MERLIN

Mainstreaming Ecological Restoration of freshwater-related ecosystems in a Landscape context: INnovation, upscaling and transformation (MERLIN): Work Package 4 economic sector questionnaire report

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Imprint

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Summary of Key findings

The **EU Horizon 2020 MERLIN** project's *(Mainstreaming Ecological Restoration of freshwater-related ecosystems in a Landscape context: INnovation, upscaling and transformation)* Work Package 4 (Transformations) (WP4) researchers based at the **James Hutton Institute** conducted a survey of experts, asking for views and perceptions regarding restoration of freshwater ecosystems using Nature-based Solutions (NbS). The views and perceptions helped to gain insights about areas and issues to focus on to develop transformation route maps for mainstreaming NbS across the economic sectors. The six primary economic sectors considered in MERLIN are Agriculture, Hydropower, Insurance, Navigation, Peat Extraction and Water Supply. The survey approach, respondents' background, sectoral responses, and the implications for MERLIN are in Sections 2, 3, 4 and 5, respectively.

Aim and background of respondents

The survey aimed to understand the opportunities and challenges to implementing nature-based solutions across Europe based on the views of economic sector experts. **In addition to the six economic sectors of MERLIN, the responses were received from other complementary sectors such as forestry, fishery, water management and nature conservation.** The findings will contribute to future activities in MERLIN, which are aimed at cooperating with primary economic sectors to design transformation strategies for mainstreaming NbS.

Main findings

1. **Water-related environmental and socio-economic challenges:** The respondents acknowledged the range of water-related environmental challenges faced in their respective sectors. The four most recognized environmental challenges are:

   - → Pollution and degraded water quality (57%)
   - → Too little water (water scarcity) (54%)
   - → Loss of connectivity between various elements in the water environment (42%)
   - → Too much water (which poses flood risks) (51%)

   The selection of these challenges proportionally varied across the sectors. For instance, while 61% of agriculture sector respondents selected 'pollution and degraded water quality' and 'too little water (water scarcity)' respectively, 54% and 30% of respondents in the peat extraction sector selected the same challenges.

   Through an open-ended question, the socio-economic challenges identified mostly relate to pressure on land use, conflicting interests in land use or management, pressure on profit margins and increasing cost of production.

2. **Impact of challenges and requirement for nature-based solutions:** The majority of the respondents (86% overall and 89% in the six MERLIN sectors combined) think that the above water-related and socio-economic challenges affect the progress of businesses. Also, the respondents (81%) generally agree that a significant shift from the current freshwater management practices is required. However, some sectors are not decided on this issue. For instance, 46% of respondents in the peat extraction sector either 'somewhat disagree', 'neither agree nor disagree', or 'do not know' whether a shift is needed.

   The respondents across all the sectors (97%) mostly agree that NbS should be part of this shift. The potential reason for the difference between the responses about the need for a shift in the current water management practices and 'NbS' being part of such shift is that some sectors are already undertaking NbS and do not see the need to shift such practices.

   In particular, the majority of the respondents think that NbS could help to address challenges such as pollution and degraded water quality (72%); loss of connectivity between various elements in the water environment (66%); too much water (64%); and erosion of the riverbanks and immediate surroundings (63%).

3. **NbS options and confidence of respondents in NbS:** Overall, 74% of respondents (although this drops to 60% in the six MERLIN sectors) are confident in the potential of NbS to address the environmental challenges. **This finding shows that even if the respondents agree with the need for a shift and NbS, some are undecided in terms of their confidence in NbS.** The NbS options selected most by the respondents include re-wetting and revegetating of wetlands and peatlands and riparian (riverbank) restoration. However, some respondents think that the type of NbS depends on the situation and the challenge being addressed. For example, NbS for peat extraction sites may be different from NbS for riparian areas. Hence, some respondents think

there should be a tailored nature-based solutions depending on the context or challenge being addressed.

4. **Motivation of actors to support NbS:** Only 36% of the respondents think the economic sector organisations are currently motivated to support mainstreaming of NbS. The rest are either indifferent or not motivated to support NbS. The reason for the difference between the responses for the confidence and motivation is unclear. The potential reason for the contrasting views is that the respondents are aware of challenges and NbS, but they need more convincing knowledge about the direct impacts of NbS on their activities and how their concerns and tradeoffs would be addressed.

   However, the respondents acknowledge that the motivation of economic sectors could be increased through measures such as demonstration of willingness by other private sector organizations; provision of adequate data and information to support NbS; increasing the economic outcome for the sectors through NbS; and collaboration with organisations within the sectors.

5. **Challenges to mainstreaming NbS and conflicts between sectors:** The respondents acknowledge the range of challenges involved in mainstreaming of NbS. The challenges recognized by most respondents are:

   - Balancing the economic, social and environmental needs (70%)
   - Inadequate (lack of) knowledge, experience, data, and uncertainties about the outcomes (63%)
   - Enhancing sectoral collaboration and coordination (61%)
   - Capturing the needs of all stakeholders and addressing conflicts (57%)

   These challenges highlight the potential conflicts that exist or arise when NbS is implemented. The agriculture sector was recognized by about 70% of the respondents (91% of peat extraction respondents) as having conflicts with other sectors. However, the respondents interpret the conflicts as the impacts of NbS on the economic activities or the impacts of economic activities on the environment. Thus, in most instances, the conflicts were not viewed as direct tradeoffs between different economic sectors. The perceived conflicts include the potential effects of raising water levels on agricultural activities. Across all the sectors, the respondents feel that NbS may affect the economic gains of the sectors. However, a few respondents think that NbS should lead to win-win outcomes and that no conflict exists.

6. **Financing of NbS:** Although several respondents acknowledged Payment for Ecosystem Services and Carbon credits as potential financing options for NbS, public-led financing such as subsidies (50%) and grants (49%) are highly regarded. Some respondents recommended a mixture of public-private funding.

7. **Opportunities for mainstreaming NbS:** Notwithstanding the overarching challenges to mainstream NbS, the respondents recognize the range of opportunities that could be capitalized upon to support NbS. The top three most recognized opportunities are:

   - Increasing knowledge of environmental challenges
   - Acceptance and support from local communities
   - New European projects to connect currently disconnected actors

   The recognition of 'increasing knowledge of environmental challenges' is not surprising because the respondents largely acknowledged the range of water-related and socio-economic challenges presented. In addition, they generally agree that these challenges affect business progress. This finding could be the basis of sensitizing actors on the importance of NbS.

8. **Views on existing policies:** The views regarding policies mostly centered on the weaknesses in EU-level policies related to NbS. Such policies include Water Framework Directive, Common Agriculture Policy, and Green Deal. Notable weaknesses raised include:

   - Lack of support for NbS by the policies
   - Inadequate subsidies and funding for NbS
   - Policies not being grounded by sound evidence

These findings have implications for the on-going MERLIN activities:

- **The views on water-related and socio-economic challenges** could contribute to the IUCN criterion 1, which requires that NbS address most significant societal challenges. Hence, stakeholders could be engaged to define and prioritize those challenges to be integrated into NbS.
- The **mixed views about the motivation of economic sectors** requires that actions are created to increase the motivation of the sectors to support NbS. MERLIN's work packages 1 and 2 could demonstrate the

economic benefits of NbS, while WP3 could provide information about the innovative funding for NbS. WP4 could examine how to create and strengthen the various approaches and discuss it as part of cooperation points with the economic sectors.

- → **The challenges to mainstreaming NbS** are not entirely avoidable. However, they could be managed by taking appropriate and profound actions, including strengthening stakeholder engagement; adopting integrated approach; piloting NbS measures; investing in data acquisition; and exploring innovative funding schemes for NbS. In particular, perceived conflicts offer the opportunity to frame NbS in a way that balances tradeoffs as required by the IUCN criterion 6.
- → While **public-led financing** will continue to be vital, it is imperative that private sources and business-centric approach to undertaking NbS are explored to augment the public sources.
- → Finally, **the opportunities** identified should be maintained, strengthened and expanded as part of transformation process to ensure that they are meaningful to the mainstreaming of NbS.

Content

Acknowledgements

The questionnaire was developed with vital inputs from MERLIN Colleagues at WWF. Also, colleagues at the James Hutton Institute and MERLIN's WP4 partners provided important feedback before finalising the questionnaire. Their inputs are very much appreciated. Thanks also to all the survey respondents and MERLIN partners who helped us to circulate the survey link.

1 Introduction

The **James Hutton Institute** recently conducted an online survey to support the **EU Horizon 2020 MERLIN** project's Work Package 4 (WP4) efforts to develop a transformation pathway to mainstream freshwater ecosystem restoration using Nature-based Solutions (NbS)[1]. The survey aimed to understand the opportunities and barriers to implementing NbS across Europe based on the views of economic sector experts. MERLIN is working with six primary economic sectors: agriculture, hydropower, insurance, navigation, peat extraction and water supply. MERLIN focuses on these sectors because they are critical to achieving the European Green Deal objectives. In particular, their activities depend on and affect the freshwater ecosystem and can benefit from implementing NbS. Transformation in these sectors involves making profound changes (e.g. policy, personal and practical) to mainstream NbS. Acknowledging that other sectors are involved in freshwater NbS, the views from 'other water-dependent sectors' were considered. The non-MERLIN sectors enabled us to understand other complimentary issues, as recommended by the IUCN standards (IUCN, 2020).

Sector experts include academics, practitioners and policymakers in not-for-profit, private and public organizations who have views about the economic sectors in the European and national contexts. It further collected possible evidence of how economic sectors are affected by the freshwater challenges and how they will benefit from NbS. The specific objectives of the survey were to gain insights about the following in the context of Europe:

- Freshwater-related and societal challenges faced by economic sectors and the need for NbS
- Confidence in NbS and motivation of economic sectors in supporting mainstreaming of NbS
- Challenges to mainstreaming NbS, including perceived conflicts, financing and policy weaknesses
- Opportunities for mainstreaming NbS, including financing and policy strengths

This report is based on all the valid responses received as of 17th October 2022. The report aims to provide information to MERLIN to support sectors to mainstream aquatic restoration in Europe. The initial results have been used to support ongoing sector briefings. This report further reflects on the lessons and implications of the results to developing a transformation pathway to mainstream NbS in Europe.

Section 2 of the report details the survey methods, and ethical procedures, while section 3 presents the respondents' background, including the type of organizations, sectoral distribution and scale of operation. Section 4 presents the main result, focusing on societal challenges and impacts on businesses, NbS options, and challenges and opportunities for mainstreaming NbS. Section 5 highlights the lessons for transformations and mainstreaming of NbS, while Section 6 concludes and highlights the next steps.

[1] Nature-based Solutions are defined as actions to protect, sustainably manage, and restore natural and modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits (Cohen-Shacham et al., 2016).

2 Methodology

The survey was conducted online using the James Hutton Institute's Qualtrics platform. The survey was first drafted and discussed by the WP4 team (the James Hutton Institute and WWF), following which the other MERLIN partners involved in WP4 were invited to review. This process helped to trim down the questions to 31, excluding questions about identifying information and ethics procedures. The survey was subsequently piloted with selected industry stakeholders invited to participate in MERLIN's Work Package 4 first roundtables[2]. The pilot returned 24 responses. Based on the results and feedback from the piloting, the 2nd round survey, involving 27 questions were distributed to experts within and outside the MERLIN consortium. The distribution targeted economic sector (private, public and NGOs, etc.) experts with whose work relate to freshwater ecosystem. The second-round survey was promoted using four main techniques, including:

- Direct email invitation to experts within MERLIN: Contacts were readily available via MERLIN consortium. Targeted respondents were experts working on MERLIN's case studies or representing the six MERLIN economic sectors.
- Direct email invitation to experts outside MERLIN: contacts for these experts were obtained through stakeholder identification process under MERLIN's Work Package 4.
- Targeted invitation by other colleagues (snowball): The invitees (above) were encouraged to forward the survey links to colleagues interested in filling in the survey.
- On the Freshwater Blog: The survey link was shared on the Freshwater Blog 23rd September 2022.

This report is based on the responses for the second-round survey. In this second round, 174 respondents agreed to participate in the survey, which reduced to 112 respondents who had a 100% completion rate (i.e., they answered all the main questions). Overall, the responses to main (sub)questions ranged from 158 to 65. The map for 112 respondents (Figure 1) shows that the majority of the respondents were geographically distributed across different parts of Europe. Only two locations were registered outside Europe. The location of 62 respondents were not registered.

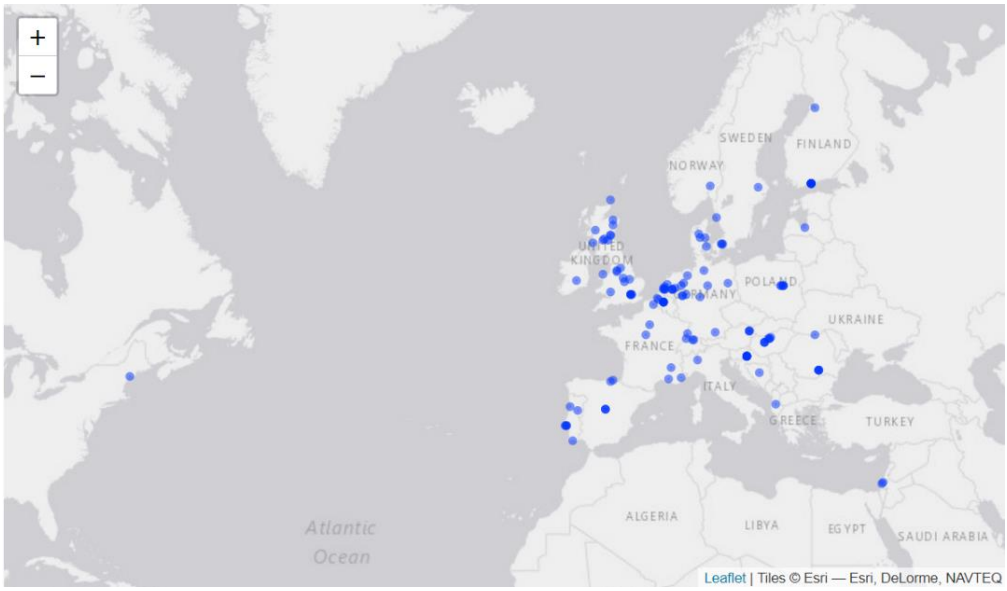

Figure 1: The respondents were geographically distributed across Europe

The survey contained both closed-ended and open-ended questions. The responses to the closed-ended questions are presented using descriptive statistics, while open-ended questions are categorized into themes by the researchers. Since the sectors are the primary focus, the results are presented using cross-tabulations to compare and contrast the answer across the sectors.

2.1 Ethical compliance

This survey was favorably reviewed by the James Hutton Institute Research Ethics Committee which considered that it presented no ethical risks to respondents from taking part. All respondents were encouraged

[2] In MERLIN, roundtables are online facilitated discussions between sector professionals designed to share knowledge and deliberate over shared issues, as a way of fostering a community of practice.

to read the privacy statement and provide their electronic consent before proceeding to the survey questions. Because of privacy issues, all personal identifying information about respondents have been removed.

3 Background of respondents

The background of respondents centered around 6 main issues, including (1) the sectors they associate themselves with; (2) type of organizations they work for; (3) the extent of their organisations' operation (4) whether they a part of MERLIN Consortium or not; (5) for those outside MERLIN, whether they have participated in NbS or restoration project not, and (6) the specific project is applicable.

3.1 Sectors of respondents

The respondents were diverse in terms of their sectors of specialization. Of 141 respondents answered the question 'What is your primary sector of specialisation? If you relate to more than one sector, please pick one for this questionnaire' (Figure 2). About 65 (approximately 46%) selected at least one of MERLIN six sectors (Agriculture (n = 26), hydropower (n = 7), insurance (n = 5), navigation (n = 3), peat extraction (n = 15) and water supply (n = 9)). The rest (76, 54%) selected non-MERLIN sectors '. non-MERLIN sectors can be classified in complementary sectors such as water quality and management (n = 18), climate and environmental adaptation (n = 11), nature conservation (n = 10), and wetland, lake and restoration (8) (See Appendix for a word cloud of 'other sectors). Only a few (n = 12) specified sectors such as knowledge exchange, policy, governance and rural development, that could not be classified as water or nature related. The rest of the analysis will use non-MERLIN sectors to represent all the sectors outside the six MERLIN economic sectors.

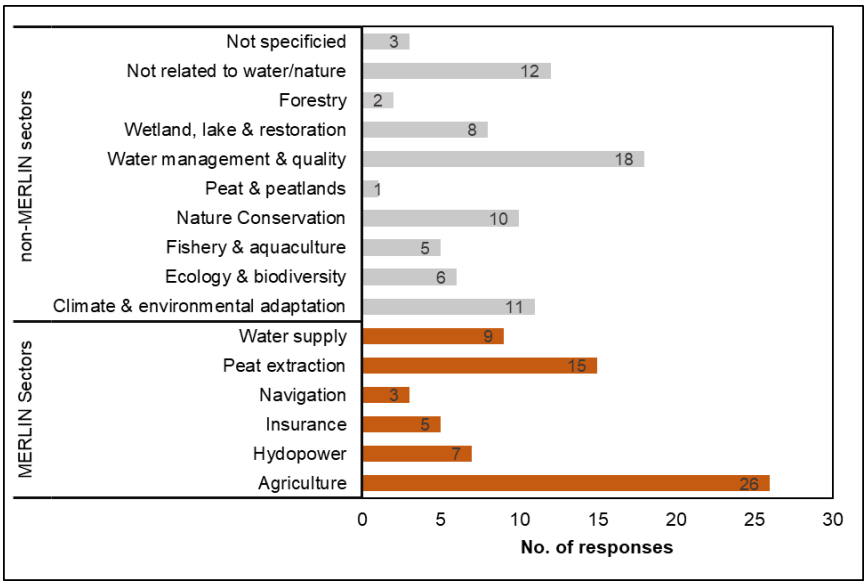

Figure 2: Distribution of respondents across the six MERLIN economic sectors and other non-MERLIN sectors. The non-MERLIN sectors were recategorized based on key terms used by the respondents. (n = 141)

3.2 Kind of organizations, extent of operation and experience in NbS

Regarding the kind of organizations (Figure 3), 38 (27%) respondents represent public or state agencies, while 37 (26%) represent academic or research institutions. The rest of the respondents (n = 66, 47%) emerged from non-public agencies such as private organisations (n =24, 17%), NGOs (n = 25, 18%) and other organization types (n = 8, 7%). Public-private and network organisations had 5 and 4 responses, respectively. Those who mentioned others specified with terms such as international organization and charity.

In terms of geographical operation (Figure 4), majority of respondents belong to organisations operating at the national scale (n = 58, 42%). The rest operate at the global scale (n = 36, 26%), European scale (n = 16, 12%) or regional scale (n = 14, 10%). Respondents who selected 'others' (n = 13, 9%) used terms such as Western Balkans, Basque Country, Danube Region, river basins or catchments and local areas.

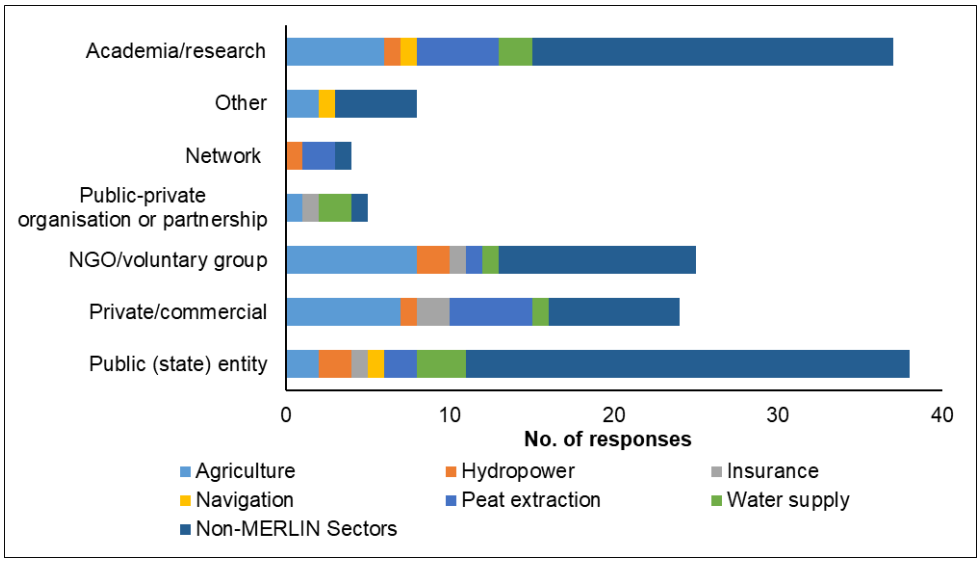

Figure 3: The kind of respondents' organizations (n = 141, (17/158 did not select sectors)

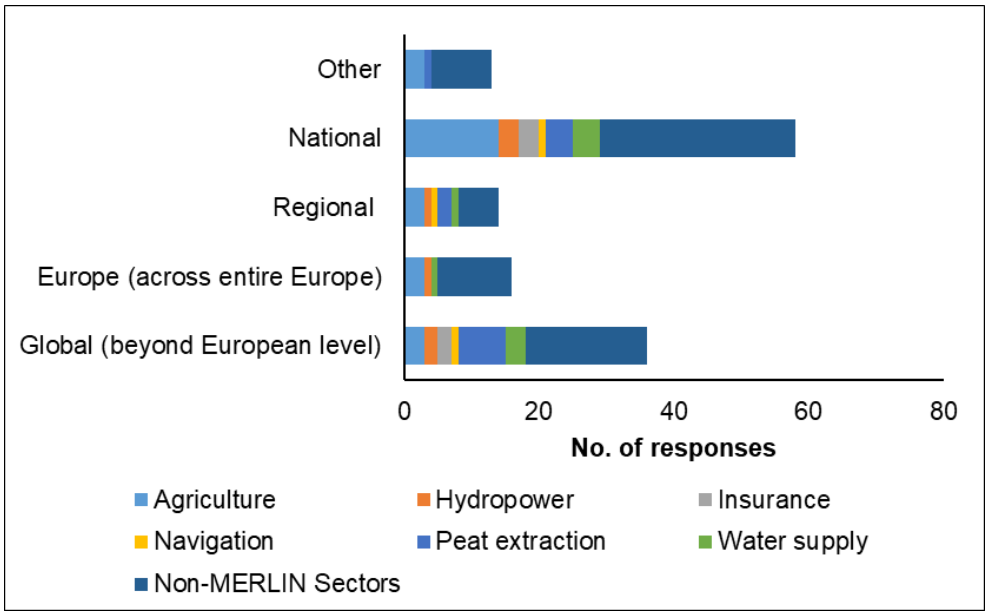

Figure 4: The scale of operation of respondents' organisations (n = 137)

Of these respondents, 75 (55%) are members of MERLIN Consortium, while 62 (45%) respondents were not. More than half (36, 58%) of those outside the MERLIN Consortium have previously participated in an NbS or restoration initiative, while 20 (32%) respondents have no such experience. Four respondents answered 'I don't know', while two did not respond to the question on NbS experience. Those who previously participated in an NbS project mentioned European Commission funded projects (e.g. LIFE, EuPOLIS project, RECONECT, NAIAD, etc.), while others specified their participation in terms of designing peatland codes, species restoration, coordinating fish migration projects, floodplain restoration and helping to design policies.

4 Nature-based solutions, challenges and opportunities: views from experts

This section presents the main results, focusing on societal challenges and impacts on businesses, NbS options, and challenges and opportunities for mainstreaming NbS. The findings are based on the views of respondents.

4.1 Water-related environmental and socio-economic challenges

To meet the Global Standards for Nature-based solutions, an initiative must explicitly address a societal challenge (Cohen-Shacham et al., 2019; IUCN, 2020). Since MERLIN's primary focus is on freshwater restoration using NbS, the respondents were asked a multiple-choice question ***'What are some of the major water-related environmental challenges faced by the sector where you specialize? Please select all that apply'***. Apart from 'others', each of the challenges presented was selected by at least 30 respondents. The four challenges selected most (Figure 5) by the respondents were 'pollution and degraded water quality (n = 70, 57%), 'too little water (water scarcity) (n = 67, 54%), 'loss of connectivity between various elements in the water environment (n = 52, 42%), and 'too much water (which poses flood risks)' (n = 50, 41%).

The acknowledgement of the challenges varied across sectors. For the non-MERLIN sectors, they were fairly balanced, with seven of the challenges being selected by at least more than 20 respondents. In the agriculture sector, the challenges selected most were 'too little water (water scarcity)' (n = 14, 61%) and 'pollution and degraded water quality' (n= 14, 61%), while in the peat extraction sector, 'pollution and degraded water quality' was selected most (n = 7, 54%).

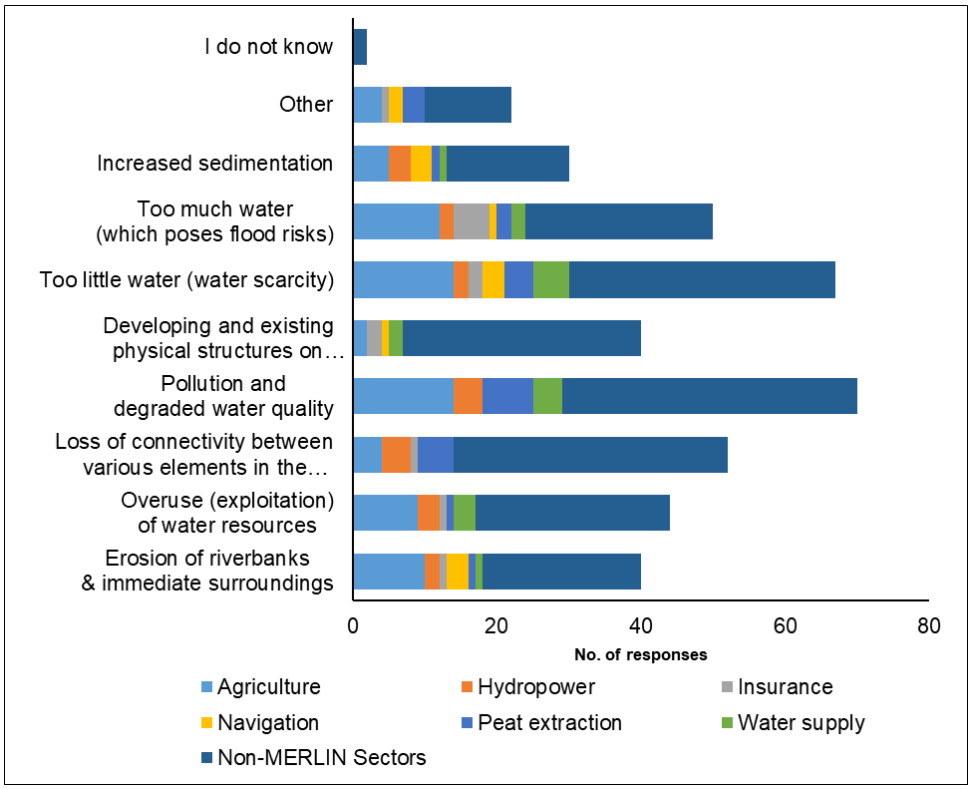

Figure 5: Respondents identified major water-related challenges pertaining to their sector (n = 123, each respondent could make multiple selections)

The 22 respondents who selected 'other, please specify' highlighted – in free text – challenges such as aquatic invasive species, loss of biodiversity, carbon dioxide emissions, climate change and eutrophication. One respondent also mentioned that *"Cascading effects due to failing infrastructure; overreliance on absolute safety of hard, physical infrastructure (e.g. dykes that age, are not properly maintained, are not fit for the hazard level due to climate change and then eventually fail)"*, while another mentioned that *"various forms of peatland degradation (burning, draining, erosion)"*. The 'other' challenges show that the water-related challenges in Europe are span many issues depending on the perspective of different respondents.

Apart from the water-related challenges, an open-ended question was asked: ***"Apart from water-related challenges, what are other socio-economic challenges affecting your sector?*** *Please, list a maximum of three responses (examples may include pressure on profits, cost of production, competition, etc.)".* This question aimed to identify the societal challenges that are not directly related to the freshwater environment. The interesting responses relate to issues such as increasing cost of production, competition between sectoral interests and land use challenges. From the word cloud, terms used to describe the challenges (Figure 6) include land, climate, costs and pressure.

Figure 6: A word cloud of socio-economic challenges identified by the respondents (n = 81)

'Land' concerns land use pressure and conflicting interests in land. For instance, a respondent stated: *"Pressure to change land use from agriculture to forestry",* while another mentioned *"fragmentation of land ownership"*. 'Cost' is about increasing cost of production and investment and rising cost of living, while 'pressures' were used to highlight pressures on profit margins and land use but also other forms of pressure. For instance, a respondent mentioned there is *"social pressure to renovate system of ditches and drain wetlands for agriculture"*, while another stated that *"pressure from lobby groups to continue peatland harming activities"*. For some respondents, however, the socio-economic challenges also concern climate change, including water-related issues such as increasing flood risks, decreasing food production, increasing vulnerability and the lack of preparation. Perhaps, these concerns were raised due to their impacts on businesses, such as the potential for climate change to increase the cost of production and reduce profit margins. Those who raised concern about 'water' highlighted the managerial issues, such as inadequate human resources in the water sector, ignorance about the water cycle and lack of acceptance of recycled water.

4.2 Impact of challenges and requirement for nature-based solutions

In this section, we asked four main questions to gain further insights about how the respondents appreciate the importance of NbS. The first question was '***To what extent do the challenges identified in the previous questions affect the progress of businesses, whether positively or negatively?'.*** The responses show that the challenges largely affect the activities of business, including their prosperity. Of the 111 respondents answering this question (Figure 7), 95 (86%) either selected 'to a high extent' (n = 52, 47%) or to some extent (n = 43, 39%). Only four respondents answered, 'to a little extent'. This response aligns with the views of the six MERLIN economic sectors. For instance, of the 53 respondents from the six MERLIN economic sectors, 89% said that the challenges affect their businesses 'to a high extent' or 'to some extent'. The responses imply that the respondents broadly agree that there is a close link between businesses and freshwater ecosystems. Thus, business prosperity could be impacted when the challenges intensify.

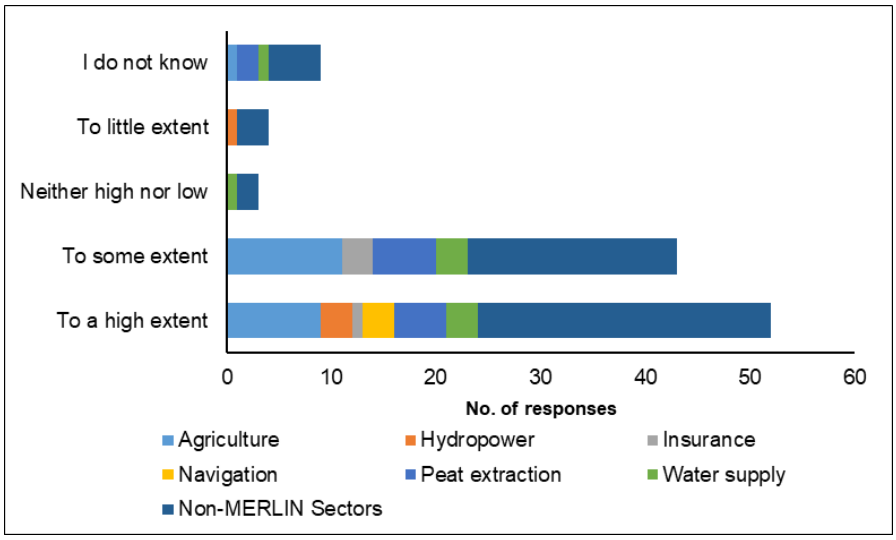

Figure 7: Respondents generally agree businesses are affected by the water-related environmental and socio-economic challenges (n=111)

Secondly, we asked the respondents that 'Given the challenges in your sector, do you agree or disagree that major improvements to your sector's existing water management practices are required for the management of freshwater resources?'. This question aimed to understand whether or not respondents agree that a shift from the current water management practices is needed. The majority (n = 97, 86%) 'strongly agree' (n = 63, 56%) and 'somewhat agree' (n = 34, 30%) that the current approach to managing freshwater should improve (Figure 8). Only nine (8%) respondents 'somewhat disagree' or 'strongly disagree' with this view. Although a large proportion of the respondents (81%) from the six MERLIN economic sectors 'strongly agree' or 'somewhat agree' with the need for a shift, 46% of respondents in the peat extraction sector either 'somewhat disagree', 'neither agree nor disagree', or do not know whether a shift is needed or not. This variation shows that even if the respondents generally agree that a shift is required, some specific sectors – such as peat extraction – may not have the same view.

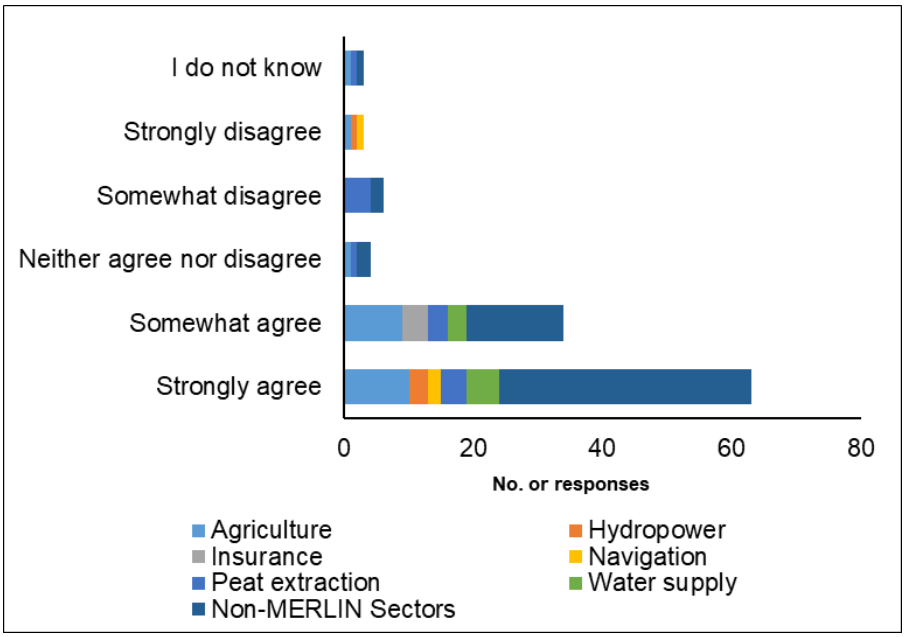

Figure 8: In general, the respondents agree that there is the need for major improvements (shift) to the existing water management practices (n=113)

In relation to the above question, we inquired from the respondents whether *they agree or* ***disagree that restoration with nature-based solutions should be an integral aspect of freshwater management*** (Figure 9). This question also showed that most respondents (n = 120, 97%) 'strongly agree' (n = 84, 70%) or 'somewhat agree' (n = 26, 17%) that NbS should be integrated into freshwater management. The responses indicate that MERLIN's economic sectors generally agree that NbS is required to address the range of water-related and other socio-economic challenges. Although 4 (31%) respondents in the peat extraction sector disagreed that a

shift was needed in the previous question, all the respondents in the peat extraction sector (n=13, 100%) strongly agree or somewhat agree that NbS should be an integral aspect of managing freshwater. The contrast between the responses to the two questions could be that the sector is potentially undertaking NbS and does not see the need to shift from such current practices.

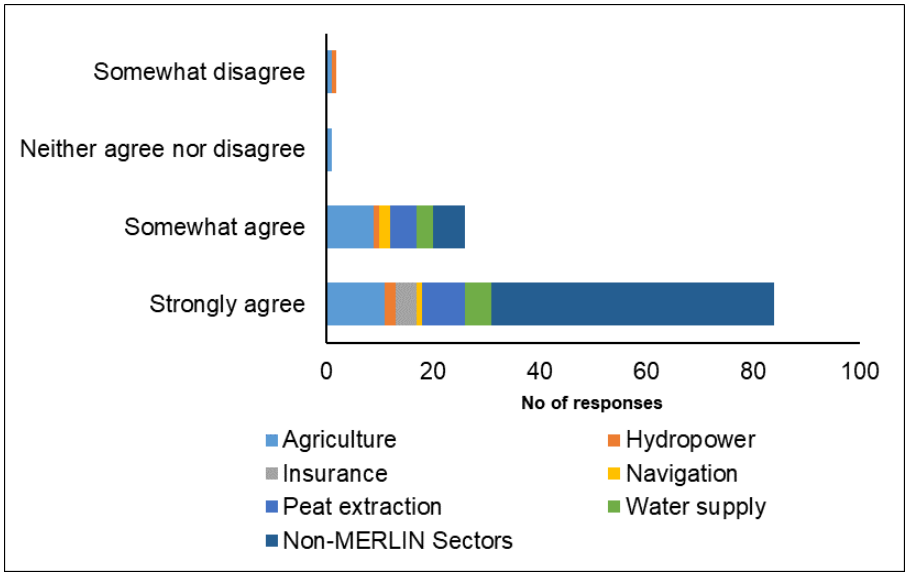

Figure 9: The respondents strongly agree that NbS should be part of the shifts to address freshwater challenges (n= 113)

Finally, we asked the respondents about the *specific challenges in their sectors that NbS and freshwater restoration could help to address* (Figure 10). The challenges selected most were 'pollution and degraded water quality' (n= 81, 72%), 'loss of connectivity between various elements in the elements in the water environment' (74, 66%), 'too much water (which poses flood risks)' (72, 64%) and 'erosion of the riverbanks and immediate surroundings (n = 71, 63%). Apart from 'erosion of the riverbanks and immediate surroundings', these challenges were among the first four challenges selected most in Section 4.1. Despite the recognition of these challenges across the six MERLIN economic sectors, the hydropower, insurance and navigation sectors do not see NbS to address challenges such as 'developing and existing physical structures on floodplains and waterways', 'increased sedimentation', and 'overuse (exploitation) of water resources', respectively. Those who selected 'others' (n = 11, 10%) mentioned challenges such as 'achieving net zero', 'increasing woodland cover, 'winter water storage' and 'addressing issues of biological communities'.

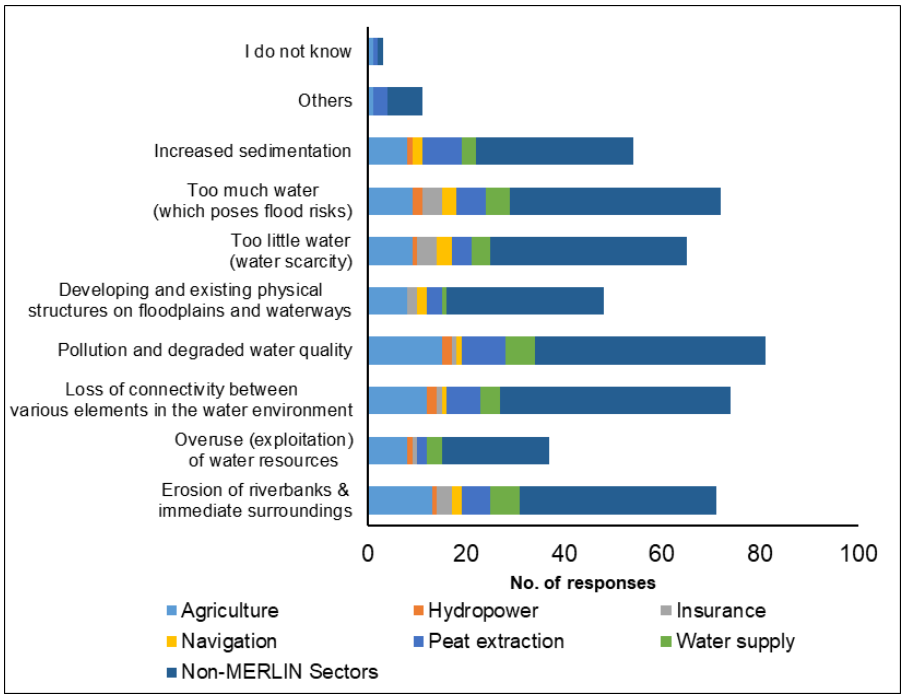

Figure 10: NbS could help to address the range of water-related environmental challenges faced by the sectors (n = 112, each respondent could make multiple selections)

4.3 NbS options and confidence of respondents

Successful NbS projects depend on adopting the appropriate NbS elements based on the challenge faced We asked the respondents to select the appropriate NbS for their sector and to rate their confidence level in NbS. Regarding **the appropriate NbS for restoration**, the response options contained the five NbS options envisaged by MERLIN. We also included 'others' to allow the respondents to propose other NbS options. As shown in Figure 11, 're-wetting and revegetating of wetlands and peatlands' (n = 78, 70%) was selected most. This option was selected most in all the six MERLIN economic sectors combined, particularly within the peat extraction and agriculture sectors.

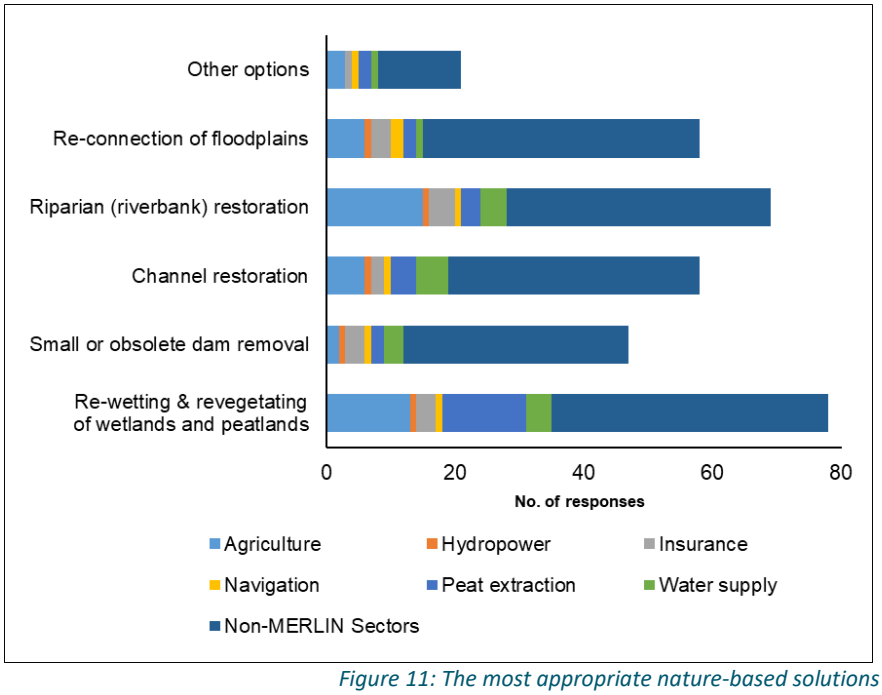

Figure 11: The most appropriate nature-based solutions for restoration for the sectors to consider (n = 112, each respondent could make multiple selections)

The second most selected NbS option was 'riparian (riverbank) restoration' (n = 69, 62%). The agriculture sector had the highest selection of this option among the six MERLIN economic sectors. Each of the NbS options envisaged by MERLIN was selected at least once in all the six MERLIN economic sectors. Only three respondents selected 'I do not know', which indicates that the respondents are generally aware of the types of NbS MERLIN plan to implement and mainstream.

Those who selected 'other options' (21, 19%) specified a range of NbS options. For instance, a respondent from the peat extraction sector mentioned: *"Deconstruction of drainage systems and raising of mire- and/or groundwater table to the natural level"*. Another respondent from the agriculture sector detailed the range of other NbS solutions available:

> *Management of pasture and arable [fields] to store more by removing compaction and increasing rooting depth (grass selection) and carbon content of soil. Better drainage maintenance to allow percolation rather than surface run off. Liming of soil to increase particle floculation. Replacing tarred areas with absorbent material and more swales. Grants for small scale ponds and widened slow deposition areas. (Agric sector respondent)*

Other respondents mostly from non-MERLIN sectors specified options such as *"reconnection of natural systems: forests, meadows, wetlands, restoration of small ponds and protection of backwaters"*. Some respondents went beyond structural NbS to highlight supporting activities in terms of management, practices and behaviours. For instance, one respondent from non-MERLIN sectors stated: *"Restoring people's ideas about river ecosystem*", while another (also from non-MERLIN sectors) stated that *"land-use changes, and extensive practices in agriculture, grassland and forest management"*. The respondents acknowledge that the choice of NbS depends on the challenge being addressed. Since NbS alone may not be possible everywhere, some respondents recommended a mixture of "green and temporary grey measures" to achieve results.

Following the above responses, we sought to understand respondents' confidence level by posing the question: ***Based on your knowledge of nature-based solutions for restoration (examples listed above), how confident are you on their effectiveness and potential to address challenges faced in your sector? (Figure 12).*** Of the 109 respondents who answered these questions, 81 (74%) were either very confident (n = 31, 28%) or confident (n = 50, 46%). Of the 50 respondents from the MERLIN sectors, 30 (60%) were either very confident or confident. While the confidence level is encouraging, about 13 (26%) of those from the six MERLIN economic sectors selected 'neither confident nor not confident'. Four out of the six respondents who selected 'not confident' belonged to the agriculture sector. Thus, despite about 97% of all respondents (94% of MERLIN respondents) previously agreeing with the need for NbS, some are undecided in terms of their confidence in NbS.

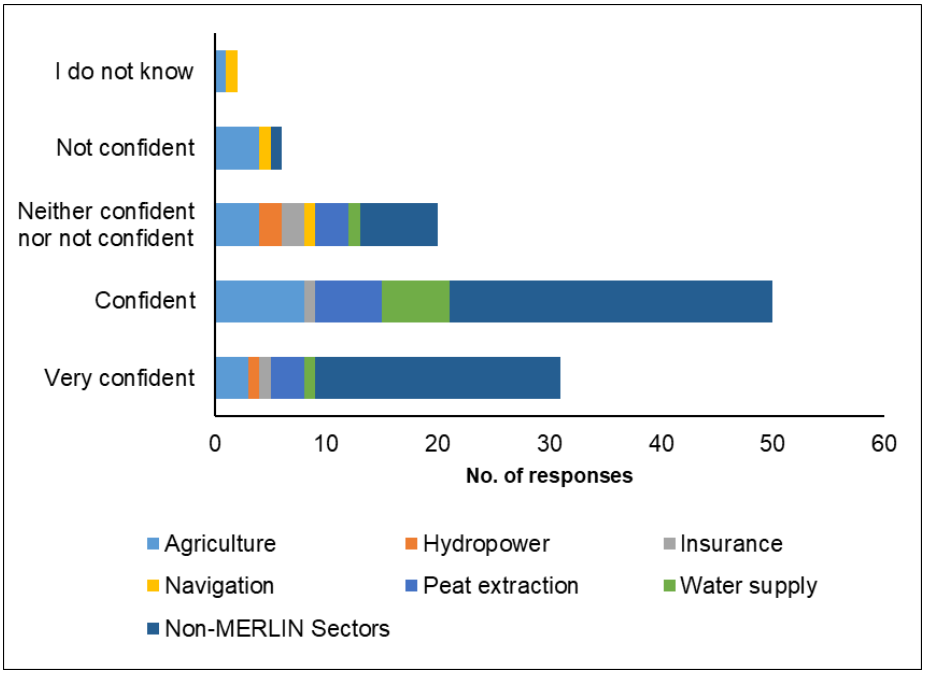

Figure 12: There is confidence in the potential of NbS to address societal challenges (n =110)

To gain further insights about these responses (NbS options, confidence levels and challenges), an open-ended question was posed for the respondents to provide ***'any other comments about the preceding questions.*** This

question generated interesting responses related to how NbS are framed, the potential conflicts and the challenges that should be addressed to achieve effective results. A respondent (from the navigation sector) who selected 'not confident' in the potential of NbS to address societal challenges stated that:

> *I filled in "not confident" for following reason: Most of the times, NbS (such as rewetting floodplains, constructing side-channels, removing bank revetments) leads to increased sedimentation in the navigation channel. This hinders navigation (less navigation depth, more dredging, hindrance by dredging vessels). I hope we can address this potential "conflict" in MERLIN. I am not an expert in NbS, I hope we can think of solutions that both help navigation and the ecosystem.*

This response concerns the potential trade-offs in implementing NbS and the need for a win-win solution. Another respondent (whose sector was not specified) raised the need to have a combination of NbS (instead of only one option), which considers stakeholders' needs:

> *I do not believe that single, prescriptive NbS solutions exist to address the issues for specific peat extraction / peatland use cases. Given that there is a socio-economic component I believe that case specific solutions will likely be a combination of many different elements that should also take just transition aspects for stakeholders and landowners into account*

Another respondent stated:

> *'Neither confident nor not confident' not because NbS will not work - they are one of our best options and are 'no regret' - but because some of them may not be effective any more under high warming scenarios ('hard limits')*

These responses pertain to framing NbS to suit the specific or local context and issues being addressed. Other concerns include the need for data and success stories, improved understanding of NbS and the cost-benefits, adopting NbS on a large-scale bases, increasing cooperation, and adopting a holistic approach. Sections 4.4 and 4.5 will highlight some of these issues regarding the challenges and the approaches to overcome them.

4.4 Motivation of actors to support NbS

This section aims to understand the level of (and how to increase) economic sectors' motivation in supporting NbS and the measures that they could support. The first question was ***based on your experience, how motivated do you think economic sector organisations are to support mainstreaming of nature-based solutions for freshwater restoration?*** The responses were not very encouraging as 35 (33%) respondents were 'indifferent', while 30 (30%) think the sectors are 'not motivated' or 'not motivated at all' (Figure 13). Only 36 (36%) think the economic sectors are 'very motivated' or 'motivated'. Out of the 48 responses from the six MERLIN economic sectors, only 15 (31%) perceive economic sectors as 'very motivated' (n = 1, 2%) or 'motivated' (n = 14, 29%), while the rest indicated indifferent (16, 33%), not motivated (14, 29%)) or not motivated at all (2). About 10 (21%) of those who selected 'motivated' were from the peat extraction (6, 13%)) and water supply (4, 8%) sectors.

To understand the strategies that could increase the motivation of stakeholders to support NbS, we posed the question: ***"As a stakeholder, which actions and changes will most likely increase your motivation to support or lead in the mainstreaming of restoration using nature-based solutions?".*** Apart from 'other' means of support, all the options had a high selection rate with at least 30 (29%) respondents selecting each option. 'Demonstration of willingness by the private sector' was the most selected option (n = 51, 49%). However, in the six MERLIN economic sectors alone, 'increasing economic outcome (profits) for my sector' was selected most (n = 24, 51%), followed by 'adequate data and information to support investment (n = 22, 47%). This result is not surprising as MERLIN economic sectors are mostly commercial entities whose investments are mostly driven by economic gains. 'Other' means of increasing motivation include funding for research, providing training, increasing scientific knowledge for dam removal, and helping to have a balanced consideration of social, economic and environmental needs.

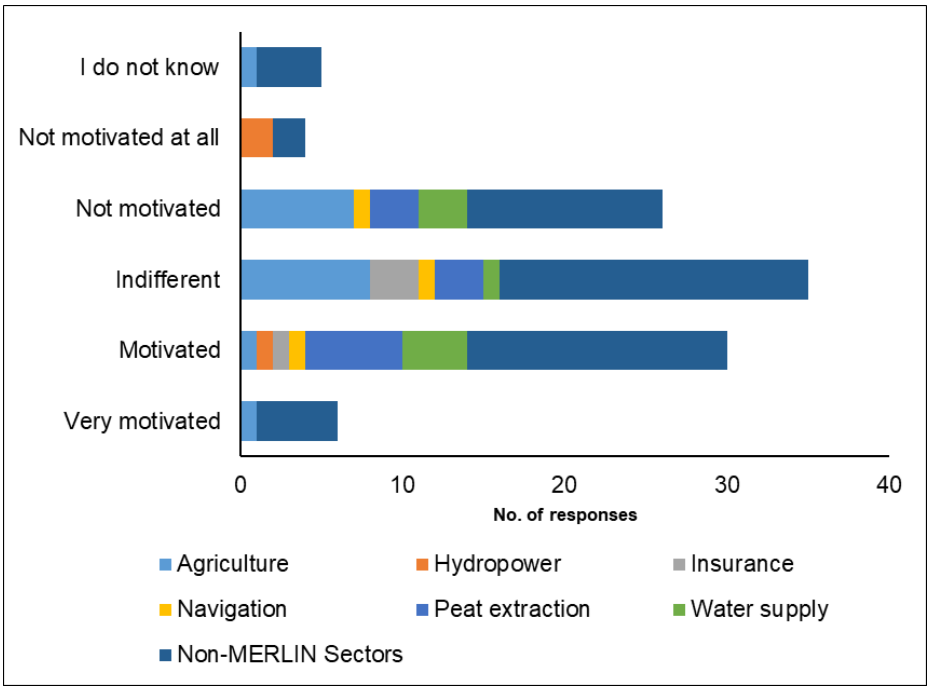

Figure 13: There are mixed views about the economic sectors' motivation to support NbS (n=106)

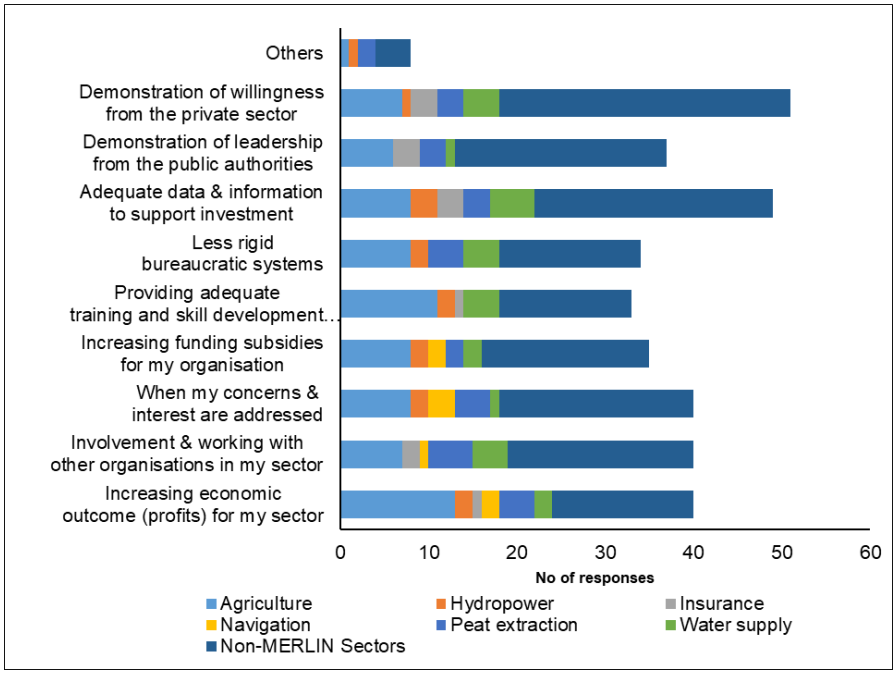

Figure 14: Respondents selected ways to increase the motivation of stakeholders (n = 105, each respondent could make multiple selections)

The final question in this section was to understand how economic sectors could support the mainstreaming of NbS. We asked that ***"Which of the following measures for mainstreaming nature-based solutions for restoration are likely to be supported by economic sector organisations?"*** (Figure 15). The four measures selected most were 'financing' (n = 52, 50%), 'building network and collaboration' (n = 52, 50%), 'training, research and knowledge and development' (n = 51, 49%) and 'developing guidelines' (n = 44, 42%). At least four respondents from the agriculture sector and three from the peat extraction selected all the measures. Despite these encouraging responses, the motivation of the economic sectors needs to be strengthened before such support can occur.

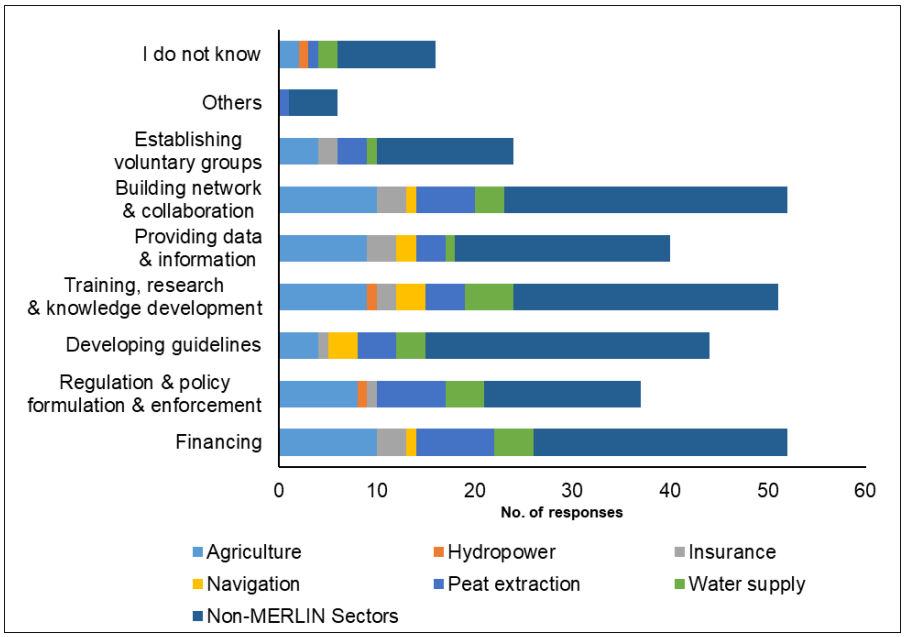

Figure 15: Measures that could be supported by economic sectors to mainstream NbS (n = 105, each respondent could make multiple selections)

4.5 Challenges, opportunities and policies for undertaking NbS

The final group of questions aimed to understand the challenges and opportunities for mainstreaming NbS and supporting transformation. The views regarding existing EU policies, conflicts between sectors, and innovative financing mechanisms were also collected.

4.5.1 Challenges to mainstreaming NbS and conflicts between sectors

Regarding the challenges, we posed a question with 11 types of challenges: ***What do you think are the major challenges to undertaking or supporting freshwater restoration using nature-based solutions?*** Please select all that apply. The challenge selected most is 'balancing the economic, social and environmental needs' (80), which is more than 70% of respondents who answered this question (Figure 16). This challenge was selected most (n = 38, 78%) by respondents in the six MERLIN economic sectors, with the peat extraction sector (n = 12, 100%) having the highest selection rate. The second most selected challenge, including the non-MERLIN sectors, was 'inadequate (lack of) knowledge, experience and data, and uncertainties about the outcomes' (69, 63% of respondents). This challenge was also the second most (n= 33, 66%) selected option by the combined six MERLIN economic sectors: about 80% and 75% of the respondents in the agriculture (n = 16) and peat extraction (n = 9) sectors, respectively, selected this option. It is quite surprising that 'inadequate (lack of) knowledge, experience and data, and uncertainties about the outcomes' is highly viewed as a major challenge, given that the respondents were generally confident (Figure 12) in the ability of NbS to help address the range of societal challenges in their sector. This finding showed that despite the awareness of the societal challenges and potential of NbS, further evidence and demonstration of benefits to the economic sectors specifically is required. The finding also aligns with view that the providing data to support investment would be key to increase the motivation of the economic sectors (see Figure 14).

Other challenges with a high selection rate across all the sectors include 'enhancing sectoral collaboration and coordination' (n = 67, 61%) and 'capturing the needs of all stakeholders and addressing conflicts' (n = 63, 57%). Those who selected 'other', mostly from the non-MERLIN sectors (n = 7), highlighted vital challenges such as *"lack of entrepreneurial mindset where grant addiction is the norm", "building landowner trust", and "social pressure biased to grey solutions".* A respondent highlighted there is *"lack of coherence, inconsistencies between state and EU subsidy schemes. The schemes can work against each other".* These responses partly concern conflicts and the potential trade-offs required to mainstream NbS.

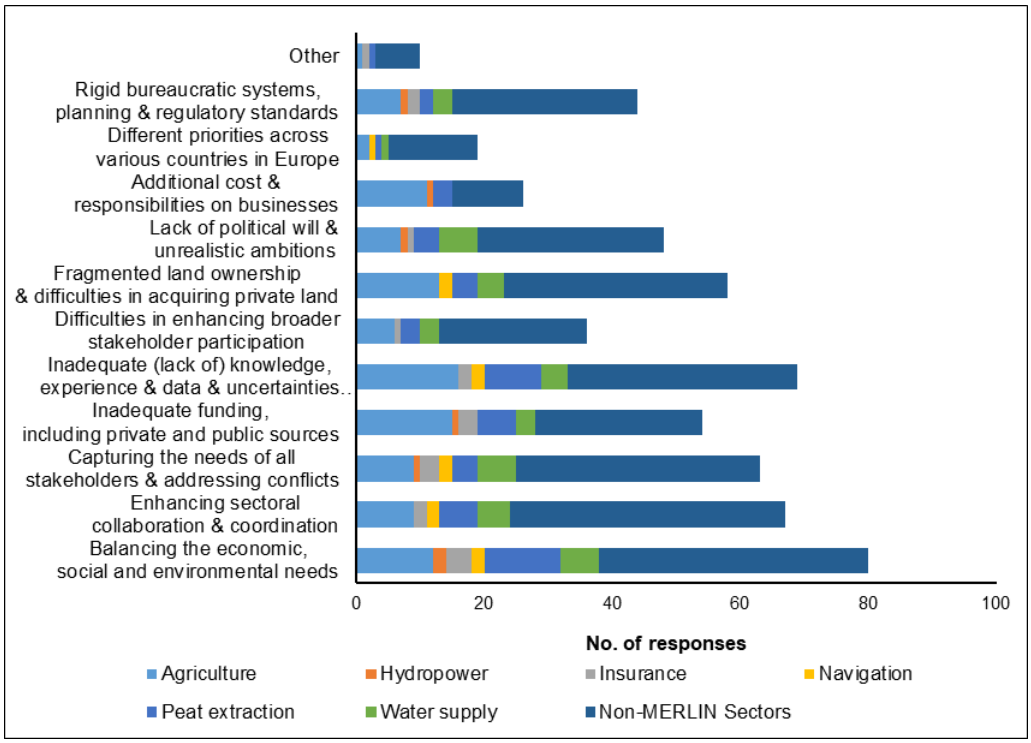

Figure 16: Major challenges to undertaking or supporting freshwater restoration using nature-based solutions (n = 110, each respondent could make multiple selections)

With specific interest to understand the **conflicts** between the six MERLIN selectors, we asked that ***Sometimes, restoration can create conflicts with another sector. Please tick any sector(s) below with whom your sector might experience conflict when implementing nature-based solutions*** *(Figure 17).* The agriculture sector was selected most (74, 70% of respondents), followed by hydropower (44, 42% of respondents) and water supply (32, 30%). A major proportion of respondents from non-MERLIN sectors (n = 44, 83%) viewed that implementing NbS by the agriculture sector may have conflicts with their sectors. For the six MERLIN economic sectors, respondents in the peat extractions sector (n = 10, 91%) selected the agriculture sector the most. In contrast, the respondents in the agriculture sector identified water supply (n = 8, 44%) and hydropower (n = 7, 39%) sectors as most often in conflict with their sector. Some respondents selected the same sectors that they belong to as having conflict (e.g. 8 (44%) of agriculture respondents). Overall, only eight respondents (8%)) selected the insurance sector as having conflicts with their own sector. Outside these sectors, some respondents specified that their sectors have conflicts with forestry, real estate, land use, mining and infrastructure development.

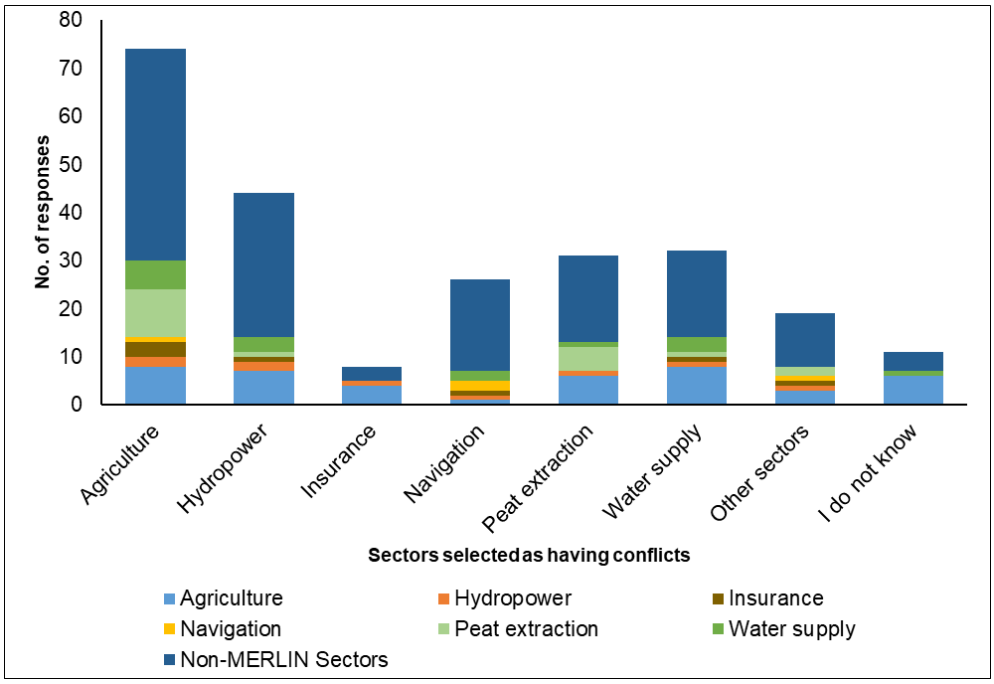

Figure 17: The sectors that may experience conflicts with different sectors when implementing nature-based solution (n = 105, each respondent could make multiple selections)

To understand how the respondents interpret or perceive the conflicts arising between sectors due to NbS, we asked them to ***'explain the kind of conflict that exists with the selected sectors'***. The respondents mostly viewed the conflicts in terms of how NbS may negatively affect another sector rather than direct conflicts between different economic sectors[3]. Regarding **conflicts with the agriculture sector due to NbS implementation**, the issues raised concern how addressing environmental challenges with NbS could negatively affect agricultural activities. For instance, a respondent from the peat extraction sector noted that *"raising water level [e.g. through rewetting] will make agriculture usage impossible/more difficult and destroy infrastructure (e.g. streets)"*. This view arose from the notion that NbS in the peat extraction sector is in the form of rewetting, which may not necessarily be for the benefit of agriculture, which focuses on draining water and farming in wetlands. Another respondent (also from the peat extraction sector) corroborated this view that *"the common practice of agricultural usage cannot be continued upon peatland restoration"*. A respondent whose sector was specified as 'aquaculture' detailed these issues as follows:

> *Agriculture, in particular in arid zones, needs a minimum quantity of water to ensure production. At the same time, other water uses are equally needed. Therefore, a conflict on the water use, and in quantity and quality needs to be achieved [may occur]. Peatlands are also a very productive area. A balance is also needed.*

Some respondents perceive the conflicts in terms of impacts of NbS on income generation and livelihood of farmers. For instance, a respondent (whose sector was specified as forestry) noted the potential *"loss of the area available for agriculture when reafforesting these areas"*. Another respondent explicitly noted that there is *"pressure on costs and profits"*, which pushes *"farmers often take unsustainable risks, e.g. slurry disposal; abuse of inorganic fertilizers and pharmaceuticals"*. Obviously NbS may not support such practices given their negative environmental consequence, which could increase the cost of production if NbS does not offer cheaper alternative means of farming.

Similar to the latter views about the agriculture sector, some respondents perceived the potential conflict with the **hydropower sector** in terms of the impacts of NbS in other sectors on income generation and the continuation of hydropower activities. A respondent (whose sector was specified as environment) stated that *"Dam removal reduces hydropower opportunities"* while another respondent noted that *"hydropower companies have understanding only for profit and do not care about biodiversity or nature"*. Also, a respondent whose sector was specified as fish habitat restoration stated that *"Hydropower do not want to change for economic reasons"*. These views do not explicitly explain how NbS could negatively affect the economic gains of the hydropower sector. However, they insinuate that conservation sectors that advocate for dam removal or

[3] There was no specific description of the conflicts with the insurance sector.

undertaking NbS for biodiversity purposes need to balance their environmental goals with economic interests of the hydropower sector.

For the **water supply sector,** the respondents perceive the potential conflicts based on the varying interests that the sectors have in water extraction as well as the potential deprivation that could be suffered by other water-depended sectors due to NbS. For instance, a respondent specialized in 'river basin management and planning' stated that NbS may lead to the free flow of rivers, which is beneficial to land management. In contrast, the respondent noted that *"conflicting water needs of various sectors and stakeholders multi economical use of longitudinal river"* may result in applying physical structures that interrupt the flow of rivers. While the respondent did not mention the specific sectors, there is a concern that the use of conventional physical infrastructure for water supply impedes the natural ecosystem. Another respondent specialized in water supply perceives the conflicts as the negative impacts of NbS on both water supply as well as navigation and agriculture:

> *Restoring the natural rivers, and increasing upland water retention can affect the navigability of rivers and decrease the water availability that can be used by agriculture and water supply companies*

The perceived **conflicts with the peat extraction sector** include the potential incompatibility of NbS with peat extraction, the benefits of peat extraction and potential economic losses if NbS results in ceasing peat extraction. A respondent indicated that *"Peatland restoration is not compatible with peat extraction and many forms of agriculture"*. Another respondent stated that *"peat extraction requires drainage, but restoring nature in the bog means raising the water level. There is automatically a contradiction."*. These views were shared by respondents who belong to the peat extraction sector. While these views did not account for the fact that restoration of peat extraction sites mostly occurs after extraction on peatland ceases, they indicate that NbS implementation on extraction sites cannot occur simultaneously with extraction.

Other respondents are concerned with the impacts of undertaking NbS on other sectors, such as aviation and agriculture. Regarding aviation, a respondent specialized in wetland restoration stated that *"airports are not willing to accept constructed wetlands close to them. They fear that constructed wetlands might attract birds (Yes, I know that big restored wetlands also attract birds)"*. This concern shows that the location of peat extraction activities and the subsequent restoration may be contested in other commercial and non-water-dependent sectors. In relation to food production and agriculture, a respondent stated that *"Restoring floodplains and peatlands could affect land availability for food production or peat mining - although the latter is probably minor"*. This view corroborates the concern in the agriculture sector that certain agricultural practices may be obstructed following NbS implementation.

Perceived **conflicts with the navigation sector** considered impacts on the navigability of waterways and financial and non-financial costs of undertaking restoration with NbS generally and in other sectors. A respondent in the insurance sector mentioned that *"natural river courses are harder to navigate and predict and need compromises from the navigation sector"*. This view indicates that the insurance sector undertaking restoration along waterways may raise concerns for the navigation sector. In a similar view, a respondent from the navigation sector highlighted the potential conflict between the navigation sector and conservation sectors, which is difficult to trade-off:

> *In addition, I regularly see that nature organisations do not sufficiently consider the indirect consequences. If transport by water is frustrated, there will be more use of the roads and that will affect air quality. There are complex and conflicting interests that are not easy to resolve. No decrease in drought and preventing the river from becoming uneven and erratic are the most important points for profitable inland navigation and safe navigation. There are almost no natural solutions that can guarantee no decline on these points.*

The perceived conflicts highlighted across all the sectors point to a potential lack of knowledge and mistrust of economic sectors about public authorities, NbS or the activities of the sectors, despite the sectors previously indicating their awareness and confidence in NbS' potential to address water-related and other socio-economic challenges. These issues could lead to opposition to NbS or opposition to the sectors' activities. For instance, one respondent from the hydropower sector stated that *"Lack of knowledge about the benefits of dam removal (by local stackers) [sic] and mistrust of public administrations promotes opposition to dam removal."* In contrast with this view, another respondent said that dam removal limits the opportunity to generate hydropower. There are other contrasting views not necessarily due to the mainstreaming of NbS but concern how the sectors operate and the sectors that should be responsible for water-related and environmental challenges. For instance, a respondent from the peat extraction sector explained that issues regarding greenhouse gas emissions are the results of agricultural activities:

> *By far the majority of GHG emissions are due to agriculture and this is particularly the case in tropical peatlands. Without a solution to this use, a solution to the problem will not be achievable. GHG emissions from the horticultural use of peat in growing media are comparatively negligible. The paludiculture approach could be a solution. However, as it is far from being economically viable, it has failed to be implemented so far.*

Another respondent whose sector was not specified stated that

> *Effects of peatland use on water quality are not solely a product of the peat extraction activities but other inputs from the watershed (silvi and agriculture) can amplify adverse effects. The involvement of all of these watershed activities is needed to make lasting changes.*

These views are important indications of the potential conflicts, trade-offs and trust issues that could emerge from initiating transformative actions and mainstreaming NbS within the economic sectors. Perhaps, they explain why the respondents selected major challenges such as (see Figure 16) 'balancing economic, social and environmental needs', 'difficulties in enhancing sectoral collaboration and coordination, and 'difficulty in addressing the needs of all actors. The results suggest that balancing sectoral needs will be vital for sustainable economic activities to coexist with a healthy environment and human well-being. A respondent specialized in aquaculture highlighted this need:

> *In current uncertainty of climate conditions and patterns, water becomes more than ever a valued resource. Many economic activities depend on it. Therefore, to ensure sustainable businesses, a healthy environment and human development, we need to ensure that water is maintained, used and persevered in an optimal balance.*

4.5.2 Opportunities for mainstreaming NbS

Despite the challenges to mainstreaming NbS, some opportunities could be pursued to address the challenges and enable NbS implementation. The respondents were asked to select **the top-three opportunities that can enable mainstreaming of freshwater restoration using nature-based solutions in Europe**. Some of the answer options contained a text box for the respondents to explain and provide examples. As shown in Figure 18, the top three opportunities are 'increasing knowledge of environmental challenges' (62, 61% of respondents), 'acceptance and support from local communities' (51, 51% of respondents) and "new European projects to connect currently disconnected actors" (42, 41%).

These were the most selected opportunities within the six MERLIN economic sectors. It is not surprising that 'increasing knowledge of environmental challenges' was selected most because the water-related challenges in Section 4.1 concern environmental issues that are being experienced globally. Although there was no explanation of the specific European projects to connect actors, some of the projects highlighted in Section 3.2 (e.g. LIFE, EuPOLIS project, RECONNECT, NAIAD, etc.) offer such opportunity because they involve a range of actors. MERLIN is an example of such opportunity as a community of practice involving industry actors is being created.

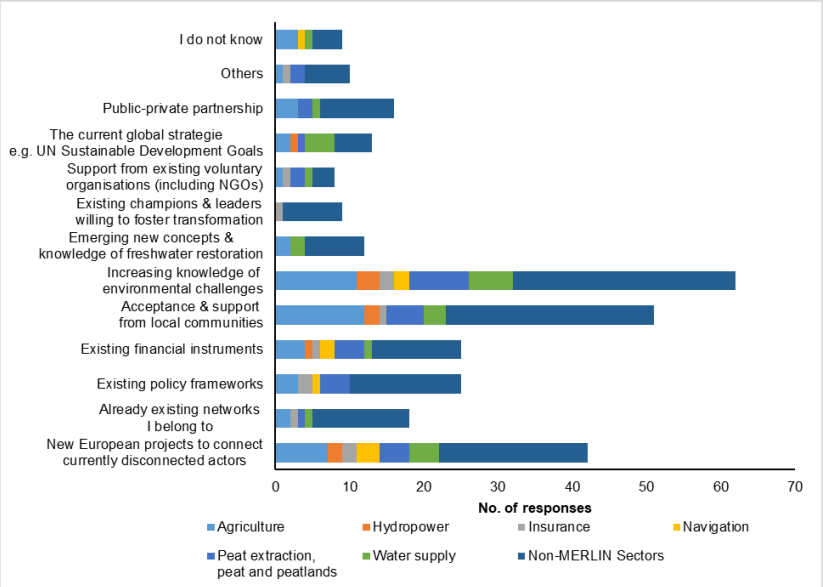

Figure 18: Respondents' choices of the top three opportunities to mainstream NbS (n = 101, each respondent could select maxim of three options)

Additional opportunities that could support NbS include the 'existing policy frameworks', 'existing financial instruments' and 'already existing networks I belong to'. Examples of existing policy frameworks include the Water Framework Directive (WFD), the EU biodiversity strategy 2030, the forthcoming Nature Restoration Law and Habitat 2000 network. Despite the opportunities offered by these policies, the respondents highlighted some weaknesses, which are presented in Section 4.5.4.

For 'already existing networks I belong to', a respondent provided a link to EcoShape, which contains a list of networks and partners. The partners include Wetland International, the European Union Regional Development Fund and the Nature-based Solutions Initiative. Networks such as Finland's Water Restoration Network and French Association for the Prevention of Natural and Technological Disasters (AFPCNT) are country-specific networks that could be useful at the country-level transformation. For the six MERLIN economic sectors, the networks listed include the National Farmers Union of Scotland (Agriculture), NABU Germany (Peat extraction), Spanish DG for Water and Basin Authorities (Insurance) and NbS Task Forces (Water Supply). The suggested examples for 'existing financial instruments' are discussed in section 4.5.3.

4.5.3 Financing of NbS

With a focus on innovative funding, we asked the respondents ***which financing mechanisms do you see as having the most potential to support implementation of restoration in their sector***. 'Subsidies' was selected most (n = 53, 50%), followed by 'Payment for Ecosystem Services' (n = 51, 49%). Both options were selected by 62% and 54% of all respondents in the six MERLIN economic sectors. Thus, on average, the six MERLIN economic sectors consider subsidies as the best funding option compared to the respondents in non-MERLIN sectors. In particular, the agriculture sector mostly favours these options, having between selected by 13 (72%) respondents, respectively. While 'grant' was the third most selected mechanism (40, 38%) in all the sectors, the 'carbon credits' emerged as the third option in the six MERLIN economic sectors.

Those who selected 'others' highlighted mechanisms such as 'compensations due to economic losses of restricting cultivation', 'one-time payment and land swap', 'insurance or pre-disaster funding for at-risk in-stream structures' and 'refundable grants.' A respondent whose sector was specified as 'investments' suggested a range of funding mechanisms such as *"crowdfunding, corporate sponsorship, mutual guarantee, lean financing, engaging local communities to support with people and machinery the restoration activities"*.

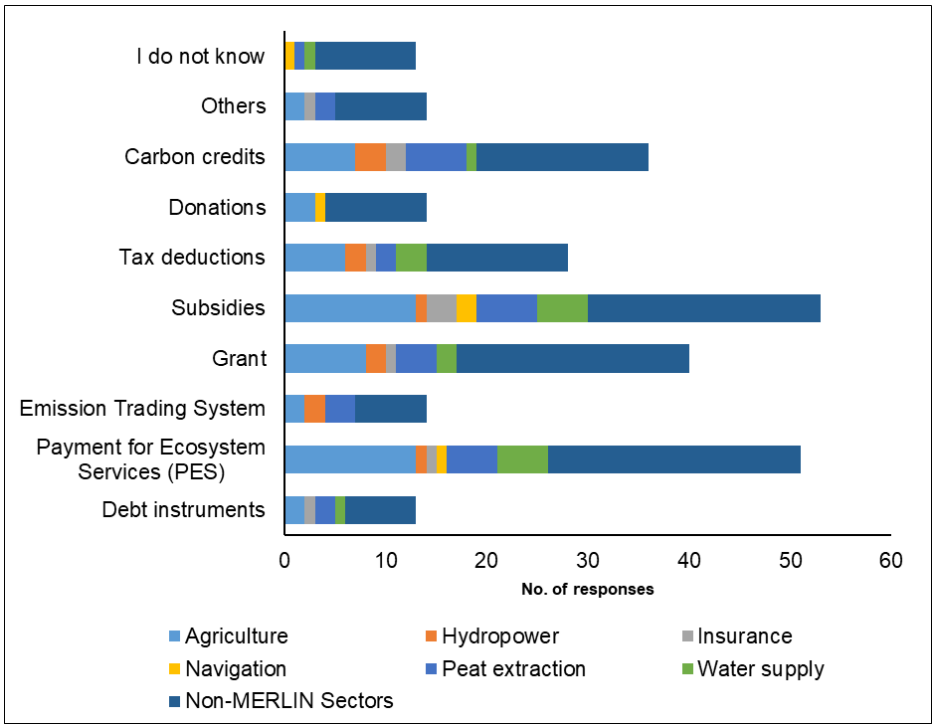

Figure 19: Financing mechanisms with most potential to support the of restoration in the sector (n = 105, each respondent could make multiple selections)

The view on financing aligns with responses on the 'existing financial instruments' in Section 4.5.2. The suggested instruments for the agriculture sector include Common Agriculture Policy (EU-wide) and Agri-Environment Climate Scheme (AECS) (Scotland). In the peat extraction sector, examples could include compensation areas, a pool of funds from different department sectors for NbS that benefits multiple sectors,

voluntary climate compensation (financed by the industry) and CO_2 tax. In non-MERLIN sectors, examples cited were mostly public financing, including EU Horizon 2020 and national funding. A respondent stated that "state financing works best". The respondents did not explain these financing mechanisms. Hence, they should be explored further for their feasibility.

While the suggested financing mechanisms are opportunities to address the funding challenges, it appears that the sectors highly regard grants and public subsidies, even within the economic sectors. These mechanisms align with traditional financing, which may not align with innovative and transformative funding approaches such as those spearheaded by the private sector. As it will be presented in Section 4.5.4, some respondents believe that some subsidies – for farming and hydropower – may promote harmful activities or impede the adoption of an NbS. A respondent cautioned that the priority funding mechanism is *"simply stopping harmful subsidies"*. To depart from the overreliance on traditional public funding, one respondent (peat extraction) suggested a mixture public and private finance options, including the ability of the private sector to buy and invest in ecosystem services.

4.5.4 Views on existing policies

The final part of the survey was asking the respondents (through an open-ended question) for their views regarding the existing policies and frameworks linked with aquatic nature-based solutions, indicating 3 examples of policies, their strengths and weaknesses. The responses mostly focused on weaknesses instead of strengths (Table 1). As shown in Figure 20, these weaknesses include the lack of focus on NbS; inadequate subsidies and funding for NbS; lack of evidence and knowledge regarding NbS impacts; and policies being voluntary. For the lack of focus on NbS, key policies highlighted were the Water Framework Directive (WFD) and the Common Agriculture Policy (CAP). Although respondents noted that the WFD has strengths such as being mandatory and having the potential to promote a sound ecological practice, some respondents think that it does not prioritise NbS. A respondent corroborated this view by highlighting that the WFD is "not geared towards NbS", while another mentioned about the CAP and other policies that:

> *"Policy areas like flood protection, CAP, forestry are hugely going against nature and water conservation. Decision makers come from a culture of concrete."*

Linked with this weakness is 'inadequate subsidies and funding for NbS'. One policy highlighted was the CAP because it provides subsidies to farmers but not subsidies for NbS. Hence, these respondents feel there is no economic incentive for farmers to practice NbS. A respondent noted that *"Agricultural policies generally do not incentivize, in many cases financially, legally"*, while another stated that *"Farming subsidies are not strong enough on remedial works"*. Thus, the respondents suggested there is generally a lack of public funding to implement NbS.

Figure 20: Major policy weaknesses categorized based on the views of respondents

Table 1: Strengths and weaknesses of policies identified by respondents

Policies identified	Strengths	Weakness
WFD	→ Monitoring ensured → Promotes sound ecological measures → Good for hydro-morphology → Mandatory → Long-term focus	→ No good link with stakeholders in the definition of RBMPs → Lack of knowledge on impacts → Does not prioritize NbS → Still option for building dams → Not up to date → Lack of political will to support NbS implementation → Lack of social and local knowledge to support implementation of NbS
Common Agriculture Policy → Environmental land management schemes (UK)	→ Helps farmers across Europe → Environmental land management schemes reached political agenda	→ No subsidies for NbS as economic incentive for farmers → Conflicting with biodiversity strategy and environmental regulations → Working against nature and weak efforts of NbS targets
Green Deal	→ Clear objectives	→ Unreliable economic model
Flora-Fauna-Habitats guideline (FFH)	→ Focus on conservation status	Not flexible
Natura 2000, Birds and Habitat Directive	→ Ensures protection of nature and limits economic developments that do not consider natural values	→ Too rigid under changing climate → Habitat Directive lack political will to support NbS implementation → Habitat Directive does not consider social knowledge to support implementation of NbS
Basque Country's Nature conservation Law	→ Clear objective and demanding	→ Lack of political will to support NbS implementation
Framework Agreement on Sava River Basin a	→ Enables cooperation between countries	→ Not compulsory
EU Biodiversity Strategy	→ Supportive	→ EU Biodiversity Strategy
EU Adaptation Strategy	→ Supportive	→ Voluntary, not compulsory

Other respondents indicated that the government promotes the sector's activities through subsidies even though such subsidies contrast with the idea of mainstreaming NbS. For instance, a respondent who specializes in 'stream ecology' stated that sectors such as hydropower, navigation and agriculture are granted unfair and unsustainable water allocation because their needs are prioritized over biodiversity. This concern is shared by another respondent whose sector is hydropower:

> *In the Basque Country, the installation of hydroelectric power plants in small dams has been an activity heavily subsidised by the Government. Its publicity in terms of green energy has been publicised [sic]. The owners of the plants and a large part of the society do not understand anything about their strong environmental and social impact. On the other hand, the demolition of small power plants is a source of conflict and opposition to their decommissioning. There is a lack of knowledge about their negative impact and resistance to change*

For 'lack of evidence and knowledge regarding NbS impacts', no specific policy was cited. However, the respondents noted that the policies are framed without evidence regarding their economic outcome or their environmental impacts. This concern was stressed in the peat extraction sector. For instance, while a respondent noted restoration of old peat extraction areas is recognized within regional strategies in the case of Finland, that respondent is concerned about the lack of evidence.

> *However, there are no actual measurements or studies [about] how fast these areas could be peat producing systems (positive carbon sequestration) or what are side effects (e.g. negative impacts on water bodies). This means that policy actions have been done without true evidence.*

On the issue of *'some policies being voluntary and not stringent'* specific policies highlighted were EU Biodiversity Strategy and EU Adaptation Strategy. A respondent acknowledged that these strategies are

supportive but was concerned that they are voluntary. Other respondents noted that the existing policies are generally not strict, and in many cases lack long-term focus.

Other issues raised include inadequate education and stakeholder engagement. A respondent noted that the biggest policy issue is the *"lack of societal engagement"* regarding NbS. For this respondent, the NbS concept is only common in the *"science-policy nexus"* rather than broader stakeholders. According to this respondent, this weakness could be addressed by engaging with actors such as companies and NGOs who are less informed about the current environmental conditions and NbS.

In contrast to the view that policies are not very strict, some sectoral respondents thought that current policies [discussions] supporting NbS are rigid and unable to balance the needs for NbS with economic goals. This view, which emerged from the peat extraction sector implies that NbS might not always be the singular solution, hence, the need for flexibility and consideration of other alternative measures. A respondent stated that:

> *NbS might not be always good solutions for peat extraction cases. Increasing renewable energy such as wind power is part of policies in Finland. Some old peat extraction areas could be suitable for renewable energy fields.*

Despite the weaknesses, some strengths were identified. For instance, despite the concern that the policies are working against nature, some policies are gradually recognizing NbS. In particular, the Natura 2000 was viewed as protecting natural values by limiting the development of economic activities in natural areas. Also, a respondent considers the Green Deal as having clear objectives despite not having a reliable economic model. In contrast to the Green Deal, the WFD was viewed as enabling the application of a good economic model to address ecological challenges. In response to the opportunities for NbS in section 4.5.2, a respondent highlighted the opportunity offered by the WFD as follows:

> *The WFD provides a comprehensive assessment of water quality framework and river basin management plans, provide the framework for implementation of NbS. I do not believe that more regulation is required. Rather the effectiveness of RBMPs should be improved. To achieve this a better integration of local stakeholders and their interests in needed.*

This view shows that the respondents have varying opinions regarding the policy weaknesses and strengths depending on their interests. Thus, some respondents consider certain EU policies as limitations to NbS, while a few respondents view such policies as adequate in terms of their support for nature. Nevertheless, the varying views set the basis for further discussions to ensure the NbS is effectively mainstreamed in relevant policies while balancing the interests of different sectors.

The respondents provided suggestions to address the policy weakness. For instance, a respondent stated the need to increase education and *"Bringing together the views of different actors and eliminating unnecessary legislation"*. On the issue of policies not being strict, a respondent highlighted the need to ensure that policies are clear and obligatory. This view relates to the peat extraction sector: "*Peatland rewetting must be obligatory, Paludiculture must be funded, Peat extraction cannot be allowed after 2050 (climate neutrality), but this is not clear in the Baltic countries".*

5 Summary of findings: Lessons for mainstreaming of NbS

In MERLIN's work package 4, transformation considers how society (including policy, business and the public) might need to change significantly to enable the restoration of freshwater ecosystems using NbS. Such change involves creating, strengthening, and/or disrupting political, personal and practical elements of societal actors (including those focused on economic objectives) to mainstream NbS. Based on the questionnaire findings, the following section highlights the key themes and lessons for mainstreaming nature-based solutions. The specific lessons for MERLIN Work packages and related-activities are highlighted using boxes.

5.1 Strong acknowledgement of societal challenges and the need for NbS

Overall, the respondents acknowledge the range of water-related and socio-economic challenges faced by the range of economic sectors. The water-related challenges include 'pollution and degraded water quality', 'too little water (which poses flood risks', 'loss of connectivity between various elements in the water environment, and 'too much water (which poses flood risks)'. Apart from 'loss of connectivity between various elements in the water environment', these challenges were highly acknowledged across the six MERLIN economic sectors. In addition to the water-related challenges, certain socio-economic challenges concern the sectors. These include pressures on land uses, pressures on profit margins and conflicting interests in land.

Relevance of findings on societal challenges to MERLIN: IUCN Global Standards for NbS

The first IUCN criterion for implementing NbS is that 'NbS effectively address societal challenges'. This criterion requires the integration of the most significant societal challenges into NbS projects.

- → The challenges identified in this study encompass most of the IUCN categorization of societal challenges, such as climate change mitigation and adaptation (e.g. too much water and too little water), environmental degradation (e.g. pollution and loss of connectivity) and economic development (e.g. pressures on profit margins).
- → MERLIN case studies could prioritize these challenges. However, the actual contexts of these challenges may vary across case studies depending on local environmental conditions. Hence, they should be analysed further and framed to suit the local context. An analysis of the challenges aligns with the IUCN requirement that the challenges are clearly understood and documented.
- → Finally, the responses show that respondents are concerned about other socio-economic challenges, including pressures on profit margin, pressures on land use, and climate effects on food production beyond water-related issues. Consequently, these challenges should be considered while ensuring that NbS linked with improving human wellbeing.

There is also a strong recognition that these challenges affect businesses, and a shift towards NbS is needed. Moreover, the respondents are generally confident that NbS could help to attenuate most of the societal challenges.

5.2 High confidence in NbS but mixed views about motivation to support NbS

Successful NbS projects depend on adopting the appropriate NbS elements based on the challenge faced (Croeser et al., 2021). Uncertainty is also a notable barrier to mainstreaming NbS (Dorst et al., 2022; Raymond et al., 2017). The findings show that there is generally high confidence in the ability of NbS to help to address societal challenges. While the range of NbS being considered by MERLIN were acknowledged across all the sectors, some respondents, particularly from the six MERLIN economic sectors, are indifferent about the ability of NbS to address these challenges. Some respondents contend that NbS should be tailored towards the challenge being addressed. Hence, blended NbS may be required, in some cases, instead of a single NbS.

Implications of motivation of sectors to transformation

An important aspect of transformation is understanding the system when initiating actions for transformation (Palomo et al., 2021; Wolfram, 2016). Motivation is a 'personal' attribute that helps to understand the willingness of actors to support NbS. The finding is not clear whether or not the economic sectors are motivated to support NbS. However, it indicates that actions are required to increase and strengthen motivation of the actors as part of gathering momentum for transformation. The

respondents acknowledge the possible ways to increase the the motivation of the economic sectors. Based on the results, such actions include but not limited to the following:

- Demonstrating that NbS can increase the economic outcome or profits for the economic sectors.
- Providing adequate and appropriate data and information to support investment in NbS.
- Providing adequate training and skill development for organisations: This could be in the form of training on how to combine societal challenges in NbS, developing skills on the innovative funding approaches, and evaluating the NbS benefits.
- Demonstration of willingness from the private sector and working with other organizations within the same sector.
- Appropriately addressing the concerns and interests of the economic sectors.

These suggestions have implications for all the work packages in MERLIN:

- Work packages1 and 2 could demonstrate how NbS increases the economic outcome for organisations through cost-benefit analysis as required by the IUCN criterion 4, economic feasibility.
- Work package 3 should continue assessing and providing information about the innovative funding approaches for NbS.

Work package 4 could examine how to create and strengthen the various approaches for increasing motivation across Europe. In particular, the cooperation points with the economic sectors need to consider how to expand the community of practice beyond the organisations already engaged to ensure that the motivation is widespread.

Despite the confidence in NbS, there were mixed views regarding the motivation of the economic sectors to support NbS. While some respondents suggest that the economic sectors were motivated, the majority think that economic sectors are either indifferent or not motivated. It is not clear whether the respondents were thinking about the description of economic sectors in the questionnaire when they responded. However, the finding indicates a lack of trust between NbS advocates who think that economic sectors are only concerned about economic gains and the respondents who are concerned about the potential impacts of NbS on their businesses. Section 5.3.1 highlights the potential tradeoffs implied by this finding.

5.3 Challenges and conflicts for mainstreaming NbS

There is recognition of the challenges to the mainstreaming of NbS. Notable challenges include:

- Balancing the economic, social and environmental needs.
- Inadequate (lack of) knowledge, experience and data, and uncertainties about the outcomes.
- Enhancing sectoral collaboration and coordination.
- Capturing the needs of all stakeholders and addressing conflicts.
- Inadequate funding from both public and private sources.

These are challenges also stressed in the literature(Cortina-Segarra et al., 2021; Dorst et al., 2022; Raška et al., 2022). Overcoming these challenges will not be easy. Hence, transformation will require taking profound measures to overcome these challenges. Such measures include strengthening stakeholder engagement; adopting integrated approach; piloting NbS measures; investing in data acquisition; and exploring innovative funding schemes for NbS.

5.3.1 Perceived Conflicts

Some of the challenges, including 'balancing the economic, social and environmental needs' and 'capturing the needs of all stakeholders and addressing conflicts' **relate to the issue of conflicts.** The agriculture sector was seen as having conflicts with sectors such as peat extraction, water supply and non-MERLIN sectors. Despite the selection of these sectors as having conflicts, it appears that the respondents have different interpretations of conflicts. In most cases, they interpreted conflicts as the negative impacts of NbS on another sector or the impacts of sectors' economic activities on the environment. Hence, the perceived conflicts were not necessarily about direct tradeoffs between the different economic sectors.

The IUCN criterion 6 requires balancing tradeoff

The different views reinforce the uncertainties about the motivation of the economic sectors in section 5.2. They highlight the different perceptions, expectations and contrasting views related to NbS despite the high confidence in the ability of NbS to address the range of water-related challenges.

- While these are relevant concerns, they offer the opportunity to frame NbS in a way that balances tradeoffs as per the IUCN criterion 6. The criterion requires acknowledging and managing tradeoffs effectively and transparently.
- In WP4, there is the opportunity to further engage the economic sectors about these potential tradeoffs and how they could be addressed. It is also relevant to create and strengthen measures, such as education, networks and coordination.
- Also, experimenting with innovative approaches for NbS to co-exist with the needs of diverse sectors will be vital. These suggestions are not conclusive; hence, additional strategies should be explored.
- The case studies in WP1 could provide lessons about their experiences and how they balanced tradeoffs between different stakeholders.

For instance, in the agriculture sector, the concern is that rewetting peatlands may impede agricultural activities requiring drainage. The navigation sector is concerned about the possibility of NbS leading to sedimentation, which could affect the navigability of waterways, while the hydropower sector is concerned with the impacts of dam removal on hydropower generation. A concern that cuts across all the sectors is the potential impact of NbS implementation on income generation of the economic sectors and land availability for economic activities. In contrast to these views, respondents from non-MERLIN economic sectors, particularly nature conservation, believe that economic sectors are mostly concerned about economic gains while neglecting the impacts of their actions on the environment.

5.3.2 Financing of NbS and policy issues

Like conflicting interests, finding financial resources to implement NbS is one of the barriers to mainstreaming NbS (Cortina-Segarra et al., 2021; Mayor et al., 2021). The survey results underpin this concern. While various funding options were acknowledged, there is still the impression that respondents highly value grants, subsidies and other public funding schemes. Overreliance on public sector funding may not be transformative – to act at scale and at pace – as true transformation will require innovative approaches to finance. Other finance mechanisms, such as ecosystem markets (Reed et al., 2022), could be explored and integrated into the current funding options.

Acquiring multiple funding sources for NbS and implications for MERLIN

The report does not imply that public sector finance is not important. However, it is well-known that public financing is currently inadequate to implement NbS at the required scale. Meanwhile, the economic sectors only undertake restoration, if any, in their sites of operation as they are not responsible for implementing NbS at the landscape scale. Hence, there should be a sufficient economic incentive for the private sector to implement NbS at the landscape scale using private finance. Although the nature of such incentive is unclear, the ongoing work in WP3 could provide vital information about how to make NbS a business venture and attractive to the private sector.

There are also concerns regarding the **suitability of existing policies** in supporting NbS. These concerns include but not limited to:

- The lack of focus on NbS.
- Policies do not have adequate funding and sound economic models for NbS.
- Some the policies are not obligatory and only implemented on voluntary basis.
- Lack of evidence or data-driven policies: Hence, there is the need to monitor and evaluate NbS outcomes to enable policies to understand the extent to which NbS could be helpful.
- Inadequate training and lack of stakeholder engagement.

Due to these policy gaps, it may be relevant to consider how existing policies align with NbS and are coherent across sectors. There could also be specific policies that are dedicated to NbS across all sectors. These policies should be based on sound evidence regarding the impacts of economic sectors on freshwater ecosystems and

how to balance the ensuing tradeoffs. In addition, while the flexibility of policy implementation is important, policies could have legally binding targets to facilitate the application of NbS by all sectors.

5.4 Opportunities for mainstreaming NbS

Despite the range of challenges, some opportunities could be strengthened to support mainstreaming of NbS. Top three opportunities acknowledged include:

- Increasing knowledge of environmental challenges
- Acceptance and support from local communities
- New European projects to connect currently disconnected actors

Existing opportunities are to be maintained and amplified as part of transformation

Maintaining activities of transformation includes strengthening and replicating existing good practices and norms. Hence, the main opportunities could be maintained profoundly as part of the transformation process.

- Increasing knowledge of environmental challenges: Knowledge per se may not lead to transformation (Bark et al., 2021; Löhr et al., 2022). However, the stakeholders fully appreciate the environmental challenges and the need for a shift, which could facilitate the acceptance of NbS. Maintaining knowledge implies expanding the knowledge beyond the experts to include a range of stakeholders, such as communities. Moreover, knowledge could be expanded beyond the mere awareness of NbS to include demonstrating co-benefits arising from NbS to address the uncertainties and lack of trust among the actors.
- Acceptance and support from local communities: Local communities' willingness to accept NbS could help to leverage communities' role in implementing, monitoring and maintaining NbS. Strengthening this opportunity includes understanding the factors influencing community acceptance and integrating such factors into NbS projects. These include effective grievance resolutions, demonstration of NbS co-benefits and community engagement and participation. Community acceptance could help to overcome issues such as resistance or protests at the local level.
- New European projects to connect currently disconnected actors: Networks could help to deepen and expand the existing good practices across actors. As part of maintaining, the established communities of practice in MERLIN and similar EU projects could be strengthened and expanded through regular meetings, exchange of contacts and information.

The awareness of societal challenges and the potential role of NbS are important opportunities that could be strengthened across diverse stakeholders. This knowledge should be linked with the high recognition that local communities could accept and support NbS. Hence, creating awareness regarding NbS should not be limited to the economic sector organizations but also local communities that may be impacted by the societal challenges. In addition, the range of EU projects on restoration and NbS – such as LIFE[4], RECONECT[5], NAIAD[6] – offer the opportunity to bring together diverse actors and create networks to support NbS. These actions could enable stakeholders to collaborate to address the potential conflicts in undertaking NbS .

[4] https://life-peat-restore.eu/en/project/

[5] http://www.reconect.eu/

[6] http://naiad2020.eu/

6 Conclusion and next steps

This research explored the views of experts regarding the application of nature-based solutions for the restoration of freshwater ecosystems in Europe. These views were explored from the perspective of MERLIN's economic sectors – Agriculture, Hydropower, Insurance, Navigation, Peat Extraction and Water Supply – and other complementary sectors such as water management, nature conservation, and ecology and biodiversity. The findings demonstrate the range of challenges and opportunities for mainstreaming NbS. The opportunities include the strong recognition of water-related challenges such as pollution, too much water and too little water. This recognition is linked with the belief that NbS could help to address these challenges.

In contrast to the opportunities, there are significant challenges related to funding, conflicts between sectors and the need to balance social, economic and environmental challenges. Despite the high confidence in NbS, respondents don't perceive that economic sectors are motivated to support mainstreaming of NbS. Improving the sectors' motivation requires increasing the economic benefits of NbS to the sectors, provision of adequate data and information to support investment in NbS and engaging other organizations within the sectors. Moreover, policies should be explicit about NbS requirements and have some degree of compulsion.

The findings provide important information for transformation as envisaged by MERLIN. Overall, opportunities require strengthening, while challenges require 'disruption'. New approaches will need to be created to overcome some of these barriers. Next steps based on the results are:

- To complete sectoral and cross-sectoral briefings: the purpose is to establish the baseline and cooperation points from which MERLIN will prioritize where to help generate transformation.
- Policy analysis to highlight policy opportunities to inform EC budget negotiations, regulations, and help frame the next Commission priorities, among others.
- To further analyze the questionnaire by comparing views based on organization types (e.g. public vs private vs academics vs NGOs). The results together with the outcomes of sectoral briefings will help frame roundtable discussions in 2023.
- Developing route maps to mainstream NbS in EU policies.

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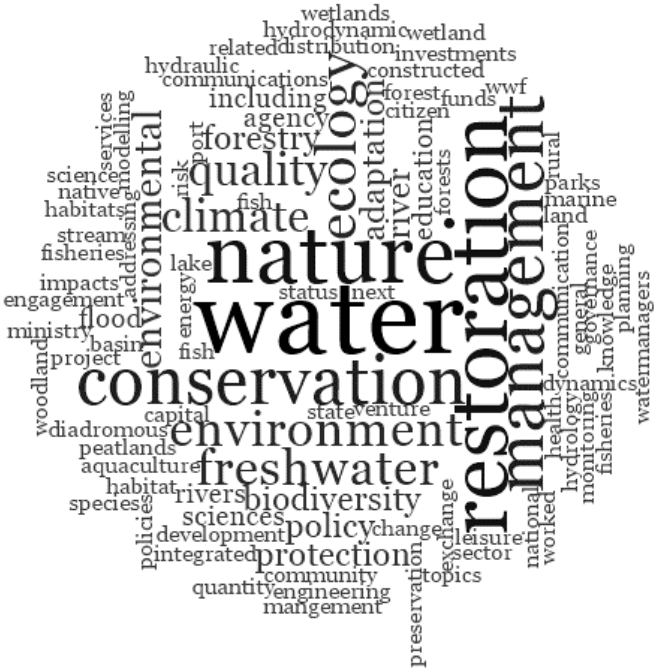
Appendices:

Appendix 1: Keywords used for other sectors



Appendix 2: Survey Questions

The MERLIN project (Mainstreaming Ecological Restoration of freshwater-related ecosystems in a Landscape context: INnovation, upscaling and transformation) aims at mainstreaming nature-based solutions as key approach to deal with current societal challenges, including climate change, biodiversity loss and other sector specific issues. Further information on the project can be found at: https://project-merlin.eu/

This questionnaire aims to gather insights from sector experts about their individual perceptions, experiences and attitudes to freshwater nature-based solutions. The questionnaire also aims to understand the current state, opportunities and barriers for implementing nature-based solutions across Europe. The results from the questionnaire will provide some information to support sectors to mainstream aquatic restoration in Europe. Please answer in English, add additional information as you wish, feel free to skip questions or use 'I do not know'. We estimate it would take you approximately 15 minutes to complete this questionnaire but if you cannot fully complete it at one time, you should be able to return to your unfinished questionnaire by using the same browser and device.

Your response to the questionnaire represents your personal and expert view and not that of the organization where you work. Please respond to the questions from the perspective of the sector where you specialize e.g. agriculture, navigation, water supply, insurance, hydropower, peat extraction, or other closely related sector.

Glossary of terms

For the purpose of this survey, we understand:

Restoration is defined as measures to restore or renew the environment.

Nature-based Solutions are defined as actions to protect, sustainably manage, and restore natural and modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits.

Transformation considers how society (including policy, business and the public) might need to significantly change to allow these actions to become mainstream.

Mainstreaming *of restoration* means taking actions to make restoration an integral part of freshwater management practices.

Freshwater management practices *mean all actions taken to regulate and control the movement, availability, use and quality of freshwater resources.*

Q2 **Data Confidentiality**

Your data will be treated with full confidentiality. It will not be possible to link your personal details with the answers you provide in the survey. It is highly unlikely that it will be possible to identify you within any research publications and outputs resulting from this research study.

What will happen to the data I provide?

Questionnaire data will be downloaded from Qualtrics and stored on secure servers of the James Hutton Institute, in the UK. The data collected for this research will be anonymised and retained for the duration of the project (2021-2025). The data will only be used for MERLIN and associated academic publications. The anonymised results will be made public in the form of reports and sector briefings. All personal information collected will be stored separately from the anonymised results. Only the James Hutton Institute's research teams will have access to the personal data and will not be shared with anyone else. All personal information will be deleted by end of 2022 once the reports from the survey have been shared with interested participants.

Do I have to take part?

No, participation is voluntary, and you can withdraw at any point without giving reasons and without your legal rights being affected. If you wish to withdraw before you complete the survey, kindly close your browser. If you wish to withdraw after submitting the survey, please email Alhassan.ibrahim@hutton.ac.uk

What are the benefits of taking part?

By taking part, you are helping us to understand how different sectors are affected by, or affects, nature-based solutions. This will help us to develop routemaps, policy briefs and sector and cross-sector strategies to support transformative restoration.

What are the possible risks from taking part?

This research is approved as a low-risk human research and no major risk is expected.

Will I be reimbursed for taking part?

To reward you for your time as a participant in this survey, we will directly email a free copy of the report resulting from this survey and related documents such as the sector briefs to you. Kindly provide your contact details at the end of the survey if you wish to receive these documents.
This survey is being run by Hutton and WWF. This research has been favourably reviewed by the James Hutton Institute Research Ethics Committee which considers that it presents no ethical risks to participants from taking part. All participants are also encouraged to read the privacy statement below, and the electronic consent section before completing the questionnaire.

Privacy statement

The James Hutton Institute and World Wildlife Fund (WWF) ('WWF; 'Hutton', 'we', 'us') are committed to protecting your personal information and being clear about what information we collect about you and how we use it. Hutton and WWF are acting as joint data controllers of any personal information collected via this survey. Please note that your personal information will be treated with confidentiality by the research team and we will ensure that you are not identifiable in any publications and outputs resulting from this survey. Your email address (if provided) will be stored separately from the survey responses in secure Hutton servers in the UK and will not be shared beyond the Hutton research team. For further information about how we process personal data please see our full privacy notices, https://www.hutton.ac.uk/terms and https://wwf.hu/en/rolunk/adatvedelem/. If you have any queries about your personal data or you wish to exercise your rights under the EU GDPR and UK GDPR, you can contact Hutton's Data Protection Officer on dpo@hutton.ac.uk.

Electronic consent

Please select your choice below. Clicking on the "AGREE" button confirms that: You have read the

above information and you voluntarily agree to participate in this research. If you do not wish to participate in the research, please decline participation by clicking "DISAGREE".

- AGREE
- DISAGREE

1. What kind of organisation do you currently work for?
   - Public (state) entity
   - Private/commercial
   - NGO/voluntary group
   - Public-private organisation or partnership
   - Network (group organisations with a common interest)
   - Academia/research
   - Other, please specify: _____
2. What is your primary sector of specialisation? If you relate to more than one sector, please pick one for this questionnaire.
   - Agriculture
   - Hydropower
   - Insurance
   - Navigation
   - Peat extraction, peat and peatlands
   - Water supply
   - Other, please specify: _____
3. What is the extent of your operation? Please select the option that is most applicable.
   - Global (beyond European level)
   - Europe (across entire Europe)
   - Regional (please specify: e.g. Northern Europe, Baltic region, etc.)

     _____
   - National
   - Other, please specify: _____
4. Are you a partner in MERLIN?
   - Yes
   - No

Display This Question:

If Q7 = No

5. Have you participated in the implementation of any nature-based solutions or restoration initiative before?
   - Yes
   - No
   - I do not know

Display This Question:

If Q8 = Yes

6. Please indicate the project type, and if possible, name, location, size, any pertinent webpage links and the capacity in which you participated.

   _____

The following questions aim to gain your views on the sectoral aspects of nature-based solutions and freshwater restoration across Europe.

7. What are some of the major water-related environmental challenges faced by the sector where you specialize? Please select all that apply.
   - Erosion of riverbanks and immediate surroundings
   - Overuse (exploitation) of water resources
   - Loss of connectivity between various elements in the water environment

- ☐ Pollution and degraded water quality.
- ☐ Developing and existing physical structures on floodplains and waterways
- ☐ Too little water (water scarcity)
- ☐ Too much water (which poses flood risks)
- ☐ Increased sedimentation
- ☐ Other, please specify: _____
- ☐ I do not know

8. Apart from water-related challenges, what are other socio-economic challenges affecting your sector? Please, list a maximum of three responses (examples may include pressure on profits, cost of production, competition, etc.)
   _____

9. To what extent do the challenges identified in the previous questions affect the progress of businesses, whether positively or negatively?
   - ○ To a high extent
   - ○ To some extent
   - ○ Neither high nor low
   - ○ To little extent
   - ○ To no extent
   - ○ I do not know
10. Given the challenges in your sector, do you agree or disagree that major improvements to your sector's existing water management practices are required for the management of freshwater resources?
    - ○ Strongly agree
    - ○ Somewhat agree
    - ○ Neither agree nor disagree
    - ○ Somewhat disagree
    - ○ Strongly disagree
    - ○ I do not know
11. Do you agree or disagree that restoration with nature-based solutions should be an integral aspect of freshwater management?
    - ○ Strongly agree
    - ○ Somewhat agree
    - ○ Neither agree nor disagree
    - ○ Somewhat disagree
    - ○ Strongly disagree
    - ○ I do not know
12. Below is a list of challenges that may affect your sector: which of these do you think nature-based solutions and freshwater restoration may help address? Please select all that apply.
    - ☐ Erosion of riverbanks and immediate surroundings
    - ☐ Overuse (exploitation) of water resources
    - ☐ Loss of connectivity between various elements in the water environment
    - ☐ Pollution and degraded water quality.
    - ☐ Developing and existing physical structures on floodplains and waterways
    - ☐ Too little water (water scarcity)
    - ☐ Too much water (which poses flood risks)
    - ☐ Increased sedimentation
    - ☐ Other, please specify: _____
    - ☐ I do not know
13. Q17 What do you think would be the most appropriate nature-based solutions for restoration for your sector to consider? Please select all that apply.
    - ☐ Re-wetting and revegetating of wetlands and peatlands
    - ☐ Small or obsolete dam removal
    - ☐ Channel restoration

- Riparian (riverbank) restoration
- Re-connection of floodplains
- Other, please specify: _____
- I do not know

14. Based on your knowledge of nature-based solutions for restoration (examples listed above), how confident are you on their effectiveness and potential to address challenges faced in your sector?
    - Very confident
    - Confident
    - Neither confident nor not confident
    - Not confident
    - Not confident at all
    - I do not know
15. If you have any other comments about any of the questions in this section, please make them here before proceeding to the next section. The next section is on experience and challenges of restoration using nature-based solutions.
16. Q20 The following questions aim to gain your views about the challenges and opportunities for mainstreaming nature-based solutions for restoration.
17. Q21 What do you think are the major challenges to undertaking or supporting freshwater restoration using nature-based solutions? Please select all that apply.
    - Balancing the economic, social and environmental needs
    - Enhancing sectoral collaboration and coordination
    - Capturing the needs of all stakeholders and addressing conflicts
    - Inadequate funding, including private and public sources
    - Inadequate (lack of) knowledge, experience and data and uncertainties about the outcomes
    - Difficulties in enhancing broader stakeholder participation
    - Fragmented land ownership and difficulties in acquiring private land
    - Lack of political will and unrealistic ambitions
    - Additional cost and responsibilities on businesses
    - Different priorities across various countries in Europe
    - Rigid bureaucratic systems, planning and regulatory standards
    - Other, please specify: _____
    - I do not know
18. Q22 Sometimes, restoration can create conflicts with another sector. Please tick any sector(s) below with whom your sector might experience conflict when implementing nature-based solutions.
    - Agriculture
    - Hydropower
    - Insurance
    - Navigation
    - Peat extraction
    - Water supply
    - Other, please specify: _____
    - I do not know

Display This Question:

If Q22 != I do not know

19. Please, explain the kind of conflict that exists with the selected sector(s)?

    _____

20. Q24 If you have any other comments about any of the questions in this section, please make them here before proceeding to the next section. The next section is about policies and incentives for transformative change.

    _____

21. Based on your experience, how motivated do you think economic sector organisations are to support mainstreaming of nature-based solutions for freshwater restoration?
    - ○ Very motivated
    - ○ Motivated
    - ○ Indifferent
    - ○ Not motivated
    - ○ Not motivated at all
    - ○ I do not know
22. Q26 Which of the following measures for mainstreaming nature-based solutions for restoration are likely to be supported by economic sector organisations? Please select all that apply.
    - ☐ Financing
    - ☐ Regulation and policy formulation and enforcement
    - ☐ Developing guidelines
    - ☐ Training, research and knowledge development
    - ☐ Providing data and information
    - ☐ Building network and collaboration
    - ☐ Establishing voluntary groups
    - ☐ Other, please specify: _____
    - ☐ I do not know
23. As a stakeholder, which actions and changes will most likely increase your motivation to support or lead in the mainstreaming of restoration using nature-based solutions?
    - ☐ Increasing economic outcome (profits) for my sector
    - ☐ Involvement and working with other organisations in my sector
    - ☐ When my concerns and interest are addressed
    - ☐ Increasing funding subsidies for my organisation
    - ☐ Providing adequate training and skill development for my organisation
    - ☐ Less rigid bureaucratic systems
    - ☐ Adequate data and information to support investment
    - ☐ Demonstration of leadership from the public authorities
    - ☐ Demonstration of willingness from the private sector
    - ☐ Other, please specify: _____
24. What is your overall view regarding the existing policies and frameworks linked with aquatic nature-based solutions? If you can, please indicate up to 3 examples of policies, their strengths and weaknesses.

    _____
25. If you have any other comments about any of the questions in this section, please make them here before proceeding to the next section. The next section is about opportunities for restoration using nature-based solutions.

    _____

26. What are the top three opportunities that can enable mainstreaming of freshwater restoration using nature-based solutions in Europe?
    - ☐ New European projects to connect currently disconnected actors
    - ☐ Already existing networks I belong to. Please specify such network/s:

      _____
    - ☐ Existing policy frameworks. Please provide example/s:

      _____
    - ☐ Existing financial instruments. Please provide example/s:

      _____
    - ☐ Acceptance and support from local communities
    - ☐ Increasing knowledge of environmental challenges
    - ☐ Emerging new concepts and knowledge of freshwater restoration. Please provide example/s:

      _____
    - ☐ Existing champions and leaders willing to foster transformation. Please provide example/s:

      _____
    - ☐ Support from existing voluntary organisations (including NGOs)
    - ☐ The current global strategies such as UN Sustainable Development Goals
    - ☐ Public-private partnership. Please provide example/s:

      _____
    - ☐ Other, please specify: _____
    - ☐ I do not know
27. Which financing mechanisms do you see as having the most potential to support implementation of restoration by your sector? Please select all that apply.
    - ☐ Debt instruments
    - ☐ Payment for Ecosystem Services (PES)
    - ☐ Emission Trading System
    - ☐ Grant
    - ☐ Subsidies
    - ☐ Tax deductions
    - ☐ Donations
    - ☐ Carbon credits
    - ☐ Other, please specify: _____
    - ☐ I do not know
28. Would you like to share any other comments for consideration?

    _____