from consultation to deliberation and co-production, although most projects used deliberation and co-production.

The answer to **Research Question 2** is that EU LIFE restoration practitioners view the following community engagement strategies as most important in supporting the long-term

success of restoration projects and to build resilience in the social-ecological system: (i) create locally relevant benefits as a result of the restoration activities, (ii) build personal relationships with key stakeholders to gain their support, (iii) build networks and partnerships with the local communities, (iv) facilitate bottom-up initiatives for restoration, (v) create structures for systematic representation and participation, (vi) communicate success of the restoration activities, and (vii) use a focal species to demonstrate success. The creation of locally relevant benefits was considered the most important community engagement strategy by four EU LIFE restoration practitioners, whereas other community engagement strategies were each considered most important by one restoration practitioner. Based on theoretical underpinnings, these strategies may build resilience in the social-ecological systems, although this should be interpreted with caution.

The **practical implications** of this research include the use of this new conceptual framework to aid restoration practitioners to evaluate and design effective community engagement strategies in current and future EU LIFE-funded European wetland restoration projects. These community engagement strategies have previously been applied in overall successful wetland restoration projects, and therefore may contribute to the long-term success of wetland restoration projects. These community engagement strategies were not present in the sets of community engagement principles, and this research has therefore created a richer set of community engagement strategies that captures the variation in engagement strategies applied in European wetland restoration projects. However, causal links between the community engagement strategies and the wetland restoration projects' success cannot be drawn from this comparative study.

Restoration practitioners may additionally be supported by this research's identification of – in the perspective of the restoration practitioners – the most important community engagement strategies for the long-term success of EU LIFE-funded European wetland restoration projects. This list may guide the allocation of resources towards particular community engagement strategies. In turn, these contributions may support the design and implementation of the 2030 EU Biodiversity Strategy's ecosystem restoration objectives.

Moreover, this research recommends policy changes within the EU LIFE programme to require future EU LIFE projects to include a range of socioeconomic indicators to measure the socioeconomic impacts of ecosystem restoration projects and to demonstrate their success and importance for human well-being. Currently, the link between restoration activities and socioeconomic impacts has been poorly documented, but strengthening this link may increase social and political support for future ecosystem restoration initiatives. Furthermore, this research recommends legislative changes to the legal requirements of coordinating beneficiaries during the After-LIFE project phase of EU LIFE projects to support the long-term success of restoration projects. Lastly, this research recommends experimentation with a bottom-up landowner-based model for wetland restoration as this may aid scaling up ecosystem restoration efforts within the EU.

Future research opportunities include exploring the applicability of this research's conceptual framework in contexts beyond EU LIFE wetland restoration projects, e.g. by exploring community engagement strategies in previously completed wetland restoration projects in other geographies, or by exploring the applicability of the conceptual framework in other ecosystem types. Although this research has found initial indications that this conceptual framework may be applicable outside of the context of EU LIFE wetland restoration project, this is yet to be confirmed. Second, the collected data allows for the exploration of potential trade-offs and synergies between the application of different community engagement strategies, which may further guide the future development of effective community engagement strategies in EU

LIFE-funded European wetland restoration projects. Third, the findings of this research may be used to identify how different community engagement strategies can be operationalised in different contexts. Lastly, this research's findings may allow further interdisciplinary research on ecosystem restoration and community engagement, as its findings enable other disciplines, e.g. sociology, to identify the potential drivers of success within these community engagement strategies in the context of European wetland restoration projects.

In **conclusion**, this research has identified the main community engagement typologies and has created a conceptual framework for the engagement of communities in overall successfully completed EU LIFE-funded European wetland restoration projects. Furthermore, it has explored restoration practitioners' perspectives on the most important community engagement strategies for the long-term success of EU LIFE-funded European wetland restoration projects. These insights may guide restoration practitioners and policymakers to enhance the long-term success of current and future European wetland restoration projects, and thereby contribute to protecting biodiversity and mitigating climate change.

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Appendix

Appendix A: Interview guide

Consent statement

My name is Stijn den Haan and I am conducting this interview for the purpose of my master's thesis at Lund University. Could you please state your name, affiliation, and whether you consent to the recording of this interview and my use of this interview and its content for my thesis? Please know that you can withdraw your consent at any point in time by informing me.

Questions

1. In one sentence, could you describe what ecosystem restoration means to you?
2. Why was the wetland restoration project started?
3. In one sentence, could you describe your role in the restoration project?
4. To what extent is the completed restoration project considered a success nowadays, and why?
5. Who was considered to be part of the local communities, and how were they selected and involved?
6. How were local communities engaged to develop community support for the restoration project?
7. Getting a restoration project started is one thing. Ensuring the long-lasting success of the restoration project once it has been completed is another, as ecosystems can relapse to their degraded state. In your perspective, which community engagement strategies have contributed most to the continued success of the restoration project, that have built resilience in this social-ecological system?
8. Looking back, is there anything that should have been done differently in the restoration project regarding the engagement of local communities, and if so, why?
9. Did the project encounter trade-offs between achieving short-term and long-term restoration objectives? If so, could you please explain how these were navigated and how the local community was involved in navigating these trade-offs?
10. Is there anything else that I should know about the project, that was not discussed, and what would that be?

Appendix B: initial coding sheet

The initial coding sheet was based on the analytical frameworks identified in the literature review (see Chapter 3).

Source	Code number	Old code
McCloskey et al. 2011	M1	adapt methods to the local context
McCloskey et al. 2011	M2	build capacity and resources in the community
McCloskey et al. 2011	M3	build networks and relationships with the community
McCloskey et al. 2011	M4	commits to long-term collaboration with the community
McCloskey et al. 2011	M5	communicate and agree on objectives with stakeholders at the start
McCloskey et al. 2011	M6	create partnerships with the community
McCloskey et al. 2011	M7	ensuring the engaging organisation lets go of control
McCloskey et al. 2011	M8	respect and understand the degree of diversity within the community
McCloskey et al. 2011	M9	respect the self-determination of the community
Reed 2008	R1	adapt methods to the local context
Reed 2008	R2	analyse and represent stakeholders systematically
Reed 2008	R3	apply a philosophy of empowerment, equity, trust, and learning
Reed 2008	R4	communicate and agree on objectives with stakeholders at the start
Reed 2008	R5	create institutional structures for participation
Reed 2008	R6	employ highly skilled facilitation
Reed 2008	R7	ensure early and ongoing stakeholder participation throughout the process
Reed 2008	R8	integrate different types of knowledge
This research	S	NA

Appendix C: Revised coding sheet

This revised coding sheet encompasses the original codes of Appendix B and were revised based on the content of the interviews. The components of this coding sheet is equivalent to the components of the conceptual framework presented in Figure 4-1.

Theme	**New code**	**Code number Appendix B**
Connect	Build local networks and partnerships	M3, M6
Connect	Build personal relationships	S
Connect	Early and broad involvement	R7
Connect	Visible leadership	S
Empower	Bottom-up initiatives	S
Empower	Create a common vision	M5, R4
Empower	Manage power dynamics	M7, M9, R6
Empower	Structures for systematic representation and participation	M8, R2, R3, R5
Learn & Teach	Adapt to the local context and history	M1, R1
Learn & Teach	Build capacity and resources	M2
Learn & Teach	Exchange and integrate knowledge	R8
Integrate	Create locally relevant benefits	S
Integrate	Organise locally relevant events around restoration activities	S
Demonstrate	Communicate success	S
Demonstrate	Use a focal species for restoration	S
Persist	Commit to long-term collaboration	M4
Persist	Create successor projects	S