Report on local acceptance, institutional and political feasibility in Collaborators

Deliverable D4.5

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Abstract (for dissemination, 100 words)	Task 4.5 in the RECONECT project focuses on assessing the framework conditions for implementing the proposed Nature-Based solutions (NBS) at RECONECT's European collaborator sites. The results of the acceptability studies suggests that stakeholders were generally supportive of NBS and had a positive outlook towards implementing such projects in their communities if process related factors are well realised (fairness, transparency, compensation, trust, participation) and if the benefits of NBS are well understood. Our analysis of the frameworks conditions and the wider political climate suggests that the consideration of NBS in the risk management process is currently still in its early stages.
Keywords	risk perception, acceptance, institutions, politics

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Executive Summary

Task 4.5 in the RECONECT project focuses on assessing the framework conditions for implementing the proposed Nature-Based solutions (NBS) at RECONECT's European Collaborator sites. This includes key factors in shaping the acceptance of the proposed NBS within the wider local community as well as the feasibility of implementing the proposed NBS within the institutional frameworks of the sites also considering the general political climate regarding the use of NBS as risk-mitigating measures.

This report focuses on analysing the acceptance of NBS among different stakeholder groups and the stakeholders' perspectives on the role of NBS in managing site-specific hydro-meteorological risks. A comprehensive site-specific analysis of the institutional and regulatory framework for hydro-meteorological risk management will inform the development of mainstreaming strategies to enhance the implementation of NBS at the respective sites. This report makes only cursory reference to these analyses where appropriate. A more detailed presentation of this information and the strategies developed on this basis will be presented in RECONECT Deliverable 4.7.

Based on extensive field work, including workshops, interviews, and the application of different research methodologies (e.g. Q-methodology and scoring cards), the analysis revealed that process-related factors play a central role in shaping acceptability of NBS. Across all Collaborator sites, process-related factors are perceived as having the strongest influence on the acceptability of NBS to reduce hydro-meteorological risks. Five out of ten of the most relevant factors point towards the institutional dimensions, including the proper design of the planning and realisation process supporting the effective uptake of NBS, a fair land acquisitions process, proper compensation schemes, an open and transparent decision-making process, a well designed and implemented participatory process, and trusted public authorities in flood risk management. Furthermore, the analysis revealed high disagreement with the view that the acceptance of NBS would depend on potential negative outcomes of NBS, such as that NBS can harm cultural and historical aspects, reduce quality of life and aesthetics. Furthermore, the analysis revealed that acceptance can also depend on site-specific features. Generally, the results of the acceptability studies suggest that stakeholders were generally supportive of NBS and had a positive outlook towards implementing such projects in their communities if institutional process-related factors are well realised (fairness, transparency, compensation, trust, participation) and if the benefits of NBS are well understood.

Our analysis furthermore suggest that the institutional framework conditions and the wider political climate are still in their early stages when it comes to considering NBS in the risk management process. Existing structures and processes are primarily geared towards the use of traditional hard infrastructure measures. The main obstacles to the adoption of NBS include lack of legal provisions, administrative and legal procedures, unclear responsibilities, lack of dedicated budgets for planning, implementation and maintenance, and limited institutional capacity to mainstream NBS. Experts across all sites widely concur that the current utilisation of NBS for managing hydro-meteorological risks is characterized as extremely limited to virtually non-existent in the Collaborator sites.

At present, despite the existence of a multitude of EU policies and directives that provide a solid legal basis for the use of NBS, the political acceptance of NBS in Collaborator countries is still not contributing to the mainstreaming of NBS. Political actors are generally perceived as observers whose activities are often seen as declaratory rather than

executive. While they may - at best - advocate the inclusion of NBS in relevant policy documents, their commitment to supporting the implementation of these policies is seen as rather low. However, several experts stress the importance of persuading political actors to develop the legal basis for mainstreaming NBS and to ensure that the necessary resources are made available for its implementation.

Experts also highlight that even though current laws do not explicitly acknowledge NBS, they also do not impede their implementation in principle. The growing environmental awareness of the population and the related activities of grassroots initiatives as well as the increasing popularity of green and blue structures in the planning context nourish the hope that the social environment for the use of NBS is slowly but steadily improving.

In addition, it is expected that the reform pressure from the influence of EU legislative frameworks will have a positive effect on the establishment of NBS not only in strategic policy documents but also in binding legal regulations. However, the influence of the European level is not limited to this. The steady increase (albeit at a low level) of local best-practice examples, often (co-)financed by the European Union, is also expected to improve the level of knowledge and awareness of NBS in politics and society through accompanying benefit monitoring and information campaigns.

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1 Introduction

This report is a building block in the preparation of the two key outputs of the RECONECT work on "Overcoming barriers, upscaling and synergies with collaborators" (WP4), i.e. the development of possible strategies for mainstreaming large-scale NBS and the prefeasibility studies for implementation of NBS in Collaborators" (D4.8). In this report, we focus on assessing the current framework conditions for implementing the proposed Nature-Based solutions (NBS) at RECONECT's European Collaborator sites. This assessment is based on the following pillars:

- Local acceptance: This pillar evaluates the level of acceptance of the proposed NBS within the wider local community. It considers factors such as risk perception, expected (co)-benefits of NBS and possible reasons for these expectations, place attachment, land acquisition, etc. to make a first assessment of whether the proposed NBS are socially acceptable.
- Institutional and political feasibility: This pillar examines the feasibility of implementing the proposed NBS given within the legal and institutional frameworks of the site also considering the general political climate regarding the use of NBS as risk-mitigating measures.

By looking at these two areas, the aim is not only to describe the current framework conditions for the implementation of the proposed NBS, including the problems to be expected, but also to make initial suggestions, based on local grassroots and expert knowledge, on how these challenges could be addressed or even solved.

Local acceptance

One of the key factors to the successful implementation of Nature-Based solutions for hydro-meteorological risk reduction lies in understanding the perspectives of local stakeholders. Despite their limited involvement in most NBS-related policy development and implementation (Brink et al., 2016), NBS planning requires transdisciplinary approaches that unite different actors (Cohen-Shacham et al., 2016; Christine Wamsler et al., 2020). Therefore, understanding stakeholders' attitudes towards NBS projects and the factors that affect public perceptions are key to achieving successful outcomes (C. Wamsler et al., 2020; Živojinović & Wolfslehner, 2015).

However, challenges related to raising stakeholder awareness and knowledge of NBS applications, as well as their effectiveness, can give rise to conflicts and resistance to implementing NBS projects (Faivre et al., 2017; Giordano et al., 2020; Kabisch et al., 2016; Santoro et al., 2019). These conflicts of interest and disagreements can, for instance, create bottlenecks during project implementation (Bark et al., 2021; Ferreira et al., 2020; Puskás et al., 2021).

Site-specific and place-based factors play a significant role in shaping stakeholders' perceptions of NBS. First of all, two prominent aspects that influence stakeholders' perceptions are place and risk (Han, 2023). On one hand, research has shown that individuals living in high-risk areas often prefer physical infrastructure as they provide a stronger sense of security (Ardaya et al., 2017; Gray et al., 2017; Martinez-Juarez et al., 2019). In high-risk environments, the lack of popularity of NBS can also be attributed to uncertainties regarding their effectiveness and unknown effects. The complexity and

variability inherent in natural systems, especially when interacting with other human-associated factors, further contribute to the scepticism surrounding NBS (Liao, 2014; Raška et al., 2022). This variability associated with NBS can create and intensify fears about potential dangers (Chou, 2016). Additionally, NBS often involve long-term and flexible planning, with delayed benefits, while engineered solutions offer more immediate and predictable outcomes (Seddon et al., 2020). The level of protection provided by NBS is challenging to predict, as it depends on the intensity and frequency of threats, ecosystem resilience, and socioeconomic vulnerabilities (Iacob et al., 2014).

On the other hand, place attachment, which encompasses cultural and social ties to communities, plays a crucial role. The attachment to a place, which fosters social bonds, can influence public perceptions of risk-mitigating measures or structural development implemented in the landscape (Davenport & Anderson, 2005; Verbrugge & van den Born, 2018; Verbrugge et al., 2019). For instance, communities may have deep cultural and emotional connections to lands or waterways affected by flooding, making them reluctant to accept interventions that disrupt these connections. However, the impact of these factors on stakeholders' perceptions is not always consistent, with studies reporting divergent and conflicting findings (Bonaiuto et al., 2002; Devine-Wright, 2009).

Another critical aspect in raising stakeholders' awareness and perceptions of NBS is balancing environmental and economic concerns. NBS initiatives often require trade-offs between environmental conservation and economic considerations. To address this challenge, it is crucial to have a clear understanding of stakeholders' priorities and values. By identifying and incorporating their perspectives, it becomes possible to develop solutions that strike a balance between these competing concerns while being acceptable to the community.

Quantifying the benefits and trade-offs associated with NBS has been an approach used to convince stakeholders and foster their support. Studies, such as those conducted by researchers like Yang et al. (2023), have provided evidence highlighting the positive impact of NBS and demonstrating their value to affected communities. By presenting concrete data and quantifiable outcomes, these studies contribute to building a stronger case for the effectiveness and benefits of NBS, thereby aiding in raising stakeholders' awareness and perceptions.

Lastly, trust is a critical factor in shaping stakeholder perceptions. Stakeholders who feel that their concerns have been heard and that they have been involved in the planning process are more likely to trust and support NBS solutions. Building trust and gaining buy-in among stakeholders can help create a shared sense of responsibility for the success of these solutions.

Institutional feasibility

The concept of institutional feasibility refers to the existence of enabling or constraining institutions for the successful implementation of policies through accompanying measures. Following Douglass C. North (1991, p. 97) the term institutions refers to the human-made constraints that shape human interaction in political, economic, and social contexts. They include both informal restrictions such as customs and traditions, and formal rules, such as laws. Institutional feasibility has been defined in IPCC's Fourth Assessment Report (IPCC 2007) as follows:

"(…) instrument design and implementation must take political realities into account. In reality, policy choices must be both acceptable to a wide range of stakeholders and supported by institutions, notably the legal system. Other important considerations include human capital and infrastructure as well as the dominant culture and traditions. (…) Certain policies may also be popular due to institutional familiarity.

Specifically, this definition emphasises the relevance of 1) public and political acceptance of policies ("acceptable to a wide range of stakeholders"), 2) the formal regulatory framework ("supported by institutions, notably the legal system"), 3) informal constraints ("dominant culture and traditions"), and the administrative capacity to implement and maintain policies ("human capital, infrastructure, bureaucratic structures") in assessing the institutional feasibility of a policy measure such as - in our case - NBS for mitigating hydro-meteorological risks.

Several factors are discussed in the literature as influencing institutional feasibility. Expectations of high effectiveness, low or at least acceptable costs and a fair distribution of benefits and burdens support the implementation of policy measures. A similar positive effect can be expected if there is a high level of knowledge and/or appreciation of the policy measure by stakeholders and decision-makers and a low level of the administrative burden associated with the introduction and administration of the policy. Administrative burden includes the time and resources required by public authorities for institutional learning and capacity building to implement and enforce the policy. (Richter, 2012)

Scope and structure of the report

This report is based on an extensive co-creation process in the Collaborator sites. In total almost 150 stakeholders were involved in 12 workshops held at the Collaborator sites. In addition, 57 expert interviews were conducted. The empirical analysis is based on a multi-method approach, including expert interviews, scorecard-assisted rating to assess the attitudes of stakeholders in the different sites towards NBS as well as a Q-methodology to investigate subjective perspectives key factors shaping the local acceptance of NBS from the perspective of stakeholders in the different sites.

The structure of the report is organized as follows: Chapter 1 serves as an introduction and provides a comprehensive overview of the background, objectives, and scope of the study. Chapter 2 describes the methodology, explaining the division of responsibilities, the involvement of subcontractors, and the detailed roadmap of the research process. Chapter 3 presents the results of the Q-methodology, and Chapter 4 thoroughly examines the central role of Nature-Based solutions in hydro-meteorological risk management at the RECONECT Collaborator sites, covering critical aspects such as public and political acceptance, stakeholders' perspectives, and expert insights. Chapter 5 then summarises the key findings and implications for RECONECT, providing an in-depth evaluation of the Q-methodology employed, its potential for effective decision making, and related considerations of institutional feasibility and political acceptance. Finally, Chapter 6 brings the report to a close by providing a concise conclusion that draws together the main points and highlights the significance and implications of the report.

2 Methodology

2.1 Overview of the co-creation processes

Achieving the objectives of Task 4.5 “Acceptability, Feasibility and Sustainability Assessments in Collaborators" of the RECONECT project required collecting and analysing data from a variety of local sources including government documents, legislation, official reports as well as ‘grey literature’, e.g. public submissions and discussion papers. In addition, data had to be collected from local stakeholders and experts through workshop activities and interviews. Field data collection required local expertise and language skills, not only to access local data sources but also to enable low-threshold communication with local stakeholders and interviewees, and to facilitate successful workshops. Therefore, a culturally sensitive approach was adopted, including the following roles and responsibilities: UFZ as task leader developed and provided the methodological framework and supported data collection and analysis. Local RECONECT partners (“Collaborators”), who were familiar with the site, provided organisational support on site, but did not have the necessary capabilities to facilitate, conduct and document the on-site activities for data collection and analysis. Hence, it was decided to contract highly qualified experts to fulfil these challenging tasks. Local RECONECT partners (“Collaborators”) supported the UFZ by screening the market for potential Subcontractors. The role and responsibilities of Subcontractors included facilitating, conducting and documenting the on-site activities for data collection and analysis. Thus, the main purpose of involving Subcontractors in this task was their local expertise, language and facilitation skills as a prerequisite for 1) access to local data sources; 2) familiarity with the national, regional and local governance setting; 3) low-threshold communication with stakeholders and interviewees; 4) successful facilitation of local workshops and confidential interviews without a language barriers.

Figure 1 provides an overview of the co-creation activities along the lines of the preparatory meetings and webinars.

Figure 1 Roadmap of project activities / milestones within the task 4.5

A more detailed description of the different tasks and steps of the co-creation process is given in In Annex C, including a detailed description of the two onsite workshops held at 6 different sites (12 workshops were held in total).

Tables 1 and 2 provide a synoptic overview of the workshop dates and number and type of stakeholders involved.

Table 1 Key figures of data collection workshops

Sites	Kamchia river basin	Pilica river basin	Bregana river basin	Vrbanja river basin	Jadar river basin	Tamnava river basin
Date	07.12.2022	11.01.2023	16.12.2022	12.12.2022	09.12.2022	02.12.2022
Location	Varna	Piotrków Trybunalski	Zagreb	Banja Luka	Krupanj	Ub
Number of partici-pants	28	31	20	18	25	23
Stake-holder types[1]	Academia & research, Private sector organisa-tion, Public authority, Political represent-tation, Civil society organisa-tion, Media	Academia & research, Private sector organisa-tion, Public authority, Political represent-tation, Civil society organisa-tion, Media	Academia & research, Private sector organisa-tion, Public authority, Political represent-tation, Civil society organisa-tion	Academia & research, Private sector organisa-tion, Public authority, Political represent-tation, Civil society organisa-tion, Media	Academia & research, Private sector organisa-tion, Public authority, Political represent-tation, Civil society organisa-tion, Media	Academia & research, Private sector organisa-tion, Public authority, Political represent-tation, Civil society organisa-tion, Media

[1] Academia & research, Private sector organisation, Public authority, Political representation, Civil society organisations, and Media

Table 2 Key figures of validation workshops

Sites	Kamchia river basin	Pilica river basin	Bregana river basin	Vrbanja river basin	Jadar river basin	Tamnava river basin
Date	24.02.2023	15.02.2023	17.02.2023	27.02.2023	23.02.2023	21.02.2023
Location	Varna	Rozprza	online	online	Krupanj	Koceljeva
Number of participants	12	25	12	10	16	18
Affiliation	Academia & research, Private sector organisation, Public authority, Political representtation, Civil society organisation	Academia & research, Private sector organisation, Public authority, Political representtation, Civil society organisation	Academia & research, Private sector organisation, Public authority, Political representtation,	Academia & research, Private sector organisation, Public authority, Political representtation, Civil society organisation	Academia & research, Private sector organisation, Public authority, Political representtation, Civil society organisation, Media	Academia & research, Private sector organisation, Public authority, Political representtation, Civil society organisation, Media

2.2 Methods

This study adopts a multi-method approach in order to effectively address the relevant research questions. The summary of the methods used for each research question is presented in Table 3, which also identifies the sections of this report where the methods.

Table 3 Methods used for each of the research priorities

Data collection methods	Research focus	Report section
Guideline-based expert interviews	Support of the institutional framework for the use of NBS for the management of hydro-meteorological risks	2.2.1
	Current practice of using NBS to manage hydro-meteorological risks	
	Experts' views on NBS as a risk management measure	
Scorecard-based rating	Stakeholder perceptions of NBS, i.e. - Relevance of NBS for managing hydro-meteorological risks - Site-specific (risk-related) benefits expected - Site-specific co-benefits expected	2.2.2
	Stakeholder risk perception	
Q-Methodology	Local acceptance of NBS	2.2.3

The analysis of the supportive nature of the current framework conditions for realising and maintaining NBS as risk-reducing measures for the management of natural hazards and the review of the current practice of their use is, at this phase of the assessment, primarily based on expert interviews. Further analyses, which will form the basis for the development of mainstreaming strategies in RECONECT Deliverable 4.7, will also incorporate the results of extensive desktop research.

The analysis of experts' and stakeholders' perspectives on NBS as risk mitigation measures is based on data collected through the use of scorecards in the context of stakeholder workshops and expert interviews and additional open-ended questions as part of the expert interviews. For details, see the sample scorecard and the expert interview guideline in Annex A and Annex B, respectively.

2.2.1 Expert interviews

As a part of the analysis, expert interviews are used to gain insights into the status and relevance of NBS within the current institutional environment at the Collaborator sites, including relevant information from the European to the local level. In addition to workshop-based data collection and desktop research, this methodology also seeks complementary information on the public and political acceptance of NBS.

Expert interviewees were selected based on their ability to provide a system-level view as well as site-specific information on the current role of NBS in hydro-meteorological

risk management. These individuals were knowledgeable decision makers in local authorities, researchers or politicians. The selection of experts was supported by local Collaborators and the UFZ and was carried out by local Subcontractors.

The format of the expert interviews consists of a series of semi-structured interviews with individual key persons and/or representatives of relevant institutions. These interviews follow an interview guide developed by the UFZ covering three main topics. The first theme explores the institutional and political feasibility of NBS, assessing the potential challenges and opportunities within the existing regulatory framework and current political situation. The second pillar of the guideline focuses on identifying the drivers and barriers to the realisation of NBS, examining factors that facilitate or hinder their implementation. The third theme focuses on the expected site-specific benefits and co-benefits of NBS into focus, taking also into account the pros and cons discussed at each site. For more details, see the interview guide in Annex B.

Each interview was conducted by a facilitator from the local subcontractors in the respective local language to ensure a conducive environment for open and comprehensive discussions. A declaration of informed consent was shared and signed ideally before the interview to secure that the data collected would be used in accordance with data protection legislation. At the beginning of interview, information about the RECONECT project, the specific context of the interview and RECONECT's local activities is shared. The duration of each interview was usually between 60 and 90 minutes, allowing sufficient time for the expert to share their knowledge, insights and experiences on the topic.

The answers to the interview questions were written down by the interviewers and translated into English. The information was provided digitally to the UFZ in the form of raw data and a written summary. Reference is made to this information where appropriate in the presentation of the results in Chapter 4.

Table 5 provides an overview of some key figures from the expert interviews conducted at the different Collaborator sites.

Table 4 Overview of expert interviews at Collaborator sites

Sites	Kamchia river basin	Pilica river basin	Bregana river basin	Vrbanja river basin	Jadar river basin	Tamnava river basin
Period	Dec 2022 - Jan 2023	Jan 2023 - Feb 2023	Dec 2022 - Jan 2023	Dec 2022	Dec 2022 - Feb 2023	Dec 2022 - Feb 2023
Number of expert inter-views	10	10	7	10	10	10
Affiliation	Academia & research, Private sector organisa-tion, Public authority	Academia & research, Public authority	Academia & research, Private sector organisa-tion, Public authority	Academia & research, Private sector organisa-tion, Public authority, Political represent-tation, Civil society organisa-tion, Interna-tional organisa-tion	Academia & research, Public authority	Academia & research, Private sector organisa-tion, Public authority

2.2.2 Scorecard-assisted rating

Scorecard-assisted rating is a method widely used in survey research e.g. to determine respondents' attitudes to various issues. In preparing the scorecards, the UFZ decided to use a 7-point Likert scale for the assessment, which had already been used in similar surveys of the RECONECT demonstrators. On this symmetrical scale, respondents indicate the extent to which they agree or disagree with a series of statements. In this specific context, the method is used to assess respondents' perceptions of the various site-specific hydro-meteorological risks, their perceptions of the relevance of NBS in mitigating these risks and selected possible causes, and their expectations on co-/benefits of NBS. The scorecard therefore consists of the following sections:

1. Background information (of the respondents)
2. Risk perception

3. Perception of NBS
    3.1 Relevance of NBS for managing hydro-meteorological risks
    3.2 Site-specific benefits expected
    3.3 Site-specific co-benefits expected

For more details on the specific statements used for the assessment, see the example scorecard in Annex A.

It was decided to use the scorecard in both the stakeholder data collection workshop and the expert interviews because it provides a structured framework for measuring perceptions allowing for a comprehensive analysis and comparison.

2.2.3 Q-methodology

In order to investigate the first pillar of this deliverable, local acceptance of NBS, Q-methodology was devised and implemented at the local data collection workshops. Q-methodology is a research approach that combines qualitative and quantitative methods to investigate subjective perspectives (Brown, 1997). This technique involves Q-sorting, where individuals rank a set of statements about a specific issue according to a defined dimension, such as agreement or importance, to express their viewpoint. The resulting rankings are called Q-sorts and are analysed using an inverted technique of factor analysis, which treats each participant's Q-sort as a variable. The analysis aims is to identify similarities and differences among the Q-sorts and interpret factors that represent commonalities in participants' perspectives (Watts & Stenner, 2005). The process of conducting a Q-methodological study involves seven stages, as illustrated in Figure 2. In the next paragraphs, we explain how we adopted Q-methodology step-by-step.

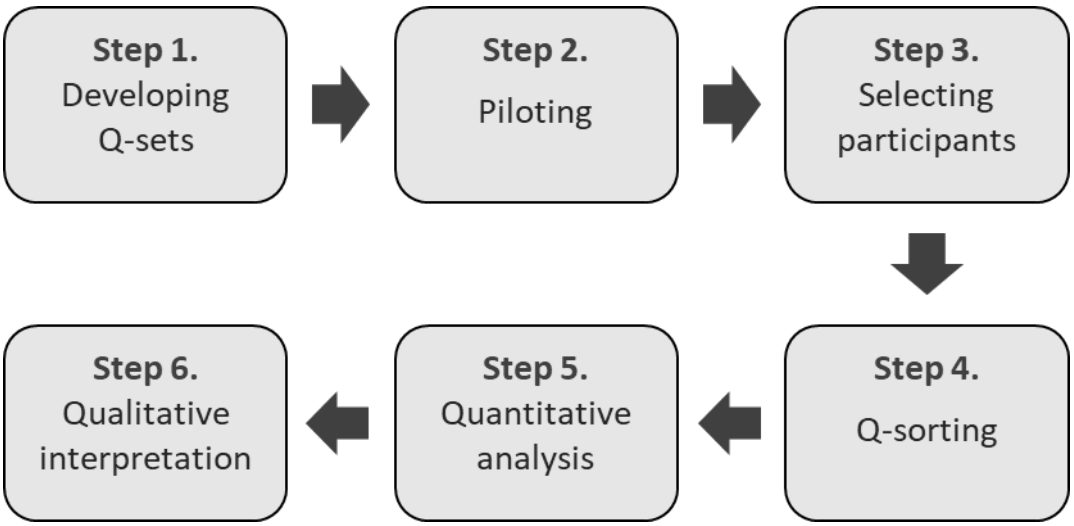

Figure 2 Steps in Q-methodology

Step 1: Developing Q-sets

A Q-set is a collection of statements, usually in the form of brief descriptions or opinions, which represent the range of viewpoints or beliefs about a particular subject. To develop the Q-set, researchers must sample the concourse, which means collecting as many relevant ideas, opinions, and statements as possible about the topic of interest. Sampling

the concourse can involve various methods, such as reviewing the existing literature, conducting preliminary interviews with experts, or searching publicly available resources like social media platforms or online forums (McKeown & Thomas, 2013). It is important to note that the process of developing a Q-set requires careful attention to detail and rigour to ensure that the resulting set of statements is both comprehensive and representative of the topic. The final Q-set should include a range of viewpoints that reflect the diversity of opinions and beliefs about the subject and should be carefully constructed to minimise bias or preconceived notions.

In this research, Q-set was constructed largely based on the systematic literature review by Han and Kuhlicke (2019) regarding perceptions of Nature-Based solutions for reducing flood risks, but also other studies, but not limited to, such as Sarabi et al. (2019) and Moosavi et al. (2021). The Q-set used is shown in Table 6.

Table 5 Q-set used in the local workshops

#	Statement
	Risk reduction efficacy
1	Hard infrastructure provides better protection than NBS.
4	More scientific proof is needed to show the effectiveness of NBS.
15	People prefer a more visible and physical way of reducing flood risks.
29	The town is so highly exposed that it cannot be protected by NBS.
	Co-benefits/Convenience
2	The NBS project can result in inconveniences (e.g. increased insects, decreased parking space, and increased traffic), therefore, people will not welcome the NBS project.
5	The NBS project can harm the cultural and historical aspects of the town area.
13	The quality of life won't increase much as a result of the NBS project.
22	Instead of implementing an NBS project, other ways of using the area are more beneficial to the town/area.
	Cost-effectiveness of NBS
6	Maintenance of NBS is complicated.
20	Taxpayers' money should be spent more wisely than demolishing existing risk management infrastructure and constructing a new one.
21	It is costly to maintain NBS.
30	The benefits of NBS do not outweigh the costs.
	Trust and transparency
3	Trust in public authorities involved in flood risk management is lacking. Therefore, people will not accept NBS.
26	The overall process of the NBS project should be open and transparent. This will increase the support for the NBS project.

#	Statement
	Level of understanding
23	Most people do not understand well how the NBS project will work for their town/area.
24	Despite the benefits of NBS, not everyone is convinced of the superiority of NBS.
	Place attachment
10	The NBS project does not meet the local resident's preference for the place.
16	The NBS site does not correspond well to the people's ideal conception of the river, and this will cause dissatisfaction amongst the residents.
	Environmental attitude
11	People place a high value on the natural environment in the NBS area, which leads to the support of NBS projects.
14	People worry that NBS can impact wildlife negatively.
	Aesthetic value
9	The NBS project implies landscape change. Therefore, people will not welcome the NBS project.
28	The changed landscape after the NBS project does not aesthetically please people.
	Accessibility
7	After the NBS implementation, people cannot access the river area where they used to go. This can cause frustration.
17	After the NBS implementation, it takes more time from one place to another. This can cause frustration.
	Land acquisition
12	If the land acquisition process is fair, it is more likely that they accept the NBS project.
25	If people are compensated properly for their property/land, it's more likely that they accept the NBS project.
	Participation
8	Strong stakeholder groups' coalition makes it difficult to bring the NBS process to a successful conclusion.
18	If stakeholders do not have a proper opportunity to participate in the process of NBS, they will not support it.
27	Stakeholders are not willing to participate in the NBS process and, therefore, they are not supportive.

Step 2: Piloting

Conducting a pilot study allows researchers to gather important feedback on the study materials and procedures before initiating the full-scale study. Specifically, it provides

insights into how easily participants understand the instructions and statements, how long it takes to complete the Q-sort, and participants' overall impression of the process. The feedback obtained from the pilot study can be used to modify the study materials or procedures to ensure that they are clear, concise, and effective (Paige & Morin, 2016). For instance, if the instructions are found to be confusing or unclear, they can be revised to provide more clarity. Similarly, if the statements are found to be ambiguous or difficult to sort, they can be refined to better represent the range of perspectives on the topic.
In order to do so, this study used the opportunity of RECONECT General Assembly to test Q-sort with the RECONECT partners including collaborators and demonstrators. The Q-sort and its instruction were revised based upon the feedback received.

Step 3: Selecting participants (P-set)

Q-methodology employs a purposive sampling strategy, where participants are selected based on their ability to express a particular viewpoint on the topic of interest and the significance of their perspective (Watts & Stenner, 2005). This is in contrast to quantitative surveys, where larger samples are typically used to ensure representativeness and generalizability to the population at large.

Due to its unique methodology, Q-studies usually have smaller sample sizes of approximately 40-60 participants (Watts & Stenner, 2005). This is because Q-methodology employs an inverted factor analysis approach that does not aim to generalise findings to a broader population, but rather to identify shared perspectives among the sample group (Valenta & Wigger, 1997). Despite the smaller sample size, the selection of participants is critical in Q-studies to ensure that a diverse range of viewpoints is represented in the data. This requires careful consideration of factors that may influence perspectives on the topic of interest.

Q-studies typically involve a more in-depth analysis of the data collected, which allows for a more nuanced understanding of the shared perspectives within the sample. This is in contrast to quantitative surveys, where the focus is often on identifying statistical trends and patterns within the data. By carefully selecting participants who can articulate their viewpoints and contribute to the study's goals, researchers can generate valuable insights that may be overlooked in larger-scale quantitative surveys.

In RECONECT, Q-methodology was performed at a data collection workshop at each Collaborator site. The workshop participants were carefully chosen by the Collaborator partners considering their roles and expertise. The Collaborator partners were asked to invite participants from six sectors (public authority, political representation, academia and research, private sector organisation, civil society organisation, media), and at least two people for each sector. Table 7 shows sample sizes at each Collaborator site.

Table 6 Sample size for Q-methodology at Collaborator sites

Site	Kamchia River Basin	Bregana River Basin	Vrbanja River Basin	Pilica River Basin	Jadar River basin	Tamnava River Basin
Sample size	14	20	18	28	25	23
Completed sample[2]	14	15	10	28	25	22

Step 4: Q-sorting

The heart of Q-methodology is the data collection process, which involves a card-sorting task called "Q-sorting." Participants are presented with a Q-set of discrete ideas or statements about a particular topic and are asked to rank them based on a given prompt or question. Q-sorting typically involves sorting statements along a quasi-normal distribution grid, which helps to formalise participants' tendencies to hold strong opinions on a smaller number of issues. This approach can provide valuable insights into the reasoning behind participants' rankings and shed light on the underlying thought processes that inform their perspectives.

In RECONECT, the Q-grid scored from -4 to +4 was used (Figure 3).

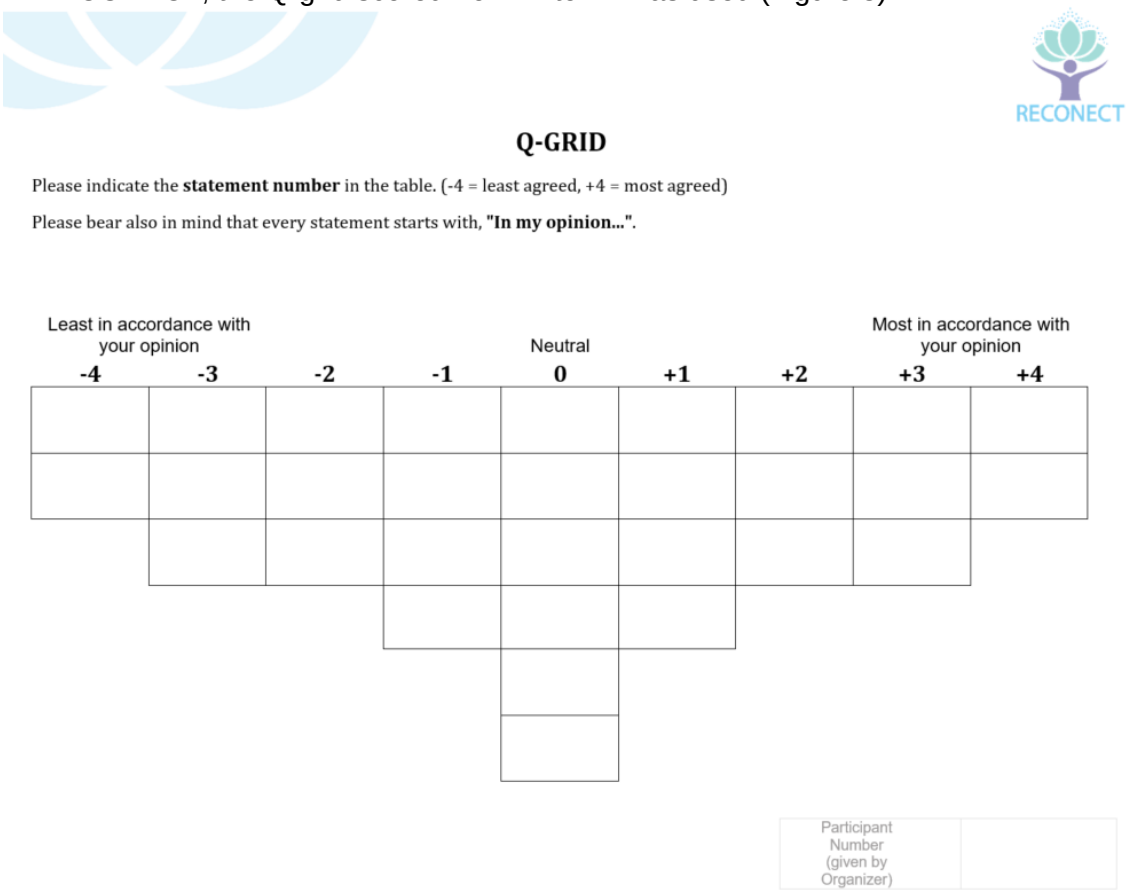

Figure 3 Q-grid used in the local workshops

[2] Samples without missing values or redundant values.

After completing the Q-sorting task, participants are often asked post-sorting questions about their experience of the process and their background and experience with the topic in general. This can help researchers to better understand how participants approached the task, the reasoning behind their rankings, and any issues or challenges they encountered.

Overall, the Q-sorting task provides a structured and systematic approach to capturing participants' perspectives on a particular topic. By providing clear prompts and asking participants to rank statements based on a given judgement, Q-sorting facilitates the identification of shared perspectives and divergent viewpoints within the sample group. Combining this approach with other empirical methods, such as interviews, can help researchers to generate a comprehensive understanding of the complex social phenomena under investigation.

In RECONECT, due to the nature of data collection in a workshop setting, participants were asked to answer three post-sorting questions.

1. What are the reasons for the most disagreed statement?
2. What are the reasons for the most agreed statement?
3. Which aspects/factors would you need to change your mind? Please name at least three main aspects/factors.

After the sorting activity and finishing the post-sorting survey, participants discussed their point of views in groups freely.

Step 5: Quantitative analysis

Factor analysis is a statistical technique used in Q-methodology to identify underlying factors or shared meanings within a set of Q-sorts. This involves correlating each Q-sort with every other one in order to determine the extent to which they share a similar configuration of the Q-set. Q-sorts that have a lot in common are typically subsumed under the same factor. It is similar to traditional factor analysis, with various options available for factor extraction (e.g., centroid, principal component) and rotation (e.g., varimax, by-hand) depending on the research question and the nature of the study. The goal of factor analysis in Q-methodology is to identify and interpret the factors that emerge from the analysis, which can then be used to gain a deeper understanding of the shared perspectives and divergent viewpoints within the sample group.

By identifying common themes and patterns within the Q-sorts, factor analysis can help researchers to explore the underlying factors that shape individuals' perspectives on a particular topic. This can be particularly useful for identifying areas of consensus or disagreement within the sample group, and for gaining a more nuanced understanding of the complex social phenomena under investigation.

The initial step in Q-sort analysis involves transforming each individual's rank-ordered statements into a numerical array. In this study, scores ranging from +4 to -4 were assigned to statements based on their position in the distribution, with statements placed at the most agreeable end receiving +4 and those at the most disagreeable end receiving -4. Statements in the middle of the distribution received a score of 0. These arrays are then correlated with the arrays of other participants to determine the degree of similarity in their rankings. Factor analysis is then applied to the resulting correlation matrix to

identify clusters of participants with similar opinions using the statistical software R package ‘qmethod’ (Zabala, 2014).
People associated with a particular factor share a common characteristic that sets them apart from those associated with other factors. The strength of each participant's association with each opinion type is shown by factor loadings, which can range from -1.00 to +1.00. For example, a factor loading of 0.88 indicates a high correlation between a participant's statement array and the corresponding factor. In Q-methodology, the process of finding participants who have high factor loading is called ‘flagging’. We have used automatic flagging for those who have high factor loadings in specific viewpoints. More details are provided in Annex E.

Step 6: Qualitative interpretation

Factor arrays that have been produced can be used to interpret the factors. These arrays are essentially ideal Q-sorts that are created for each factor by taking into account the Q-sorts of participants who loaded on the factor. This is done by using a weighted averaging approach that considers the importance of each participant's responses. These are ideal Q-sorts that are computed for each factor by weighting the participants' Q-sorts that are loaded on the factor.

One important thing to note is that the overall configuration of statements in a factor array is more meaningful than the placement of specific items within the array. For example, the arrangement of all the statements in the factor array is as important as the most negative/positive or agreed/disagreed statements. Interpreting the factor arrays involves developing narratives that incorporate as many statements from the array as possible. These narratives should be based on a deep understanding of the data and may draw on other information about the participants who are loaded on that particular factor. By doing this, researchers can gain a more nuanced understanding of the factors under investigation and develop more accurate interpretations.

3 Perception of NBS proposed for Collaborator sites

3.1 General analysis

In order to understand the perceptions of suggested Nature-Based solutions, Q-methodology was used. The data was collected from the local workshops in six Collaborators' sites. Before looking at the site-specific data, mean and standard deviation of the statement scores using the agglomerated data from all six sites were analysed. This allows us to grasp the most agreed and least agreed statements and the level of consensus by looking at standard deviation.

This initial analysis enables researchers to gain a broader understanding of the data and identify the most widely agreed-upon statements, as well as the areas of greatest disagreement or uncertainty. The standard deviation provides a measure of the dispersion of the data around the mean, which can be used to gauge the level of consensus among the study participants. By examining the mean and standard deviation of the agglomerated data, identifying patterns or trends that may inform their subsequent analysis of the site-specific data is possible. This approach can be particularly useful in cases where the site-specific data is limited or the sample sizes are small, as it provides a preliminary overview of the data and can help researchers identify areas where further investigation may be needed.

Table 8 shows the grand mean, the average of the means of the different sites, and its standard deviation for each statement. Table 8 is sorted by the grand mean.

Table 7 Grand mean and standard deviation of scores for each statement

Statement		Grand Mean	Standard deviation
12	If the land acquisition process is fair, it is more likely that they accept the NBS project.	2.22	0.43
25	If people are compensated properly for their property/land, it's more likely that they accept the NBS project.	2.07	0.49
26	The overall process of the NBS project should be open and transparent. This will increase the support for the NBS project.	1.97	0.80
23	Most people do not understand well how the NBS project will work for their town/area.	1.58	0.40
15	People prefer a more visible and physical way of reducing flood risks.	1.45	0.47
24	Despite the benefits of NBS, not everyone is convinced of the superiority of NBS.	1.30	0.27
18	If stakeholders do not have a proper opportunity to participate in the process of NBS, they will not support it.	1.17	0.47
11	People place a high value on the natural environment in the NBS area, which leads to the support of NBS projects.	0.90	0.59
4	More scientific proof is needed to show the effectiveness of NBS.	0.65	0.81

Statement		Grand Mean	Standard deviation
3	Trust in public authorities involved in flood risk management is lacking. Therefore, people will not accept NBS.	0.53	1.23
8	Strong stakeholder groups' coalition makes it difficult to bring the NBS process to a successful conclusion.	0.15	0.60
16	The NBS site does not correspond well to the people's ideal conception of the river, and this will cause dissatisfaction amongst the residents.	-0.04	0.41
20	Taxpayers' money should be spent more wisely than demolishing existing risk management infrastructure and constructing a new one.	-0.05	0.90
17	After the NBS implementation, it takes more time from one place to another. This can cause frustration.	-0.26	0.62
29	The town is so highly exposed that it cannot be protected by NBS.	-0.29	0.98
10	The NBS project does not meet the local resident's preference for the place.	-0.38	0.43
27	Stakeholders are not willing to participate in the NBS process and, therefore, they are not supportive.	-0.47	0.50
30	The benefits of NBS do not outweigh the costs.	-0.61	0.44
19	People prefer the previous landscape before the NBS implementation.	-0.75	0.35
2	The NBS project can result in inconveniences (e.g. increased insects, decreased parking space, and increased traffic), therefore, people will not welcome the NBS project.	-0.79	0.93
21	It is costly to maintain NBS.	-0.91	0.58
6	Maintenance of NBS is complicated.	-0.94	0.57
22	Instead of implementing an NBS project, other ways of using the area are more beneficial to the town/area.	-0.95	0.52
14	People worry that NBS can impact wildlife negatively.	-1.03	0.54
1	Hard infrastructure provides better protection than NBS.	-1.08	0.74
9	The NBS project implies landscape change. Therefore, people will not welcome the NBS project.	-1.10	0.64
7	After the NBS implementation, people cannot access the river area where they used to go. This can cause frustration.	-1.21	0.93
13	The quality of life won't increase much as a result of the NBS project.	-1.24	0.63
5	The NBS project can harm the cultural and historical aspects of the town area.	-1.24	0.82
28	The changed landscape after the NBS project does not aesthetically please people.	-1.41	0.84

Grand mean values for each statement span from -1.41 to 2.23, and the standard deviations from 0.27 to 1.23. Table 8 also shows that there are site-specific differences in stakeholder perceptions.

In order to see the general level of agreement, the highest and lowest score statements were examined. Across the sites, workshop participants generally agree with the importance of the land acquisition process, proper compensation, and open and transparent process of the project. The three highest score statements across the workshop sites are:

- #12. If the land acquisition process is fair, it is more likely that they accept the NBS project. (M: 2.23, SD: 0.43).
- #25. If people are compensated properly for their property/land, it's more likely that they accept the NBS project. (M: 2.07, SD: 0.49)
- #26. The overall process of the NBS project should be open and transparent. This will increase the support for the NBS project. (M: 1.97, SD: 0.80)

On the other hand, the workshop participants expressed disagreement with several statements that suggested negative outcomes of implementing NBS. The three lowest score statements across the workshop sites are:

- #28. The changed landscape after the NBS project does not aesthetically please people. (M: -1.41, SD: 0.84)
- #5. The NBS project can harm the cultural and historical aspects of the town area. (M: -1.24, SD: 0.82)
- #13. The quality of life won't increase much as a result of the NBS project. (M: -1.24, SD: 0.63)

Specifically, they did not agree that a changed landscape resulting from an NBS project would not please people. This suggests that the participants believed that an NBS landscape could potentially be aesthetically pleasing and acceptable to the community. Furthermore, the participants did not agree with the statement that the cultural and historical aspects of the town area would be harmed due to NBS, indicating that they may have perceived NBS as compatible with preserving the town's cultural and historical heritage. Finally, the participants did not agree with the statement that the quality of life would not increase with NBS, suggesting that they believed that NBS could potentially offer a range of benefits to the community beyond just ecological outcomes. These findings suggest that the workshop participants were generally supportive of the potential benefits of NBS and had a positive outlook towards implementing such projects in their communities.

The three most consensus statements across sites using their standard deviation are:

- #24. Despite the benefits of NBS, not everyone is convinced of the superiority of NBS. (M: 1.30, SD: 0.27).
- #19. People prefer the previous landscape before the NBS implementation. (M:-0.75, SD: 0.35).
- #23. Most people do not understand well how the NBS project will work for their town/area. (M: 1.58, SD: 0.39).

Meanwhile, some of the statements that include site specificity, such as, site accessibility, risk levels of town, and evaluation of the trust in public authorities were perceived differently by the sites.

The three most conflicting statements across sites using their standard deviation are:

- #7. After the NBS implementation, people cannot access the river area where they used to go. This can cause frustration. (M: 2.23, SD: 0.43).
- #29. The town is so highly exposed that it cannot be protected by NBS. (M: 2.23, SD: 0.43).
- #3. Trust in public authorities involved in flood risk management is lacking. Therefore, people will not accept NBS. (M: 2.23, SD: 0.43).

3.2 Site-specific analysis

3.2.1 Kamchia river basin, Bulgaria

3.2.1.1 Q-sort analysis

After transforming each individual's rank-ordered statements into a numeric array, a factor analysis is applied to identify the clusters of participants with similar opinions. In the following three clusters are presented (viewpoints 1,2 and 3).

Viewpoint 1

Five out of 10 participants (AU3, AC2, C3, PR3, and PO2) were significantly associated and flagged with the viewpoint 1. This viewpoint has an eigenvalue of 3.22 and it explained 23% of the total variance. This group stands out from the other two points of view by ranking two statements distinctively (see table 9).

Table 8 Statements that are distinguished from Viewpoint 2 and 3 in Kamchia site

	Statement	**Viewpoints**		
		1	2	3
8	Strong stakeholder groups' coalition makes it difficult to bring the NBS process to a successful conclusion.	1	0	-2
15	People prefer a more visible and physical way of reducing flood risks.	4	1	0

Generally speaking, viewpoint 1 perceives that land acquisition/compensation process and awareness and understanding of NBS are important for enhancing perceptions of NBS. At the same time, this viewpoint reflects a distinct perspective on valuing visibility and physical attributes of flood-reducing measures (#15, +4). Moreover, people with this viewpoint showed strong disagreement on inconvenience (#2, -4) and inaccessibility (#7, -4) due to NBS projects. Otherwise speaking, people with this viewpoint value NBS for its co-benefits. For instance, in the post-sorting survey, AU3 stated as below:

> *"It is NBS that bring convenience; there are no marshy lands and mosquitoes, smells, etc. The main task of stakeholders (local and regional authorities) is to participate in programmes and projects for NBS."*

In the meantime, the people with this viewpoint believe that NBS can be as effective, if not more effective, than traditional hard infrastructure (#1, -3). They do not necessarily

believe that more scientific proof is needed to demonstrate the effectiveness of NBS (#4, -2). This perspective is also seen by post-sorting survey, C3 stated as follows:

> *"I believe stakeholders in the region are sufficiently aware of benefits of NBS."*

They emphasise the importance of stakeholder participation in the decision-making process for NBS implementation (#18, +3). However, they did not worry much about stakeholder groups' coalition that may hinder NBS process (#8, +1).

As a summary, stakeholders with viewpoint 1, arguably, consider NBS as "visible", and effective for reducing risks with diverse co-benefits and use-values.

Viewpoint 2

Five out of 10 participants (AU1, AC1, AC3, C1, C2, and PR2) were significantly associated and flagged with the viewpoint 2. This viewpoint has an eigenvalue of 2.35 and it explained 16.79% of the total variance. Viewpoint 2 is particularly distinguished by nine statements with the factor scores respectively (see table 10).

Table 9 Statements that are distinguished from Viewpoint 1 and 3

	Statement	**Viewpoints**		
		1	**2**	3
1	Hard infrastructure provides better protection than NBS.	-3	-2	-4
4	More scientific proof is needed to show the effectiveness of NBS.	-2	1	-1
5	The NBS project can harm the cultural and historical aspects of the town area.	1	0	3
11	People place a high value on the natural environment in the NBS area, which leads to the support of NBS projects.	3	-2	4
13	The quality of life won't increase much as a result of the NBS project.	1	-3	0
20	Taxpayers' money should be spent more wisely than demolishing existing risk management infrastructure and constructing a new one.	-3	0	-2
21	It is costly to maintain NBS.	-2	3	-3
23	Most people do not understand well how the NBS project will work for their town/area.	3	0	1
29	The town is so highly exposed that it cannot be protected by NBS.	-1	-4	-1

This group of stakeholders believes that trust is a critical component that is currently lacking, which leads to hesitancy in accepting NBS as a solution (#3, +4). About trust, C2 stated as below:

> *"The local people do not trust the government, they believe its actors are not competent enough and the infrastructure is expensive."*

PR2 argued that political instability is part of its cause for lacking trust towards authorities:

"The political instability in the country ruins the trust in public authorities."

In this regard, they suggest that implementing transparent processes could help to improve support for NBS (#26, +4), indicating that stakeholder participation is moderately important (#18, 2). Additionally, they believe that fair land acquisition can lead to greater support for NBS (#25, +2). AU1 and AC3 stated respectively:

> *"In order to increase support for NBS, the implementation process needs to be open and transparent."*
>
> *"Fair expropriation of land is a prerequisite for the acceptance of the proposed NBS."*

In contrast to other viewpoints, stakeholders who hold viewpoint 2 tend to express relatively lesser scepticism regarding the effectiveness of NBS (#1, -2). Rather, they emphasised the role of communication in achieving a better understanding of NBS. For example, AC1 expressed their view on the importance of communication for diffusing the effectiveness of NBS as below.

> *"The implementation of NBS requires modern technological means and a variety of scientific methods, which should be communicated to the level of the regular citizen."*

Additionally, they perceive the maintenance costs of NBS to be quite high (#21, +3) while they still view NBS as a viable solution for highly exposed areas (#29, -4).
Overall, individuals who hold this viewpoint are strong advocates for NBS and generally support its implementation to reduce risks in their town. However, they have concerns regarding the transparency and trustworthiness of the process, and also high maintenance cost.

Viewpoint 3

Two out of 10 participants (PR1 and PO1) were significantly associated and flagged with viewpoint 3. This viewpoint has an eigenvalue of 2.01 and it explained 14.34% of the total variance. Viewpoint 3 is particularly distinguished by three statements with the factor score respectively (see table 11).

Table 10 Statements that are distinguished from Viewpoint 1 and 2 in Kamchia site

	Statement	**Viewpoints**		
		1	2	**3**
10	The NBS project does not meet the local resident's preference for the place.	0	0	2
14	People worry that NBS can impact wildlife negatively.	-3	-3	3
16	The NBS site does not correspond well to the people's ideal conception of the river, and this will cause dissatisfaction amongst the residents.	0	-1	2

This particular group of stakeholders holds a view that the implementation of NBS will result in inconveniences, which may not be welcomed by the wider community (#2, +4). In line with this, they believe that the NBS project may not fully meet the local residents' preferences for the area (#10, +2). They moderately agree that the NBS site may not align with the ideal conception of the river that people have (#16, +2). Furthermore, they

are of the opinion that the NBS project could have a negative impact on local wildlife (#14, +3). This viewpoint emphasises that user-values (inconvenience/convenience or other direct benefits), and environmental attitude would decide residents' support. PO1 stated that *"The eventual inconveniences predetermine people's decisions."*

However, they do not agree that people will prefer the previous landscape over the new NBS-implemented landscape (#19, -4). Rather, PO1 stated that *"the landscape is not always important to the population."* Also, it seems clear to them, the residents' dissatisfaction was not due to the complexity of maintaining NBS (#6, -4).

Overall, this group has concerns that the implementation of NBS could result in inconvenience and may not necessarily align with the local residents' preferences for the area. They also express concern about the potential negative impact on local wildlife. However, they do not consider NBS maintenance to be complicated. It can be inferred that these people are cautious and hesitant about the implementation of NBS and would like to ensure that the project aligns with their preferences and values while minimising potential negative impacts on the environment.

3.2.2 Bregana river basin, Croatia

3.2.2.1 Descriptive analysis

20 people in total participated in the Q-methodology activity during the local workshop in Bregana, Croatia. The participants include seven local authority representatives (AU1, AU2, AU3, AU5, AU6, AU-n, AU-n1), one member of civil society (C2), three members of the private sector (PR1, PR2, PR4), and five political representatives (PO1, PO2, PO4, PO5, PO6), and one unidentified participant. Among them, five participants' q-sort which were either not complete, or had redundant values were omitted. Table 12 shows the mean and median values for each statement sorted from the highest to lowest mean score. It allows us to find the most agreed and disagreed statements at the site.

Table 11 Mean and Median scores of the statements in Bregana site

	Statement	Mean	Median
12	If the land acquisition process is fair, it is more likely that they accept the NBS project.	2.27	3
15	People prefer a more visible and physical way of reducing flood risks.	1.93	2
23	Most people do not understand well how the NBS project will work for their town/area.	1.60	2
3	Trust in public authorities involved in flood risk management is lacking. Therefore, people will not accept NBS.	1.40	1
25	If people are compensated properly for their property/land, it's more likely that they accept the NBS project.	1.33	1
26	The overall process of the NBS project should be open and transparent. This will increase the support for the NBS project.	1.27	1

24	Despite the benefits of NBS, not everyone is convinced of the superiority of NBS.	1.20	1
11	People place a high value on the natural environment in the NBS area, which leads to the support of NBS projects.	0.93	1
17	After the NBS implementation, it takes more time from one place to another. This can cause frustration.	0.87	1
18	If stakeholders do not have a proper opportunity to participate in the process of NBS, they will not support it.	0.87	1
8	Strong stakeholder groups' coalition makes it difficult to bring the NBS process to a successful conclusion.	0.53	0
7	After the NBS implementation, people cannot access the river area where they used to go. This can cause frustration.	0.47	1
2	The NBS project can result in inconveniences (e.g. increased insects, decreased parking space, and increased traffic), therefore, people will not welcome the NBS project.	0.37	0.5
4	More scientific proof is needed to show the effectiveness of NBS.	0.23	-0.5
16	The NBS site does not correspond well to the people's ideal conception of the river, and this will cause dissatisfaction amongst the residents.	0.20	0
6	Maintenance of NBS is complicated.	-0.40	0
19	People prefer the previous landscape before the NBS implementation.	-0.47	0
22	Instead of implementing an NBS project, other ways of using the area are more beneficial to the town/area.	-0.70	-0.5
9	The NBS project implies landscape change. Therefore, people will not welcome the NBS project.	-0.73	-1
21	It is costly to maintain NBS.	-0.73	-1
29	The town is so highly exposed that it cannot be protected by NBS.	-0.83	-1.5
1	Hard infrastructure provides better protection than NBS.	-0.87	-1
20	Taxpayers' money should be spent more wisely than demolishing existing risk management infrastructure and constructing a new one.	-0.87	-1
10	The NBS project does not meet the local resident's preference for the place.	-0.90	-0.5
5	The NBS project can harm the cultural and historical aspects of the town area.	-1.07	-1
14	People worry that NBS can impact wildlife negatively.	-1.10	-0.5
27	Stakeholders are not willing to participate in the NBS process and, therefore, they are not supportive.	-1.27	-1

30	The benefits of NBS do not outweigh the costs.	-1.27	-2
13	The quality of life won't increase much as a result of the NBS project.	-1.90	-2.5
28	The changed landscape after the NBS project does not aesthetically please people.	-2.67	-3

Three statements, which garnered the most agreement among participants, were statement #12, which stated that a fair land acquisition process would increase the likelihood of NBS project acceptance; statement #15, which suggested that people prefer physical methods of reducing flood risks; and statement #23, which revealed that many people do not fully comprehend how the NBS project will operate in their specific area.

In contrast, the study found that statement #28, which discussed the potential negative aesthetic impact of the NBS project, statement #13, which stated that the project would not significantly improve quality of life, and statement #27, which suggested that stakeholders were unwilling to participate and thus unsupportive, received the least amount of agreement.

To better understand the underlying viewpoint in Bregana river basin, we distinguished the statements by the topics and average scores per topic are presented below in Figure 4. In general, in the Bregana site, land acquisition, accessibility, level of understanding, and trust and transparency were considered crucial for people's perceptions of NBS (average topic score above 1).

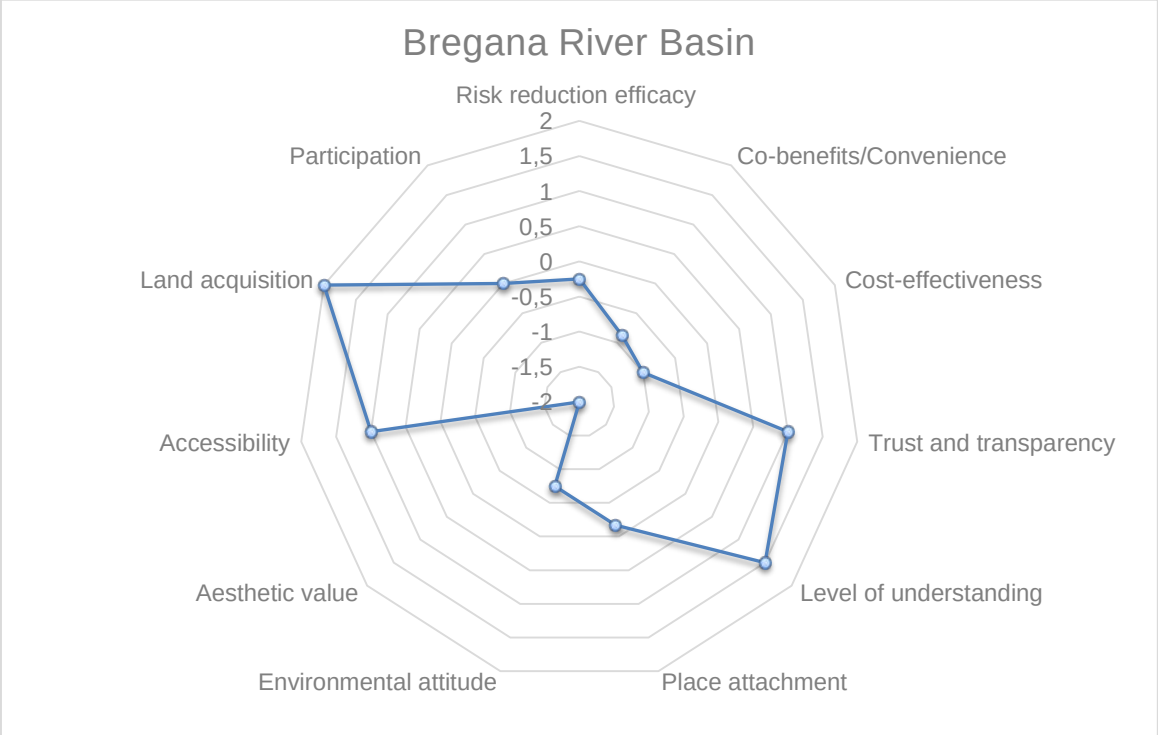

Figure 4 Radar chart with average topic scores in Bregana River Basin

3.2.2.2 Q-sort analysis

After transforming each individual's rank-ordered statements into a numeric array, a factor analysis is applied to identify the clusters of participants with similar opinions. In the following, three clusters are presented (Viewpoint 1,2 and 3).

Viewpoint 1

Six out of 14 participants (AU5, AU-n, AU-n1, PR4, PO1, and PR2) were significantly associated and flagged with Viewpoint 1. This viewpoint has an eigenvalue of 2.98 and it explained 21% of the total variance. This group of people is distinguished from the other two viewpoints, particularly with these two statements (#3 and #26) as below (see Table 13).

Table 12 Statements that are distinguished from Viewpoint 2 and 3 in Bregana site

	Statement	Viewpoints		
		1	2	3
3	Trust in public authorities involved in flood risk management is lacking. Therefore, people will not accept NBS.	0	4	2
26	The overall process of the NBS project should be open and transparent. This will increase the support for the NBS project.	4	1	1

Viewpoint 1 is characterised by a strong emphasis on stakeholder participation in decision-making processes, with an emphasis on openness and transparency (#26, +4). PR2 explicitly mentioned transparent *financing* for NBS implementation. At the same time, they show rather a neutral stance about the statement that strong stakeholder groups' coalition makes it difficult to bring NBS process to a successful conclusion (#8, +1). In comparison to other viewpoints, stakeholders within Viewpoint 1 do not necessarily agree that trust in public authorities is lacking (#3, 0). This can be attributed to a significant portion of this group comprising public authority (AU) and political representation (PO) members who tend to have a more favourable view of government actions. AU-N1 stated as such:

> *"The local population is not sufficiently familiar with the measures of the so-called 'green' infrastructure and are distrustful of institutions, an additional problem is the problematic purchase of land for the implementation of such conditions."*

Additionally, stakeholders with this viewpoint do not agree with the statement that NBS projects will have negative impacts on local wildlife (#14, -4). However, they do express a strong belief that most people do not understand the NBS project's operations and potential benefits to their area, which is not as explicitly stated in the other two viewpoints (#23, +4). AU-N1 stated as such:

> *"…I have the impression that everything is still worked out quite studiously and vaguely; additional education of the local population - not only interested stakeholders."*

Also, they emphasised the role of raising understanding of NBS for ameliorating perceptions (#23, +4 & #24, +3).

Viewpoint 2

Five out of 14 participants (AU7, PO4, AU1, PO6, and PO5) were significantly associated and flagged with Viewpoint 2. This viewpoint has an eigenvalue of 2.63 and it explained 19% of the total variance. This group of people is distinguished from the other two viewpoints particularly with these five statements (#4, #5, #9, #24 and #25) as below (see Table 14).

Table 13 Statements that are distinguished from Viewpoint 1 and 3 in Bregana site

	Statement	Viewpoints		
		1	**2**	3
4	More scientific proof is needed to show the effectiveness of NBS.	-2	4	-2
5	The NBS project can harm the cultural and historical aspects of the town area.	-3	0	-2
9	The NBS project implies landscape change. Therefore, people will not welcome the NBS project.	-2	1	-1
24	Despite the benefits of NBS, not everyone is convinced of the superiority of NBS.	3	0	2
25	If people are compensated properly for their property/land, it's more likely that they accept the NBS project.	3	0	4

Viewpoint 2 represents a distinct stance among stakeholders who emphasise the need for more concrete evidence to sway public opinion towards the adoption of NBS over hard infrastructure options (#4, +4). For instance, PO6 emphasised that "s*cientific evidence (in addition to practical) is the best measure of effectiveness*". Despite this, they hold a belief that traditional infrastructure provides superior protection against natural hazards when compared to NBS alternatives (#1, +2). However, they still acknowledge that NBS can offer sufficient protection to their town from potential environmental risks (#29, -4). In general, the stakeholders with this perspective argued that no matter which solutions, people will put forward the flood risk reduction effectiveness. PO4 stated as such:

> *"People will support any project if it contributes to flood protection. The quality of life can be significantly increased by the NBS project because it also provides comprehensive protection against floods."*

This viewpoint's group expresses concern that limited access to the river after NBS implementation could hinder support for the project (#7, +3). They also slightly agree that NBS implementation could have negative impacts on the local wildlife population (#14, +1). Interestingly, in contrast to other viewpoints, stakeholders with Viewpoint 2 believe that people have a reasonable understanding of how the NBS project will operate within their area (#23, -1). In the meantime, they believe that gaining more trust can boost the positive perceptions of NBS (#3, +4).

Viewpoint 3

Three out of 14 participants (C2, AU6, and PR1) were significantly associated and flagged with Viewpoint 3. This viewpoint has an eigenvalue of 2.54 and it explained 18%

of the total variance. This group of people is distinguished from the other two viewpoints, particularly with these five statements (#6, #13. #20, and #30) as below (see table 15).

Table 14 Statements that are distinguished from Viewpoint 1 and 2 in Bregana site

	Statement	Viewpoints		
		1	2	**3**
6	Maintenance of NBS is complicated.	-1	0	-3
13	The quality of life won't increase much as a result of the NBS project.	-3	-3	0
20	Taxpayers' money should be spent more wisely than demolishing existing risk management infrastructure and constructing a new one.	0	-1	-4
30	The benefits of NBS do not outweigh the costs.	-3	-3	4

Viewpoint 3 is characterised by a belief in the effectiveness of NBS in reducing risks (#1, -4). They do not agree that taxpayers' money should be spent more wisely in demolishing existing risk management infrastructure and constructing a new one (#20, -4). However, they express concerns about the high cost associated with realising NBS, especially when compared to its benefits (#30, +4).[3]

The group suggests that a strong coalition of stakeholders may prevent the successful conclusion of NBS initiatives (#8, +3).

Additionally, in contrast to other viewpoints, stakeholders within Viewpoint 3 hold a more neutral stance on the extent to which the NBS project will improve the quality of life in their area (#13, 0). They expect more co-benefits besides the risk-reduction function of NBS than other viewpoints. For instance, C2 listed *"increasing biodiversity, reducing flood damage, long-term problem solving, and benefits for the local community"* for garnering more support.

In general, stakeholders with Viewpoint 3 believe in the effectiveness of NBS in reducing risks but disagree with demolishing existing infrastructure, expressing concerns about the high cost of implementing NBS compared to its benefits. They also highlight the potential hindrance of stakeholder coalitions on NBS initiatives and hold a more neutral stance on the extent of improved quality of life, emphasising additional co-benefits such as increased biodiversity and benefits for the local community.

Figure 5 summarizes the different viewpoints.

[3] However, there is a limitation that participants misunderstood the statement. For instance, in the post-sorting survey, about statement #30, PR1 wrote, ""The costs caused by floods are greater than any flood protection measures.", and C2 wrote "I expect a long-term cost reduction and more efficient protection". If we take them into account, we can conclude that they misunderstood the sentence.

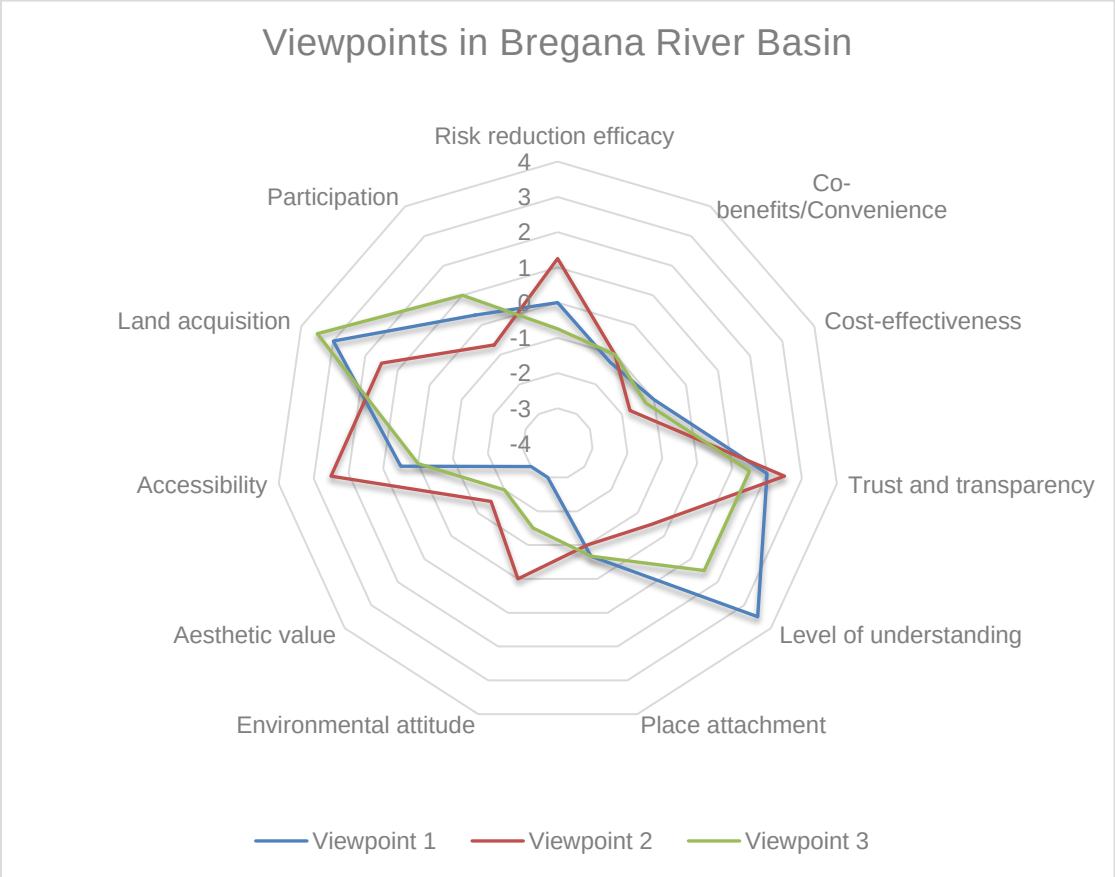

Figure 5 Radar chart with average scores per topic by three viewpoints in Bregana site

3.2.3 Vrbanja river basin, Bosnia and Herzegovina

3.2.3.1 Descriptive analysis

During a local workshop in Vrbanja, Bosnia and Herzegovina, a total of 18 individuals participated in a Q-methodology activity. The participants were a diverse group, including five local authority representatives (AU1-AU5), two members from civil society (C1 and C2), two members from the private sector (PR1 and PR2), three political representatives (PO1, PO2, and PO4), five from academia (AC1-AC5), and one from the media (M1). However, seven of the participants had incomplete or redundant q-sorts, so their data was omitted from the analysis, leaving a total of 11 participants' data to be analysed.

It should be noted that this analysis falls short of the suggested number of participants for a Q-methodology study, which typically ranges from 40 to 60 participants. However, as a qualitative analysis tool, the number of participants may be less important. To identify the most agreed and disagreed upon statements at the site, Table 16 was created to show the mean and median value for each statement, sorted from highest to lowest mean score. This table provides valuable insight into the perspectives of the 11 participants whose data were analysed.

Table 15 Mean and Median scores of the statements in Vrbanja site

	Statement	Mean	Median
4	More scientific proof is needed to show the effectiveness of NBS.	2.10	3
25	If people are compensated properly for their property/land, it's more likely that they accept the NBS project.	1.80	1
26	The overall process of the NBS project should be open and transparent. This will increase the support for the NBS project.	1.80	1
18	If stakeholders do not have a proper opportunity to participate in the process of NBS, they will not support it.	1.70	2
3	Trust in public authorities involved in flood risk management is lacking. Therefore, people will not accept NBS.	1.60	2.5
12	If the land acquisition process is fair, it is more likely that they accept the NBS project.	1.50	2.5
20	Taxpayers' money should be spent more wisely than demolishing existing risk management infrastructure and constructing a new one.	1.10	0.5
15	People prefer a more visible and physical way of reducing flood risks.	1.00	1
23	Most people do not understand well how the NBS project will work for their town/area.	0.90	1
24	Despite the benefits of NBS, not everyone is convinced of the superiority of NBS.	0.80	1
11	People place a high value on the natural environment in the NBS area, which leads to the support of NBS projects.	0.50	0.5
16	The NBS site does not correspond well to the people's ideal conception of the river, and this will cause dissatisfaction amongst the residents.	0.30	0
27	Stakeholders are not willing to participate in the NBS process and, therefore, they are not supportive.	0.10	0
29	The town is so highly exposed that it cannot be protected by NBS.	0.00	0
8	Strong stakeholder groups' coalition makes it difficult to bring the NBS process to a successful conclusion.	0.00	0
17	After the NBS implementation, it takes more time from one place to another. This can cause frustration.	-0.30	-0.5
21	It is costly to maintain NBS.	-0.40	0
30	The benefits of NBS do not outweigh the costs.	-0.40	0
14	People worry that NBS can impact wildlife negatively.	-0.50	-1

22	Instead of implementing an NBS project, other ways of using the area are more beneficial to the town/area.	-0.50	0
28	The changed landscape after the NBS project does not aesthetically please people.	-0.50	0
10	The NBS project does not meet the local resident's preference for the place.	-0.60	-1.5
6	Maintenance of NBS is complicated.	-1.00	-1
13	The quality of life won't increase much as a result of the NBS project.	-1.20	-2
2	The NBS project can result in inconveniences (e.g. increased insects, decreased parking space, and increased traffic), therefore, people will not welcome the NBS project.	-1.20	-1
1	Hard infrastructure provides better protection than NBS.	-1.30	-2
19	People prefer the previous landscape before the NBS implementation.	-1.30	-1
5	The NBS project can harm the cultural and historical aspects of the town area.	-1.90	-2.5
7	After the NBS implementation, people cannot access the river area where they used to go. This can cause frustration.	-2.00	-1.5
9	The NBS project implies landscape change. Therefore, people will not welcome the NBS project.	-2.10	-3

Three statements that received the most agreement among the participants in Vrbanja workshop are #4, #26, and #25. Statement #4 emphasises the necessity of more scientific proof of NBS, #26 points out the importance of fair and open process, #25 is about the proper compensation for property and land before implementation of NBS. Conversely, statements with regards to negative aspects of NBS such as #9, negative influence on the landscape, #7, limited accessibility, #5, negative influence on cultural aspects received the least agreement amongst participants.

To better understand the underlying viewpoint in Vrbanja river basin, we distinguished the statements by the topics and average scores per topic are presented as below in Figure 6. As a site in general, land acquisition and trust and transparency are most emphasising elements for acceptance of NBS.

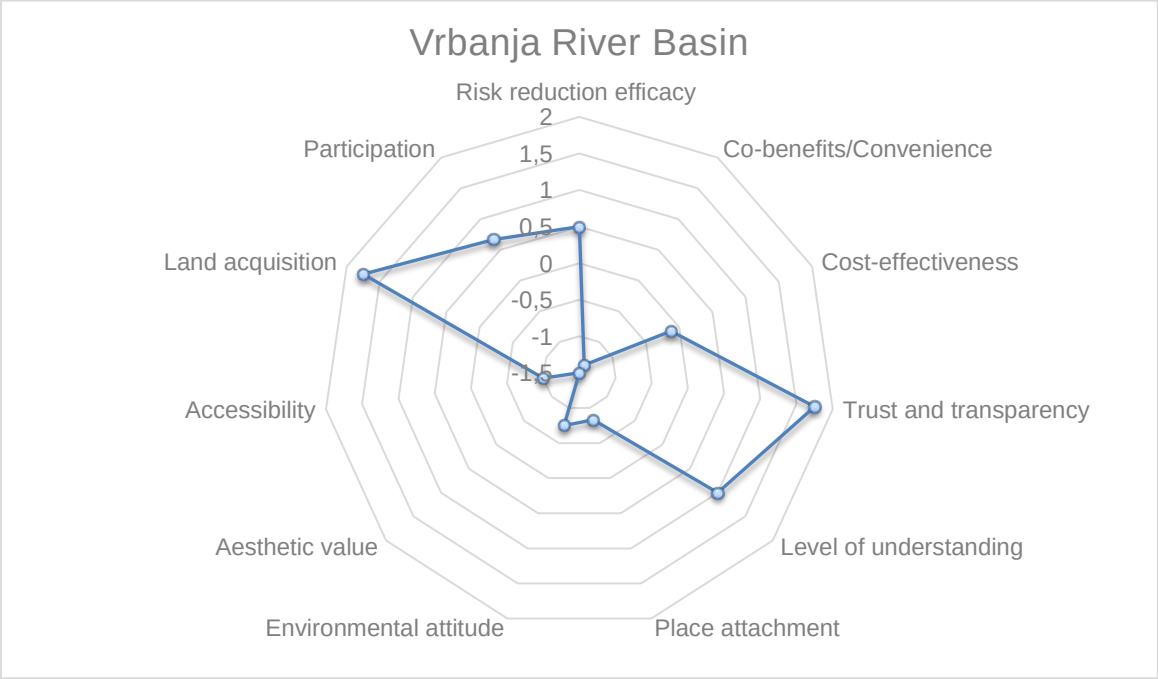

Figure 6 Radar chart with average topic scores in Vrbanja site

3.2.3.2 Q-sort analysis

Following the same steps ahead, after transforming each individual's rank-ordered statements into a numeric array, the factor analysis is applied to identify the clusters of participants with similar opinions.

Viewpoint 1

Four out of 10 participants (AC1, AC3, M1, and PR1) were significantly associated and flagged with Viewpoint 1. This viewpoint has an eigenvalue of 2.46 and it explained 25% of the total variance. This group of people is distinguished from the other two viewpoints, particularly with these four statements (#2, #12, #18, and #20) as below (see Table 17).

Table 16 Statements that are distinguished from Viewpoint 2 and 3 in Kamchia site

	Statement	**Viewpoints**		
		1	2	3
2	The NBS project can result in inconveniences (e.g. increased insects, decreased parking space, and increased traffic), therefore, people will not welcome the NBS project.	0	-2	-3
12	If the land acquisition process is fair, it is more likely that they accept the NBS project.	4	-1	-1
18	If stakeholders do not have a proper opportunity to participate in the process of NBS, they will not support it.	0	3	3

20	Taxpayers' money should be spent more wisely than demolishing existing risk management infrastructure and constructing a new one.	2	1	0

Stakeholders with Viewpoint 1 prioritise fair land acquisition (#12, +4) as they believe it could increase public acceptance of the NBS project. In general, they perceive more benefits than drawbacks, for instance, they strongly oppose the statement that the NBS project's altered landscape would not be aesthetically pleasing to the public (#28, -4). This implies that they believe people may prefer the new landscape. Additionally, they do not believe that the NBS project will damage the town's cultural and historical aspects (#5, -3).

When it comes to cost, these stakeholders place relatively more value on the cost-effectiveness of flood risk management measures (#20, +2), indicating that they would prefer to use what is currently built for flood risk management. This is seen by the answer by AC1 in the post-sorting survey that AC1 would argue for more proof/evidence for risk reduction effectiveness of NBS. AC stated as such:

> *"Due to the fact that NBS are a new concept that is unknown in these areas, and the fact that NBS do not give an immediate effect nor can they act as quickly as grey infrastructure. A systemic approach to this topic is necessary, as well as significant investments."*

In summary, stakeholders in Viewpoint 1 prioritise fair land acquisition, believing that it could increase public acceptance of the NBS project. They put emphasis on the cost aspect of NBS, as the project is a significant investment.

Viewpoint 2

Four out of 10 participants (AC2, AC4, AC5, and PO4) were significantly associated and flagged with Viewpoint 2. This viewpoint is represented mostly by stakeholders from academic and research fields. This viewpoint has an eigenvalue of 1.98 and it explained 20% of the total variance. This group of people is distinguished from the other two viewpoints, particularly with these four statements (#1, #3, #10, and #26) as below (see Table 18).

Table 17 Statements that are distinguished from Viewpoint 1 and 3 in Vrbanja site

	Statement	**Viewpoints**		
		1	**2**	3
1	Hard infrastructure provides better protection than NBS.	1	-3	2
3	Trust in public authorities involved in flood risk management is lacking. Therefore, people will not accept NBS.	4	1	4
10	The NBS project does not meet the local resident's preference for the place.	-3	0	-2
26	The overall process of the NBS project should be open and transparent. This will increase the support for the NBS project.	1	4	1

Viewpoint 2 distinguishes itself from the other two perspectives by placing a greater emphasis on the importance of openness and transparency in the NBS process, believing that it is crucial for gaining more support. In contrast, Viewpoints 1 and 3 did not score highly for statement #26. AC5 told as such:

> *"Like all innovations that are included in the application of NBS solutions, they need to be proven, both 'on the field' and with scientific evidence. Transparency in everything is very important, this also applies to the application of NBS solutions."*

Moreover, Viewpoint 2 disagrees with the notion that hard infrastructure can provide better protection than NBS, scoring -3 for statement #1. However, stakeholders with this viewpoint also recognize that valuing the natural environment highly does not necessarily lead to support for NBS, as demonstrated by a score of -4 for statement #11. AC4 illustrated as such:

> *"People do not value the natural environment, so NBS solutions are not conditioned by that factor."*

They also acknowledge that changes to the landscape resulting from NBS projects may not be aesthetically pleasing to everyone, scoring +3 for statement #28. This may be linked to a score of 0 for statement #10, as NBS projects may not always align with local residents' preferences. While the other two viewpoints are rather opposed to statement #10, stakeholders with Viewpoint 2 scored in the middle range (0).
In summary, Viewpoint 2 focuses on the importance of openness and transparency in the implementation of NBS to gain support. They disagree with the notion that hard infrastructure is superior to NBS for protection. While they recognize that valuing the natural environment does not guarantee support for NBS, they believe that transparency is crucial in the application of NBS. They acknowledge that changes to the landscape resulting from NBS projects may not be visually appealing to everyone. Local residents' preferences may not always align with NBS projects, but stakeholders with Viewpoint 2 have a neutral stance on this.

Viewpoint 3

Only AU2 out of 10 participants was significantly associated and flagged with viewpoint 3. This viewpoint has an eigenvalue of 1.27 and it explained 13% of the total variance. This group of people is distinguished from the other two viewpoints, particularly with these four statements (#6, #9, #15, and #23) as below (see table 19).

Table 18 Statements that are distinguished from Viewpoint 1 and 2 in Vrbanja site

	Statement	Viewpoints		
		1	2	3
6	Maintenance of NBS is complicated.	-2	0	3
9	The NBS project implies landscape change. Therefore, people will not welcome the NBS project.	-4	-4	3
15	People prefer a more visible and physical way of reducing flood risks.	3	2	-3
16	The NBS site does not correspond well to the people's ideal conception of the river, and this will cause dissatisfaction amongst the residents.	1	1	-4

23	Most people do not understand well how the NBS project will work for their town/area.	2	2	-2

Viewpoint 3 is a distinct perspective among the stakeholders, represented by a single stakeholder. This viewpoint asserts that the landscape changes resulting from NBS will discourage people from supporting the project (#9, +3), or at the very least, that people will not find the altered landscape aesthetically pleasing compared to other viewpoints (#28, +0). AU2 stated that there is *"reluctance to change and distrust in natural solutions".* Additionally, this viewpoint highlights the complexity of NBS maintenance (#6, +3). Unlike other viewpoints, Viewpoint 3 strongly disagrees with the notion that the NBS site fails to correspond well with the people's ideal conception of the river, which could result in dissatisfaction among residents (#16, -4). This perspective does not agree much about the statement that stakeholders are not willing to participate in the NBS process, therefore, they are not supportive (#27, -3).

In summary, Viewpoint 3 highlights landscape changes' discouraging effect on support, and acknowledges maintenance complexity, but disagrees on the role of stakeholder participation in supportive attitude and river site dissatisfaction after NBS.

In order to ease the understanding of each viewpoint and to show it visually, the z-scores per topic are average and illustrated as the radar chart (Figure 7).

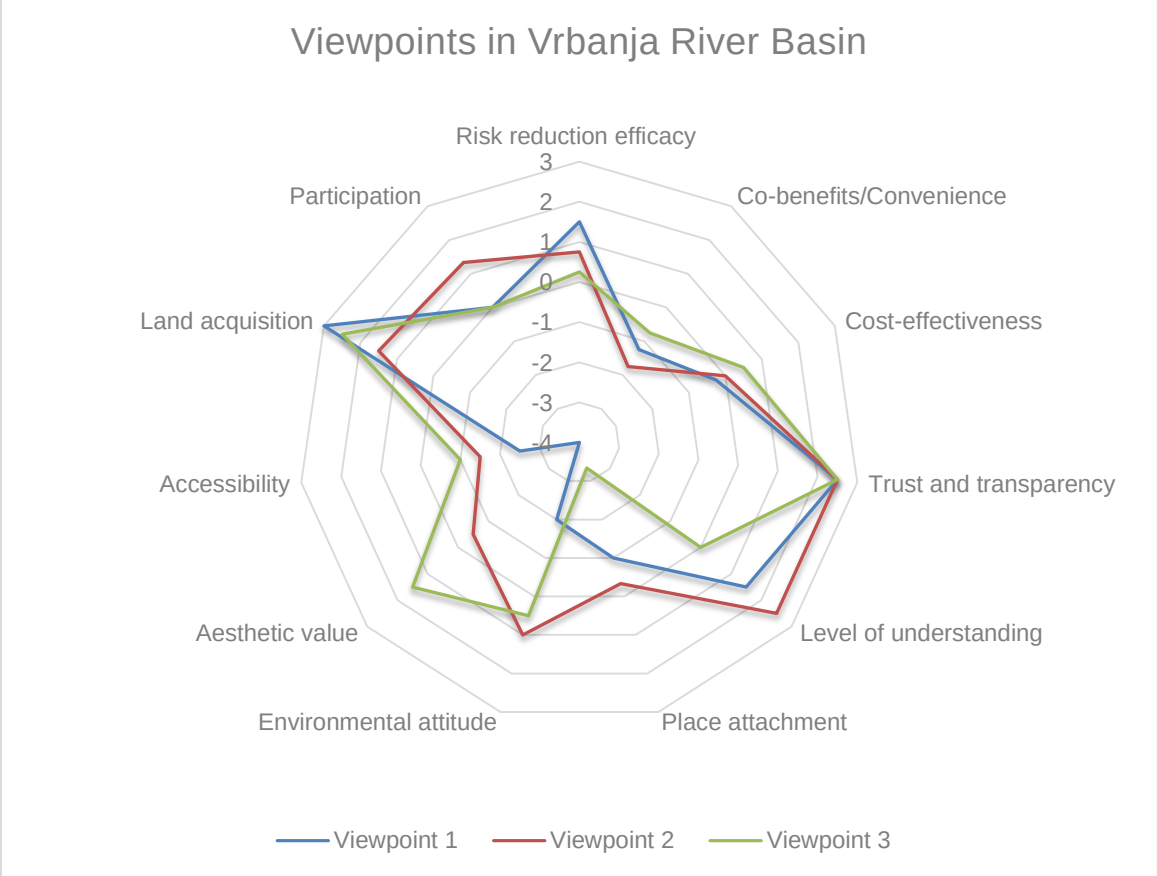

Figure 7 Radar chart with average scores per topic by three viewpoints in Vrbanja site

3.2.4 Pilica river basin, Poland

3.2.4.1 *Descriptive analysis*

During a local workshop in Bogdanowka, Poland, a total of 28 individuals participated in a Q-methodology activity. The participants were a diverse group, including 12 local authority representatives (AU1-AU11, AU13), three members from civil society (C1-C3), three members from the private sector (PR1-PR3), seven political representatives (PO1-PO7), and three from academia (AC1-AC3). There were no participants from the media sector. All participants submitted the full-data q-grid.

To identify the most agreed and disagreed upon statements at the site, Table 20 was created that shows the mean and median value for each statement, sorted from highest to lowest mean score.

Table 19 Mean and Median scores of the statements in Pilica site

	Statement	Mean	Median
25	If people are compensated properly for their property/land, it's more likely that they accept the NBS project.	2.43	3
12	If the land acquisition process is fair, it is more likely that they accept the NBS project.	2.29	3
11	People place a high value on the natural environment in the NBS area, which leads to the support of NBS projects.	2.04	2
15	People prefer a more visible and physical way of reducing flood risks.	1.96	3
23	Most people do not understand well how the NBS project will work for their town/area.	1.93	2
24	Despite the benefits of NBS, not everyone is convinced of the superiority of NBS.	1.36	2
8	Strong stakeholder groups' coalition makes it difficult to bring the NBS process to a successful conclusion.	0.93	1
26	The overall process of the NBS project should be open and transparent. This will increase the support for the NBS project.	0.86	0.5
3	Trust in public authorities involved in flood risk management is lacking. Therefore, people will not accept NBS.	0.79	1
18	If stakeholders do not have a proper opportunity to participate in the process of NBS, they will not support it.	0.79	1
4	More scientific proof is needed to show the effectiveness of NBS.	0.18	0
10	The NBS project does not meet the local resident's preference for the place.	0.14	0
9	The NBS project implies landscape change. Therefore, people will not welcome the NBS project.	-0.29	-0.5

20	Taxpayers' money should be spent more wisely than demolishing existing risk management infrastructure and constructing a new one.	-0.32	0
22	Instead of implementing an NBS project, other ways of using the area are more beneficial to the town/area.	-0.32	0
16	The NBS site does not correspond well to the people's ideal conception of the river, and this will cause dissatisfaction amongst the residents.	-0.36	0
21	It is costly to maintain NBS.	-0.36	0
30	The benefits of NBS do not outweigh the costs.	-0.43	0
29	The town is so highly exposed that it cannot be protected by NBS.	-0.46	0
17	After the NBS implementation, it takes more time from one place to another. This can cause frustration.	-0.50	-1
13	The quality of life won't increase much as a result of the NBS project.	-0.75	-1
2	The NBS project can result in inconveniences (e.g. increased insects, decreased parking space, and increased traffic), therefore, people will not welcome the NBS project.	-0.79	-1
7	After the NBS implementation, people cannot access the river area where they used to go. This can cause frustration.	-0.82	-0.5
27	Stakeholders are not willing to participate in the NBS process and, therefore, they are not supportive.	-0.82	-0.5
19	People prefer the previous landscape before the NBS implementation.	-0.86	-1
6	Maintenance of NBS is complicated.	-1.21	-1.5
28	The changed landscape after the NBS project does not aesthetically please people.	-1.25	-2
5	The NBS project can harm the cultural and historical aspects of the town area.	-1.96	-3
14	People worry that NBS can impact wildlife negatively.	-2.04	-2.5
1	Hard infrastructure provides better protection than NBS.	-2.14	-2.5

Three statements that received the most agreement among the participants in the Bogdanowka workshop are #25, #12, and #11. Statement #25 and #12 are both related to the process aspect before implementing NBS (e.g. land acquisition and compensation). In the meantime, #1, #14, and #5 statements received the lowest score among participants.

To better understand the underlying viewpoint in the Pilica river basin, we distinguished the statements by the topics and average scores per topic are presented below in Figure 8.

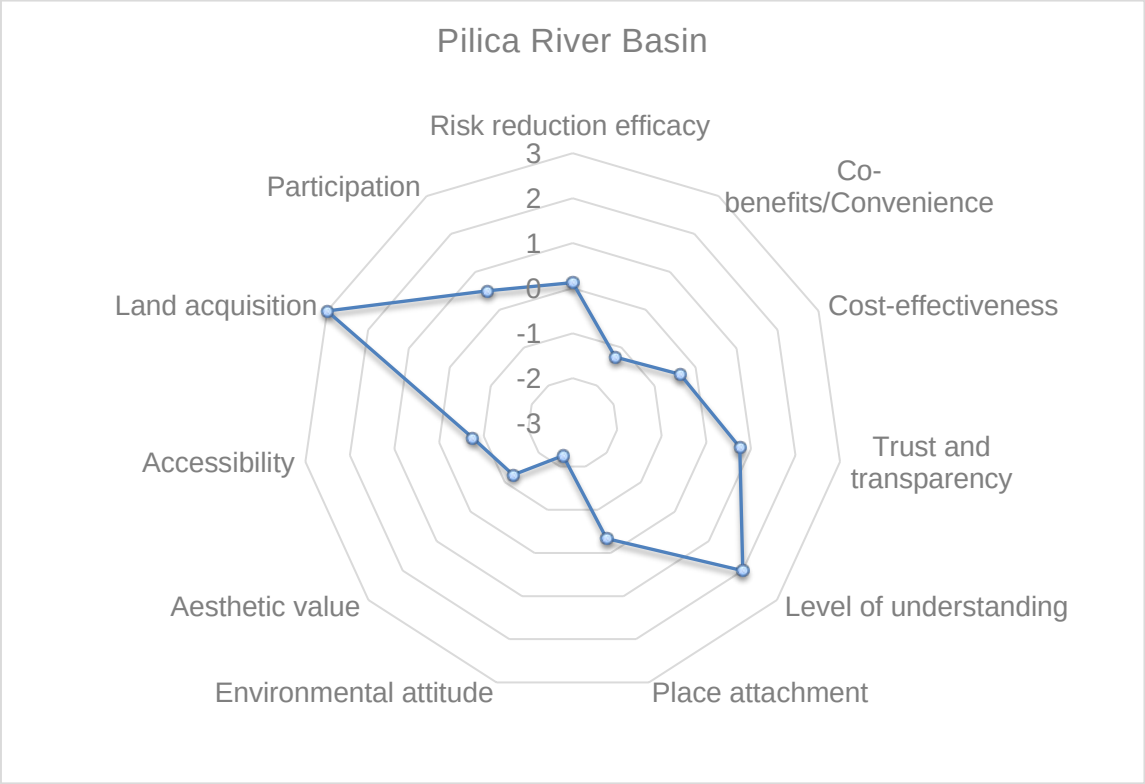

Figure 8 Radar chart with average topic scores in Pilica site

3.2.4.2 Q-sort analysis

Following the same steps ahead, after transforming each individual's rank-ordered statements into a numeric array, the factor analysis is applied to identify the clusters of participants with similar opinions.

Viewpoint 1.

12 out of 28 participants (AU3, AU7, AU11, AU13, C1, C3, PR1, PR2, PR3, PO1, PO5, and AC1) were significantly associated and flagged with Viewpoint 1. This viewpoint has an eigenvalue of 5.58 and it explained 19.93% of the total variance. This group of people is distinguished from the other two viewpoints, particularly with these four statements (#2, #12, #20, #21) as below (see Table 21).

Table 20 Statements that are distinguished from Viewpoint 2 and 3 in Pilica site

	Statement	**Viewpoints**		
		1	2	3
2	The NBS project can result in inconveniences (e.g. increased insects, decreased parking space, and increased traffic), therefore, people will not welcome the NBS project.	-4	1	0
12	If the land acquisition process is fair, it is more likely that they accept the NBS project.	4	2	3

20	Taxpayers' money should be spent more wisely than demolishing existing risk management infrastructure and constructing a new one.	-2	2	0
21	It is costly to maintain NBS.	-2	1	1
26	The overall process of the NBS project should be open and transparent. This will increase the support for the NBS project.	3	-1	0

This perspective differs from others in that it places significant emphasis on two specific factors to garner support for the NBS project. Firstly, they prioritise fair land acquisition (#12, +4) and value an overall open and transparent process (#26, +3). However, in terms of compensation, they place less emphasis on its importance compared to other viewpoints (#25, +2), although they still recognize its significance.

Overall, this perspective highlights the importance of transparency, which involves providing information on the project to the public, enabling them to make informed decisions and understand the potential impact of the project. They acknowledge that trust in public authorities for flood risk management is lacking in their site (#3, +3). This perspective does not believe that the NBS project would result in inconvenience in their site, which sets it apart from other perspectives (#2, -4). Although they agree with the statement, they consider it to be of lesser importance than other factors.

Viewpoint 2.

Seven out of 28 participants (AU4, AU10, C2, PO6, PO7, AC2, and AC3) were significantly associated and flagged Viewpoint 2. This viewpoint has an eigenvalue of 4.41 and it explained 15.77% of the total variance. This group of people is distinguished from the other two viewpoints, particularly with these four statements (#5, #8, #9, #10. #11, #16, #23, and #28) as below (see Table 22).

Table 21 Statements that are distinguished from Viewpoint 1 and 3 in Pilica site

	Statement	**Viewpoints**		
		1	**2**	3
5	The NBS project can harm the cultural and historical aspects of the town area.	-4	-1	-4
8	Strong stakeholder groups' coalition makes it difficult to bring the NBS process to a successful conclusion.	1	3	0
9	The NBS project implies landscape change. Therefore, people will not welcome the NBS project.	0	-2	1
10	The NBS project does not meet the local resident's preference for the place.	1	-3	0
11	People place a high value on the natural environment in the NBS area, which leads to the support of NBS projects.	3	4	3
16	The NBS site does not correspond well to the people's ideal conception of the river, and this will cause dissatisfaction amongst the residents.	0	-3	0

23	Most people do not understand well how the NBS project will work for their town/area.	1	4	2
28	The changed landscape after the NBS project does not aesthetically please people.	0	-4	-1

Stakeholders with Viewpoint 2 hold a unique perspective in that they believe that people have a limited understanding of how the NBS project works (#23, +4). With regards to this, C2 argued for "*education from an early age*". They believe that improving environmental attitudes can lead to more support for NBS (#11, +4), and that fair land compensation is an important factor in gaining acceptance (#25, +3). However, they do not necessarily agree that providing more opportunities for stakeholder participation will result in greater support for the project (#19, -2). In fact, they believe that forming a coalition of stakeholders could hinder the smooth implementation of the NBS project (#8, +3). Unlike other viewpoints, stakeholders with Viewpoint 2 do not believe that the NBS project will harm the cultural and historical aspects of the town (#5, -1). Moreover, they disagree with the idea that the project fails to meet the preferences of the local population (#10, -3), which suggests that they have a more positive outlook on the potential impact of the NBS project on the community.

Overall, Viewpoint 2 emphasises the importance of improving public understanding, promoting environmental attitudes, and providing fair compensation to gain acceptance for the NBS project. However, they caution that stakeholder coalitions may pose a challenge to its implementation.

Viewpoint 3

Six out of 28 participants (AU1, AU2, AU5, AU9, PO2 and PO4) were significantly associated and flagged with Viewpoint 3. This viewpoint has an eigenvalue of 4.01 and it explained 14.32% of the total variance. This group of people is distinguished from the other two viewpoints, particularly with these four statements (#4, #7, #13, #15, #22, #27, and #29) as below (see Table 23).

Table 22 Statements that are distinguished from Viewpoint 1 and 2 in Pilica site

	Statement	**Viewpoints**		
		1	2	**3**
4	More scientific proof is needed to show the effectiveness of NBS.	-1	0	4
7	After the NBS implementation, people cannot access the river area where they used to go. This can cause frustration.	0	1	-4
13	The quality of life won't increase much as a result of the NBS project.	0	0	-2
15	People prefer a more visible and physical way of reducing flood risks.	4	3	3
22	Instead of implementing an NBS project, other ways of using the area are more beneficial to the town/area.	0	0	-3
27	Stakeholders are not willing to participate in the NBS process and, therefore, they are not supportive.	-1	-1	-2

29	The town is so highly exposed that it cannot be protected by NBS.	1	0	-3

The stakeholders with Viewpoint 3 have expressed their opinion on the effectiveness of NBS, stating that they believe more scientific evidence is needed to fully prove its efficacy (#4, +4). While they think that people may prefer more visible and physical methods of reducing flood risks (#15, +3), the stakeholders acknowledge the value and benefits of implementing NBS over other approaches (#22, -3). One reason for this preference is that they believe the risk level is not currently high enough to necessitate more extreme measures, making NBS a viable and effective option for managing the risk (#29, -3). Stakeholders with Viewpoint 3 do not seem to consider the potential drawbacks of limited accessibility after NBS implementation (#7, -4). They recognize the importance of compensation in gaining public acceptance of NBS measures (#25, +4). They believe that trust in flood risk management is currently lacking to some degree (#3, +2).

Stakeholders with Viewpoint 3 advocate for more scientific evidence to prove the effectiveness of NBS, recognizing the preference for visible flood risk reduction methods; they acknowledge the value and benefits of NBS, considering it a viable and effective option given the current risk level and emphasise the importance of compensation and building trust in flood risk management.

In order to ease the understanding of each viewpoint and to show it visually, the z-scores per topic are average and illustrated as the radar chart (Figure 9).

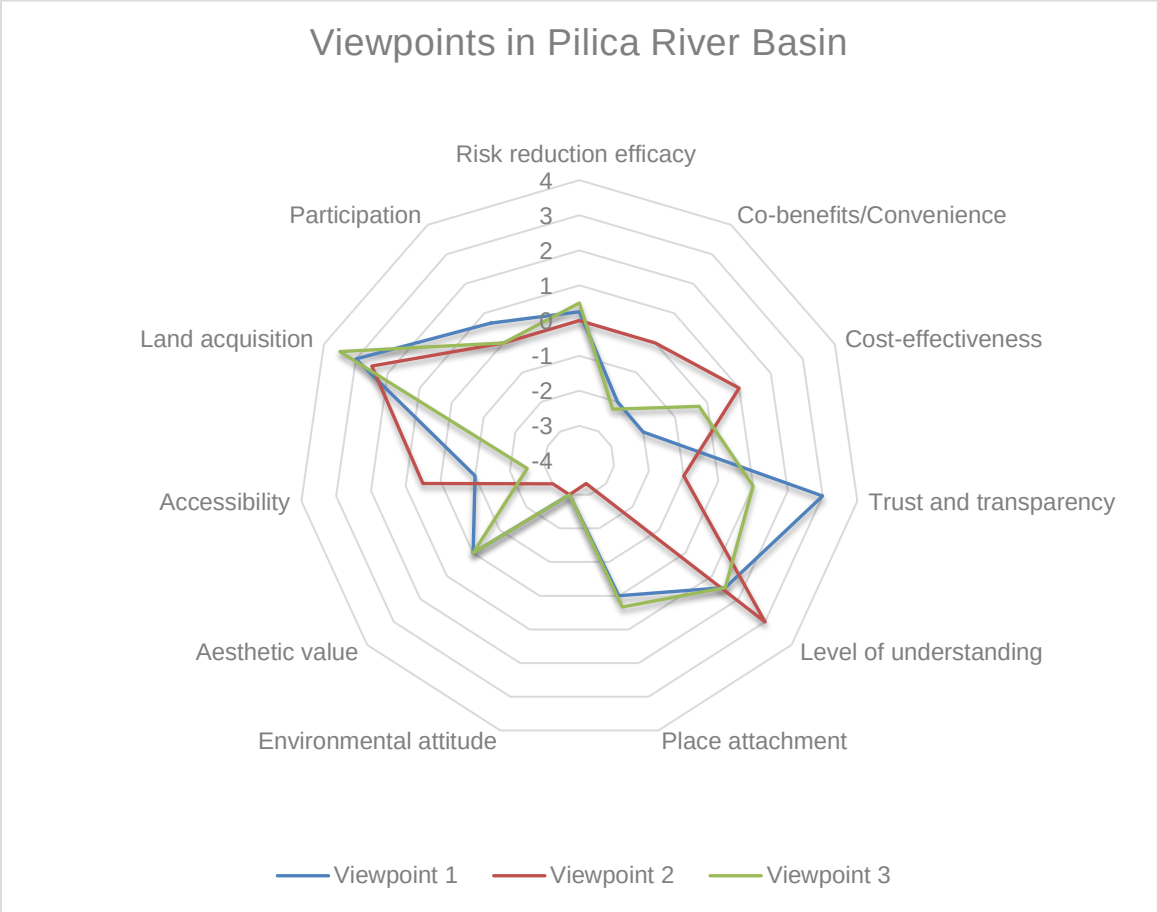

Figure 9 Radar chart with average scores per topic by three viewpoints in Pilica site

3.2.5 Jadar river basin, Serbia

3.2.5.1 Descriptive analysis

Among the workshop participants, 25 people participated in the Q-methodology activities in Krupanj, Serbia. The participants include eight from local authorities (AU1-6, 8, 9), four from civil society (C1-4), six from political representatives (PR1-6), two political representatives (PO1-2), two from media sectors (M1-2), three from academia and research (AC1-3).

Table 24 shows the most agreed and disagreed statements sorted by the average score from highest to lowest score. The results of the study indicate that there are three statements that received the most widespread agreement, namely statement #26, #25, and #12. The most agreed statements did not show much discrepancy from general analysis across the sites (Chapter 3.1). It shows that in general, the procedural aspect of NBS is most essential. The most disagreed statements are #2, #13, and #28. The participants disagreed with the statements that indicate the negative aspects of NBS, and it implicitly indicates that the general perception of NBS of participants is rather positive.

Table 23 Mean and Median scores of the statements in Jadar site

	Statement	Mean	Median
26	The overall process of the NBS project should be open and transparent. This will increase the support for the NBS project.	2.76	3
25	If people are compensated properly for their property/land, it's more likely that they accept the NBS project.	2.52	3
12	If the land acquisition process is fair, it is more likely that they accept the NBS project.	2.40	3
23	Most people do not understand well how the NBS project will work for their town/area.	1.84	2
18	If stakeholders do not have a proper opportunity to participate in the process of NBS, they will not support it.	1.72	2
15	People prefer a more visible and physical way of reducing flood risks.	1.68	2
24	Despite the benefits of NBS, not everyone is convinced of the superiority of NBS.	1.56	2
11	People place a high value on the natural environment in the NBS area, which leads to the support of NBS projects.	0.88	1
29	The town is so highly exposed that it cannot be protected by NBS.	0.76	1
16	The NBS site does not correspond well to the people's ideal conception of the river, and this will cause dissatisfaction amongst the residents.	0.48	0
4	More scientific proof is needed to show the effectiveness of NBS.	0.28	0
20	Taxpayers' money should be spent more wisely than demolishing existing risk management infrastructure and constructing a new one.	0.12	0
17	After the NBS implementation, it takes more time from one place to another. This can cause frustration.	-0.08	0
27	Stakeholders are not willing to participate in the NBS process and, therefore, they are not supportive.	-0.12	0
10	The NBS project does not meet the local resident's preference for the place.	-0.16	0
1	Hard infrastructure provides better protection than NBS.	-0.36	0
19	People prefer the previous landscape before the NBS implementation.	-0.48	0
3	Trust in public authorities involved in flood risk management is lacking. Therefore, people will not accept NBS.	-0.60	-1
30	The benefits of NBS do not outweigh the costs.	-0.64	-1

8	Strong stakeholder groups' coalition makes it difficult to bring the NBS process to a successful conclusion.	-0.84	-1
14	People worry that NBS can impact wildlife negatively.	-0.84	0
6	Maintenance of NBS is complicated.	-1.04	-1
5	The NBS project can harm the cultural and historical aspects of the town area.	-1.32	-1
22	Instead of implementing an NBS project, other ways of using the area are more beneficial to the town/area.	-1.44	-1
9	The NBS project implies landscape change. Therefore, people will not welcome the NBS project.	-1.52	-2
7	After the NBS implementation, people cannot access the river area where they used to go. This can cause frustration.	-1.60	-2
21	It is costly to maintain NBS.	-1.64	-2
28	The changed landscape after the NBS project does not aesthetically please people.	-1.72	-1
13	The quality of life won't increase much as a result of the NBS project.	-1.96	-2
2	The NBS project can result in inconveniences (e.g. increased insects, decreased parking space, and increased traffic), therefore, people will not welcome the NBS project.	-2.04	-2

To better understand the underlying viewpoint in the Jadar river basin, we distinguished the statements by the topics and average scores per topic are presented as below in Figure10.

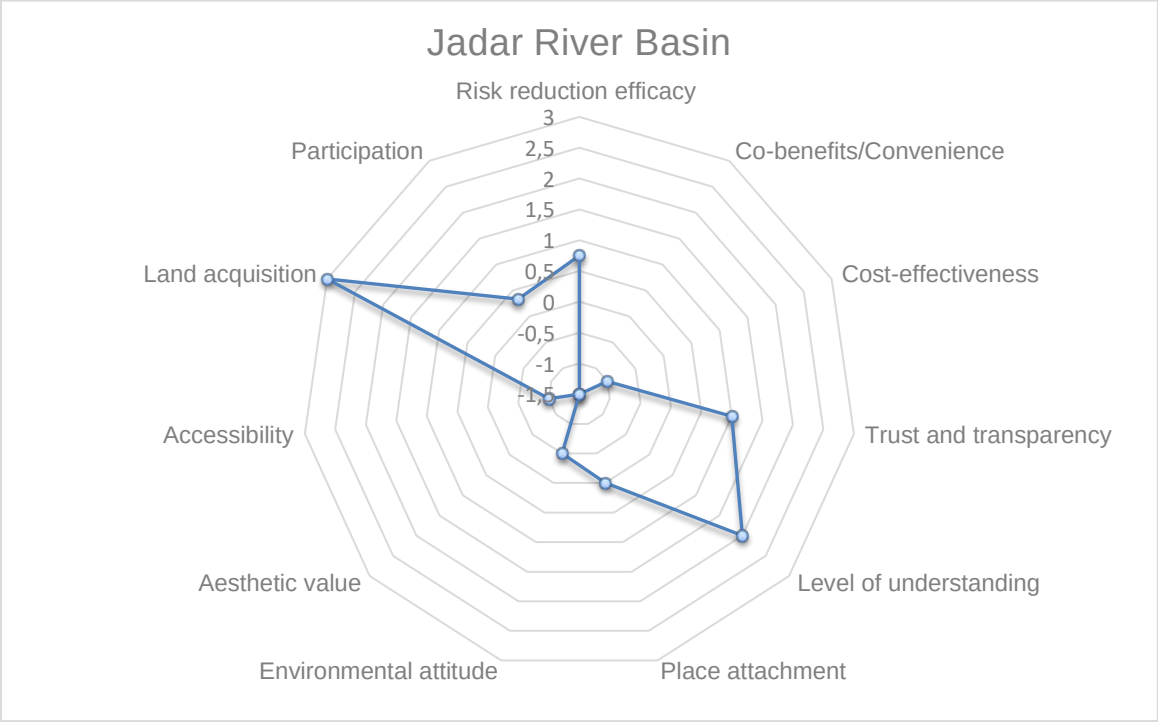

Figure 10 Radar chart with average topic scores in Jadar site

3.2.5.2 Q-sort analysis

Following the same steps ahead, after transforming each individual's rank-ordered statements into a numeric array, the factor analysis is applied to identify the clusters of participants with similar opinions.

Viewpoint 1

Seven out of 25 participants (AU2, AU8, C2, C3, PR1, PR3, and AC1) were significantly associated and flagged with Viewpoint 1. This viewpoint has an eigenvalue of 5.36 and it explained 21% of the total variance. This group is particularly distinguished from the other two viewpoints by ranking statements with the factor score. Table 25 shows four statements that are distinguished from the other two viewpoints.

Table 24 Statements that are distinguished from Viewpoint 2 and 3 in Jadar site

	Statement	Viewpoints		
		1	2	3
4	More scientific proof is needed to show the effectiveness of NBS.	-1	1	2
15	People prefer a more visible and physical way of reducing flood risks.	1	4	4
16	The NBS site does not correspond well to the people's ideal conception of the river, and this will cause dissatisfaction amongst the residents.	0	2	3
20	Taxpayers' money should be spent more wisely than demolishing existing risk management infrastructure and constructing a new one.	0	0	0

Stakeholders with Viewpoint 1 stand out from the other two viewpoints by strongly agreeing that there is a deficit of knowledge regarding NBS projects among the general public (#23, +4), which suggests that more education and outreach efforts are needed to raise awareness about the benefits of NBS. C2 stated as such, "*Most people do not understand well how the NBS project will contribute to their community. Education is needed - informing interested citizens about NBS*". The stakeholders firmly believe that NBS is beneficial for the town and surrounding area, even when compared to other approaches (#22, -4). C3 commented that "*NBS projects cannot have a negative impact on nature and citizens in any sense*".

Stakeholders also recognize that individuals with a higher environmental attitude are more likely to support NBS projects (#11, +3). Furthermore, they stress the importance of a fair land acquisition process (#12, +3) in enhancing public perception of NBS initiatives. Unlike the other two viewpoints, stakeholders in Viewpoint 1 do not believe that additional scientific evidence is necessary to prove the effectiveness of NBS (#4, -1). Interestingly, stakeholders in Viewpoint 1 showed rather a neutral stance that more visible and physical approach to reducing flood risks would be preferred by the public (#15, +1).

In summary, stakeholders with viewpoint 1 emphasise the lack of public knowledge about NBS projects, highlighting the need for education and outreach to raise awareness, while firmly believing in the benefits of NBS compared to other approaches and considering it beneficial for both nature and citizens; they recognize the importance of environmental attitudes, fair land acquisition, and do not see the need for additional scientific evidence, but show neutrality towards the preference for visible flood risk reduction methods.

Viewpoint 2

Six out of 25 participants (C1, C4, PR4, PR6, PO1, and M1) were significantly associated and flagged with Viewpoint 2. This viewpoint has an eigenvalue of 4.96 and it explained 20% of the total variance. This group is particularly distinguished from the other two viewpoints by ranking four statements with the factor score. Table 26 shows four statements that are distinguished from the other two viewpoints (see Table 26).

Table 25 Statements that are distinguished from Viewpoint 2 and 3 in Jadar site

	Statement	Viewpoints		
		1	2	3
3	Trust in public authorities involved in flood risk management is lacking. Therefore, people will not accept NBS.	-1	3	-1
5	The NBS project can harm the cultural and historical aspects of the town area.	-3	0	-2
6	Maintenance of NBS is complicated.	1	-4	1
7	After the NBS implementation, people cannot access the river area where they used to go. This can cause frustration.	-4	-1	-3

Compared to other viewpoints, stakeholders holding Viewpoint 2 strongly believe that public authorities lack the trust necessary to effectively manage flood risks (#3, +3). In detail, C1 commented as such:

> *"The population is used to traditional structures for protection against floods, and the demolition or construction of the NBS without prior consultation can create a sense of threat and lack of trust in the competent authorities."*

In order to offset the lack of trust, they emphasise the need for more education and outreach efforts to improve public understanding of NBS (#23, +4).

Unlike other viewpoints, stakeholders in Viewpoint 2 have rather a neutral stance regarding the importance of fair land acquisition, while others argue that this factor is crucial to consider (#12, +1). Moreover, stakeholders in Viewpoint 2 do not associate an environmental attitude with support for NBS (#11, -2). They do not perceive NBS as a significant change to the landscape (#9, -3) and disagree with the statement that people will be unable to access the river after the implementation of NBS (#7, -1). They have a neutral stance regarding the potential harm that the implementation of an NBS project could cause to the cultural and historical aspects of the town area (#5, 0). Stakeholders with Viewpoint 2 believe that the maintenance of NBS will not pose significant problems (#6, -4).

Overall, stakeholders in Viewpoint 2 appear to prioritise the need for education and outreach efforts and question the need for fair land acquisition processes. They do not associate environmental attitudes with support for NBS and have a more neutral stance on various aspects related to NBS projects, such as changes to the landscape, access to the river, and cultural and historical impacts.

Viewpoint 3

Five out of 25 participants (AU1, AU5, PR2, M2 and AC2) were significantly associated and flagged with the viewpoint 3. This viewpoint has an eigenvalue of 4.35 and it explained 17% of the total variance. This group is particularly distinguished from the other two viewpoints by ranking 12 statements with the factor score. Tabls 27 shows seven statements that are distinguished from other two viewpoints.

Table 26 Statements that are distinguished from Viewpoint 1 and 2 in Jadar site

	Statement	Viewpoints		
		1	2	3
2	The NBS project can result in inconveniences (e.g. increased insects, decreased parking space, and increased traffic), therefore, people will not welcome the NBS project.	-2	-2	-4
10	The NBS project does not meet the local resident's preference for the place.	0	0	2
17	After the NBS implementation, it takes more time from one place to another. This can cause frustration.	-1	-1	2
18	If stakeholders do not have a proper opportunity to participate in the process of NBS, they will not support it.	2	3	1
19	People prefer the previous landscape before the NBS implementation.	0	-1	1
24	Despite the benefits of NBS, not everyone is convinced of the superiority of NBS.	2	2	0
27	Stakeholders are not willing to participate in the NBS process and, therefore, they are not supportive.	2	0	-3

Stakeholders with Viewpoint 3 exhibit a cautious and sceptical attitude towards the project's benefits. They slightly agreed with the statement that the NBS project does not meet the local residents' preferences for the place (#10, +2), while other viewpoints are rather neutral (0). They showed rather a neutral stance towards the statement that not everyone is convinced of the superiority of NBS, despite its benefits (#24, 0). In the meantime, they hold a strong disagreement with the statement that the NBS project can result in inconveniences, therefore, people will not welcome the project (#2, -4). Disagreement with this statement can be interpreted as, among others, they think the NBS project would not result in inconvenience, or this would not be the major reason for objection.

When it comes to stakeholder participation in the NBS project process, they do not agree that stakeholders' unwillingness to participate affects their level of support (#27, -3). They also show less agreement with the idea that stakeholders will not support the project if they do not have proper opportunities to participate (#18, +1), which is different from the other viewpoints. In comparison with other viewpoints, their evaluation on stakeholder participation and its effect on support of the process of NBS is relatively weak. In terms of land acquisition, stakeholders with Viewpoint 3 emphasise the importance of a fair process to gain more support for the project (#12, +3).

Viewpoint 3 exhibits caution and scepticism regarding the benefits of the NBS project, expressing slight agreement with the project not meeting local residents' preferences, neutrality on the superiority of NBS, and strong disagreement that the project would result in inconveniences; they also disagree with the notion that stakeholder participation affects their support and show less agreement on stakeholders needing proper participation opportunities, emphasizing the importance of fair land acquisition for garnering support.

In order to ease the understanding of each viewpoint and to show it visually, the z-scores per topic are average and illustrated as the radar chart (Figure 11).

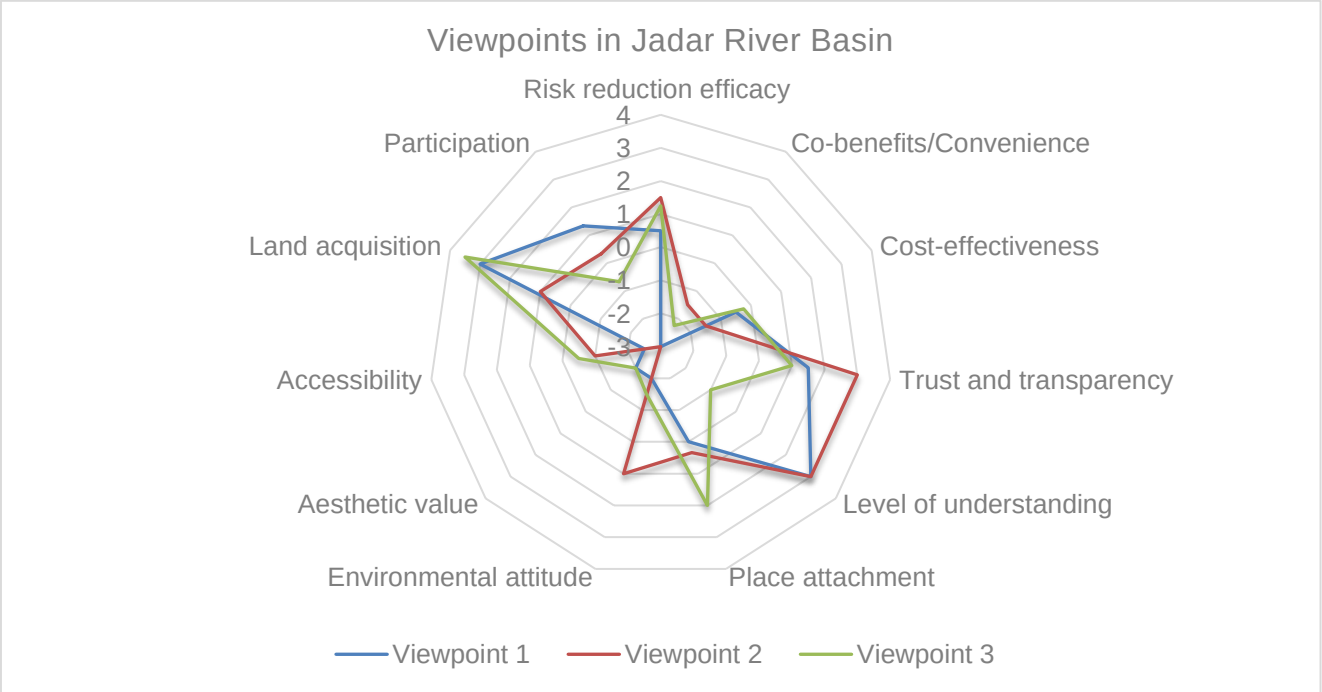

Figure 11 Radar chart with average scores per topic by three viewpoints in Jadar site

3.2.6 Tamnava river basin, Serbia

3.2.6.1 Descriptive analysis

Among the workshop participants, 22 people participated in the Q-methodology activities in Ub, Serbia. The participants include eight from local authorities (AU1, AU3, AU 5-7, AU9-11), two from civil society (C2, C6), four from political representatives (PR1, PR3, PR4, PR6), three political representatives (PO1, PO3, PO5), three from media sectors (M1-3), two from academia (AC1, AC3).

Table 28 shows the most agreed and disagreed statements sorted by the average score from highest to lowest score. The results of the study indicate that there are three statements which received the most widespread agreement, namely statements #26, #25, and #12. The most agreed statements did not show much discrepancy from the general analysis (Chapter 3.1). It shows that in general, the procedural aspect of NBS is most essential. The most disagreed statements are #7, #28, and #6.

Table 27 Mean and Median scores of the statements in Tamnava site

	Statement	Mean	Median
12	If the land acquisition process is fair, it is more likely that they accept the NBS project.	2.82	3
25	If people are compensated properly for their property/land, it's more likely that they accept the NBS project.	2.50	3
26	The overall process of the NBS project should be open and transparent. This will increase the support for the NBS project.	2.36	2.5
23	Most people do not understand well how the NBS project will work for their town/area.	1.86	2
24	Despite the benefits of NBS, not everyone is convinced of the superiority of NBS.	1.45	2
4	More scientific proof is needed to show the effectiveness of NBS.	1.14	2
15	People prefer a more visible and physical way of reducing flood risks.	0.91	1
20	Taxpayers' money should be spent more wisely than demolishing existing risk management infrastructure and constructing a new one.	0.82	1
18	If stakeholders do not have a proper opportunity to participate in the process of NBS, they will not support it.	0.64	1
29	The town is so highly exposed that it cannot be protected by NBS.	0.64	1
11	People place a high value on the natural environment in the NBS area, which leads to the support of NBS projects.	0.55	0.5
8	Strong stakeholder groups' coalition makes it difficult to bring the NBS process to a successful conclusion.	0.27	0.5
30	The benefits of NBS do not outweigh the costs.	0.00	-0.5
1	Hard infrastructure provides better protection than NBS.	-0.23	-1
16	The NBS site does not correspond well to the people's ideal conception of the river, and this will cause dissatisfaction amongst the residents.	-0.36	0
27	Stakeholders are not willing to participate in the NBS process and, therefore, they are not supportive.	-0.36	0
17	After the NBS implementation, it takes more time from one place to another. This can cause frustration.	-0.64	-1
14	People worry that NBS can impact wildlife negatively.	-0.68	0
10	The NBS project does not meet the local resident's preference for the place.	-0.77	-0.5
19	People prefer the previous landscape before the NBS implementation.	-0.95	-1

9	The NBS project implies landscape change. Therefore, people will not welcome the NBS project.	-1.09	-1
22	Instead of implementing an NBS project, other ways of using the area are more beneficial to the town/area.	-1.18	-1.5
13	The quality of life won't increase much as a result of the NBS project.	-1.27	-1
2	The NBS project can result in inconveniences (e.g. increased insects, decreased parking space, and increased traffic), therefore, people will not welcome the NBS project.	-1.32	-2
3	Trust in public authorities involved in flood risk management is lacking. Therefore, people will not accept NBS.	-1.36	-1.5
5	The NBS project can harm the cultural and historical aspects of the town area.	-1.50	-1
21	It is costly to maintain NBS.	-1.64	-1.5
6	Maintenance of NBS is complicated.	-1.77	-2
28	The changed landscape after the NBS project does not aesthetically please people.	-1.82	-3
7	After the NBS implementation, people cannot access the river area where they used to go. This can cause frustration.	-2.00	-2.5

3.2.6.2 Q-sort analysis

Following the same steps ahead, after transforming each individual's rank-ordered statements into a numeric array, the factor analysis is applied to identify the clusters of participants with similar opinions.

Viewpoint 1

Eight out of 25 participants (AU1, AU5, AU7, C6, PR1, PR3, M3, AC1) were significantly associated and flagged with Viewpoint 1. This viewpoint has an eigenvalue of 4.41 and it explained 20% of the total variance. This group is particularly distinguished from the other two viewpoints by ranking statements with the factor score. Table 29 shows two statements that are distinguished from other two viewpoints.

Table 28 Statements that are distinguished from Viewpoint 2 and 3 in Tamnava site

	Statement	**Viewpoints**		
		1	2	3
8	Strong stakeholder groups' coalition makes it difficult to bring the NBS process to a successful conclusion.	2	0	0
25	If people are compensated properly for their property/land, it's more likely that they accept the NBS project.	2	3	4

Stakeholders with Viewpoint 1 prioritise open and transparent participation processes for the implementation of NBS, which is reflected in their strong agreement with statement #26 (+4) and statement #18 (+4). They believe that a fair and inclusive process will lead to more successful outcomes. AC1 argued that *"the greater the participation of interested parties, the greater the chances of putting pressure on competent institutions and obtaining funds".*

At the same time, they moderately agree that the presence of a strong stakeholder group coalition can make it difficult to reach a successful conclusion (#8, +2). Regarding compensation, Viewpoint 1 considers it to be of lesser importance for gaining support for NBS, compared with other viewpoints. Despite some potential challenges, stakeholders with Viewpoint 1 acknowledge the potential benefits of NBS, as reflected in their agreement with statement #24 (+3). They do not agree with the statement that the NBS project could harm the cultural and historical aspects of the town (#5, -3), suggesting that they may not see this as an obstacle.

Overall, stakeholders with Viewpoint 1 prioritise open and transparent participation processes for NBS implementation and acknowledge the potential benefits of NBS, and they are aware that not everyone is convinced of its superiority. They do not believe that the project will harm the cultural and historical aspects of the town, and they consider compensation to be of less importance than other factors in gaining support for NBS.

Viewpoint 2

Seven out of 25 participants (AU9, AU10, C2, PR6, PO3, PO5, M1) were significantly associated and flagged with Viewpoint 2. This viewpoint has an eigenvalue of 4.10 and it explained 19% of the total variance. This group is distinguished from the other two viewpoints by ranking statements with the factor score. Table 30 shows two statements that are distinguished from the other two viewpoints.

Table 29 Statements that are distinguished from Viewpoint 1 and 3 in Tamnava site

	Statement	Viewpoints		
		1	2	3
3	Trust in public authorities involved in flood risk management is lacking. Therefore, people will not accept NBS.	-3	1	-3
4	More scientific proof is needed to show the effectiveness of NBS.	1	3	1
20	Taxpayers' money should be spent more wisely than demolishing existing risk management infrastructure and constructing a new one.	2	0	2

The stakeholders with Viewpoint 2 were characterised with general support to NBS and emphasise the importance of benefiting from nature. They believe that investing in nature is not expensive and that leaving a clean natural environment for future generations is crucial. PO3 stated as such:

> *"Benefit from NBS - nature gives us, nothing is expensive when investing in nature. We should leave our children a tidy natural environment."*

While they acknowledge the need for more scientific evidence to support NBS (#4, +3), they do not share concerns about limited accessibility (#7, -4). They also disagree with the notion that stakeholder participation does not lead to support (#18, -3). Like other viewpoints, they consider land acquisition and compensation to be essential elements for implementing NBS (#12, +4 & #25, +3). In addition, they believe NBS is not costly to maintain (#21, -4).

Stakeholders in Viewpoint 2 support NBS, emphasising the importance of benefiting from nature and leaving a clean environment for future generations, while also recognizing the need for more scientific evidence; they do not share concerns about limited accessibility, disagree with the idea that stakeholder participation does not lead to support, consider land acquisition and compensation crucial, and believe that NBS is not costly to maintain.

Viewpoint 3

Five out of 25 participants (AU3, AU11, PR4, PO1, and M2) were significantly associated and flagged with Viewpoint 3. This viewpoint has an eigenvalue of 4.06 and it explained 18% of the total variance. This group is particularly distinguished from the other two viewpoints by ranking statements with the factor score. Table 31 shows two statements that are distinguished from the other two viewpoints.

Table 30 Statements that are distinguished from Viewpoint 1 and 2 in Tamnava site

	Statement	Viewpoints		
		1	2	3
2	The NBS project can result in inconveniences (e.g. increased insects, decreased parking space, and increased traffic), therefore, people will not welcome the NBS project.	-1	-1	-2
9	The NBS project implies landscape change. Therefore, people will not welcome the NBS project.	0	-1	-3
13	The quality of life won't increase much as a result of the NBS project.	-4	-3	1
15	People prefer a more visible and physical way of reducing flood risks.	1	2	3
23	Most people do not understand well how the NBS project will work for their town/area.	3	3	1

Stakeholders with Viewpoint 3 do not believe that NBS are sufficient to address the current level of flood risk, as indicated by their agreement with statement #29 (+3). They also believe that people prefer more visible and physical ways of reducing flood risks, which sets them apart from other viewpoints and is reflected in their agreement with statement #15 (+3). M2 elaborated the situation as such:

> *"We had a big flood in Ub in 2014, and I think that the citizens are not willing to give a chance (and money from the budget) to something that does not act as safe protection against floods."*

At the same time, stakeholders with Viewpoint 3 do not see inaccessibility (#2, -2 & #7, -4) or resistance to landscape-scale changes made by NBS (#9, -3) as problematic, which contrasts with the viewpoints of other stakeholders. They do not believe that NBS will significantly improve the quality of life in the area (#13, +1), which is another point of contrast with other viewpoints. However, they do acknowledge that NBS can be costly to maintain (#21, +2). To gain more support for the NBS project, stakeholders with Viewpoint 3 emphasise the importance of an open and transparent process, as reflected in their agreement with statement #26 (+3).

Overall, stakeholders with Viewpoint 3 have reservations about the effectiveness of NBS for addressing the current level of flood risk, and they prioritise more visible and physical solutions. They do not see inaccessibility or landscape-scale changes as problematic, but they do acknowledge the cost of maintaining NBS. To gain more support for the project, they prioritise an open and transparent process.

In order to ease the understanding of each viewpoint and to show it visually, the z-scores per topic are average and illustrated as the radar chart (Figure 12).

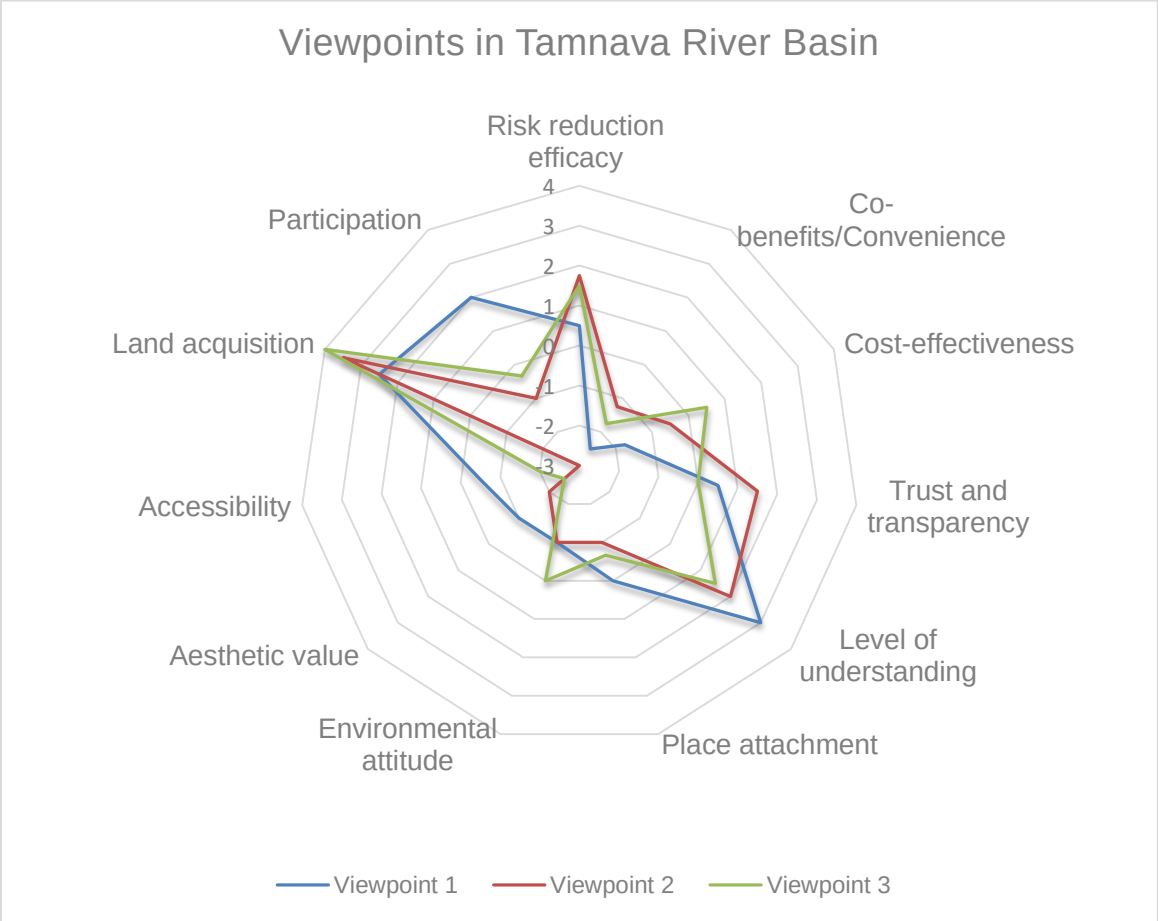

Figure 12 Radar chart with average scores per topic by three viewpoints in Tamnava site

4 The role of NBS in hydro-meteorological risk management at RECONECT Collaborator sites

4.1 Practice of use

There is broad agreement among the experts from the RECONECT Collaborator sites on the current practice of using NBS to manage hydro-meteorological risks: it is described as extremely limited to non-existent.

The Polish experts stress that NBS tend to be undervalued in current environmental risk management practice and that they are often considered irrelevant or unreliable.

In the Serbian sites of Jadar and Tamnava, experts emphasise that although NBS are considered as relevant in theory, their application in practice remains very limited. In Tamnava, they attribute this to the fact that NBS are not yet so well known to investors.

In Bulgaria, experts make a similar argument, stressing that although NBS are considered relevant for solving long-term problems, they are currently not sufficiently used and, therefore, not relevant in practice. They attribute this in part to serious coordination problems.

At the Croatian site in Bregana, experts indicate that NBS are seen as more difficult to implement than traditional solutions and therefore NBS are not yet relevant in practice. It is also said that there is currently no experience or serious desire to use them.

In the Vrbanja river basin, according to the experts consulted, NBS do not yet exist. Although they are considered by the experts to be relevant for the management of hydro-meteorological risks, they are not yet generally recognised as such.

Nevertheless, there is reason for optimism in this regard, as there are anecdotal indications that the use of NBS is gaining in popularity.

4.2 Public and political acceptance of NBS

Judgments on the political acceptance of NBS for managing hydro-meteorological risks are made based on expert interviews and desktop research conducted by local researchers at the RECONECT Collaborator sites. The assessments provide insights into the current state of political acceptance, impulses for improvement, barriers, and recommendations for increasing political support for NBS implementation.

The political acceptance of NBS in the Bregana river basin is influenced by the politicians' focus on projects that bring profit or significant savings. As NBS have not yet fully demonstrated their superiority over traditional solutions and require long-term financial investment, politicians are hesitant to support them wholeheartedly. Potential public objections, related to land ownership issues, lack of confidence in the effectiveness of NBS, and the belief that only visible hard infrastructure can deliver the expected benefits also contribute to this reluctance.

Similarly, in the Vrbanja river basin, politicians show interest in projects that are profitable and easy to maintain. However, they are still unfamiliar with NBS and the inability to demonstrate immediate benefits compared to traditional solutions hinders full political

support. The long-term nature of NBS projects and potential public opposition are additional factors influencing politicians' reservations.

The role of the political sector role in the Pilica river basin is mainly characterised as observational and planning-oriented, with a moderate level of involvement. Nevertheless, the experts recognise the importance of politicians in legislation, financing, and planning processes related to NBS.

In the Tamnava and Jadar river basins, the political acceptance of NBS is a matter of debate. Politicians and the administration are criticised for their perceived inefficiency and inertia, raising concerns about their ability to adequately plan and implement NBS. Experts emphasise that political will and adequate strategic planning are crucial for the successful implementation of NBS. They also note that policy makers often prefer short-term measures that can demonstrate effectiveness and visibility within their term of office.

In contrast, the local experts in the Kamchia river basin stress that there is no reason to believe that NBS are not politically accepted as an option for managing hydro-meteorological risks. However, they acknowledge that acceptance may not be unconditional.

Several drivers for improving the political acceptance of NBS are identified across the basins. In the Bregana river basin, EU legislation and directives with clear objectives and commitments to nature conservation could encourage politicians to support NBS. In addition, the presentation of good practice examples and the availability of funding from various projects and organisations could attract more support from the political sector. Similarly, in the Vrbanja river basin, the demonstration of successful NBS implementation and the availability of funds from different sources are identified as factors that could increase political support. The experts also suggest that carrying out quality cost-benefit analysis could overcome barriers to acceptance. In the Pilica river basin, the experts associated with institutions highlight the important role of politicians in legislation, financing, and planning processes for NBS.

In terms of public acceptance of NBS the business sector is seen as primarily responsible for the implementation of NBS. Its role is also discussed critically by some experts, as participation or co-creation activities are not always carried out in the spirit of the NBS principles. Others, however, stress the importance of the sector for research and development and advisory services, all of which can support the further implementation of NBS. The business sector itself points to the economic viability of NBS.

Some experts emphasise that civil society is often the initiator of NBS actions, but it is usually a highly engaged group of people involved in the consultation and implementation of projects. The public is generally reported to have a positive attitude towards NBS. An important reason for this seems to be the synergy effects of NBS, e.g. for flood protection, the environment and nature conservation, or non-risk-related effects such as improvement of the microclimate, mitigation of the effects of climate change (extreme weather events, droughts, floods), positive effects on biodiversity and the creation of "*friendly spaces for the public*". However, it is also noted that part of the public still prefers hard infrastructure measures to manage hydro-meteorological risks. It can be assumed that the current state of knowledge about the impacts and effectiveness of NBS plays a role in this.

The various experts give very different indications as to what is holding back public acceptance of NBS at the sites. The lack of public trust in these measures, which has not yet been secured, and cost issues are repeatedly raised. In addition, there is the need for post-investment monitoring and maintenance (and associated costs), complicated procedures for obtaining relevant permits and approvals, the lack of verified results from large-scale tests, the need to reconcile the interests of multiple actors in the planning and implementation process, and even the loss of the area's natural assets.

Overall, the diagnosis showed that the public and political and acceptance of NBS is still a challenge.

Experts suggest that greater public acceptance would be possible if more awareness-raising campaigns were tailored to different groups, so that the material could be understood by lay people. Mechanisms should be put in place to address financial issues, such as compensation for land expropriation for large-scale solutions. Experts also point to the importance of grassroots initiatives in the implementation of NBS as parts of the public are very interested in the implementation of NBS and active in the field.

The political acceptance of NBS for managing hydro-meteorological risks varies between Collaborator sites. While some basins face challenges and reluctance to fully support NBS initiatives, others show more favourable conditions. Challenges such as the need for demonstrated benefits, financial considerations, public objections, and political inertia were identified as barriers to acceptance. To increase political support for NBS, the experts recommended raising awareness about the long-term benefits and cost-effectiveness of NBS, providing concrete examples of successful implementation, leveraging EU legislation, and actively involving politicians in relevant processes.

4.3 Stakeholders' perspective on site-specific hydro-meteorological risks, relevance of NBS for managing these risks and their (co-)benefits

Although many of the stakeholders at the RECONECT Collaborator sites are very concerned about flood-related natural hazards, their risk perceptions vary considerably in detail. Data to reveal their risk perceptions was collected in late 2022 and early 2023 using scorecards during the on-site workshops conducted by local partners.

A total of 131 stakeholders completed the scorecards. In Kamchia, 14 stakeholders completed in the scorecards, in Pilica 31, in Bregana 24, in Vrbanja 15, in Jadar 24 and in Tamnava 23. The data were processed and analysed by the UFZ team. The results provide valuable insights into the perceived risks associated with different natural hazards at each site. A graphical overview is shown in Figure 13.

In the Kamchia and Vrbanja river basins, flood-related risks were perceived as extremely high, exceeding all other risks in terms of magnitude. Stakeholders identified different types of floods as the most important natural hazards in these areas.

Stakeholders in the Jadar river basin perceived risks from several different hazards as very high. They identified the risks of fluvial flooding and flash flooding as well as soil erosion and landslides as major concerns. The risk of drought was also considered to be high.

In the Pilica river basin, however, the perceived risk of drought exceeds the risk of flooding in terms of severity.

Stakeholders in the Bregana river basin consider flash floods to be the most critical risk in their area. However, they also recognised the high risks associated with soil erosion, fluvial flooding and pluvial flooding.

In the Tamnava River Basin, stakeholders identified the risks of fluvial and flash floods as well as droughts as very high, which means that both floods and water scarcity need to be considered in hydro-meteorological risk management.

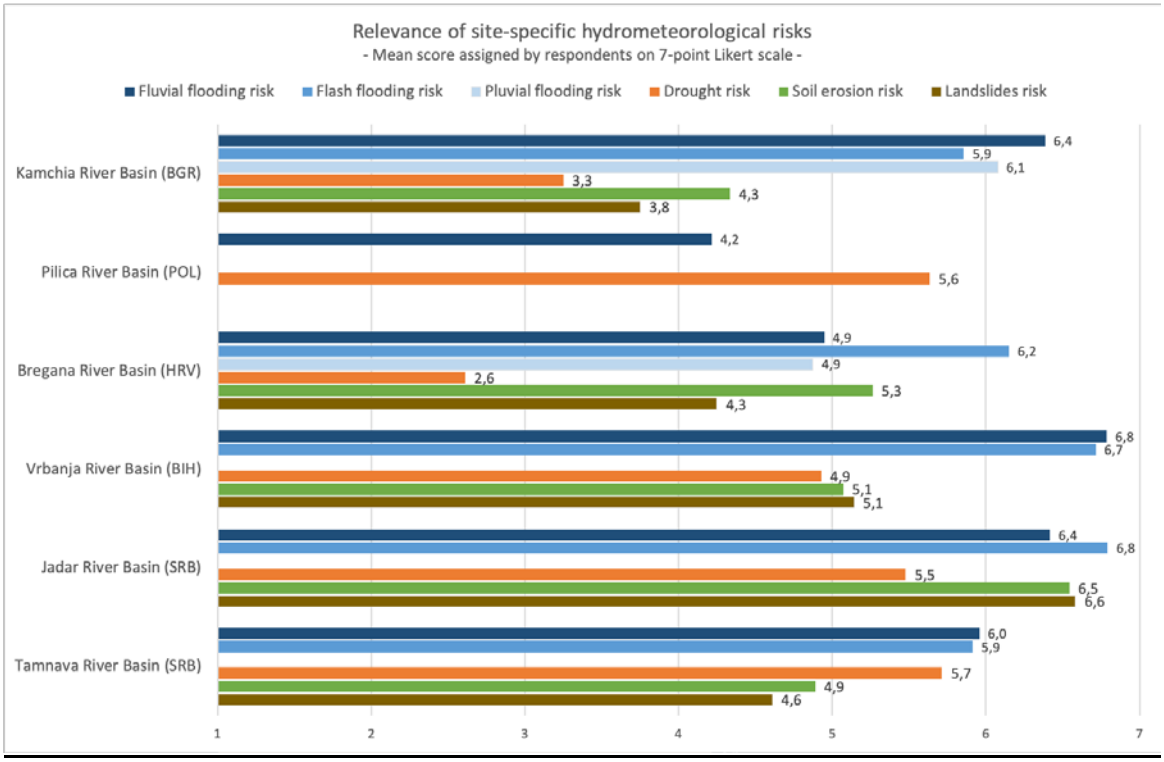

Figure 13 Relevance of site-specific hydro-meteorological risks at RECONECT Collaborator sites

The expected benefits, i.e. the primary risk-related effects, reflect to some extent the perceived risks at most sites. However, there are some striking features. In the Jadar river basin, the risk perception (rather high) and the expectations regarding the risk reduction potential of the proposed NBS are the most divergent (with the exception of the management of pluvial floods). In the Tamnava river basin, expectations are only slightly positive, especially regarding the impact on drought management (which is a very relevant natural hazard there). Expectations are also very positive in the Bregana River Basin for the impact of the NBS on drought management and in the Pilica River Basin for the reduction of fluvial floods.

The expected risk reduction effect of the proposed NBS is the highest in the Vrbanja River Basin (maximum average value in all applicable natural hazard categories) and the lowest in the Kamchia River Basin (minimum average value in 3 out of 6 natural hazard categories).

In the case of the Kamchia, this corresponds to the risk perception, i.e. the least relevant risks are expected to be least affected by the proposed NBS.

The situation is somewhat different in the Vrbanja river basin, where the expected risk reduction effect of the proposed NBS is the highest compared to all other sites. This means that not only the risk perception of stakeholders in the Vrbanja river basin is above average, but also their expectations of the impact of the proposed NBS.

For a detailed breakdown of the benefits expected at each site, see Figure 14.

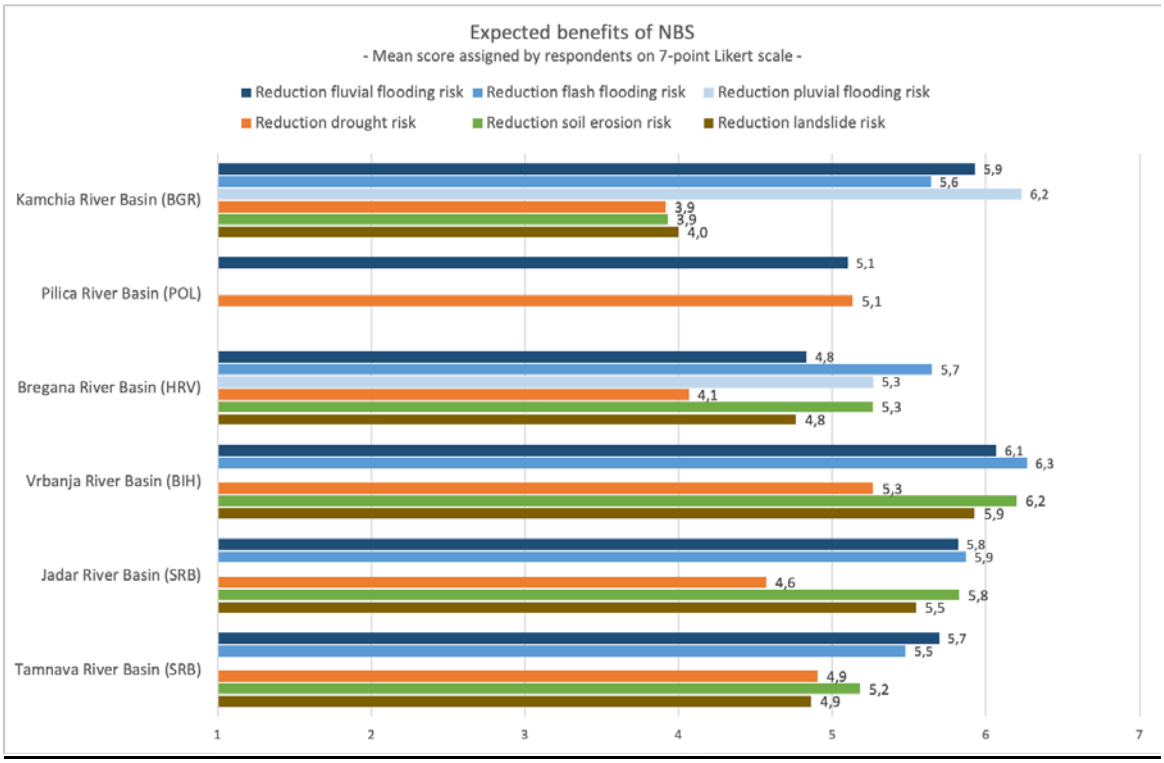

Figure 14 Benefits of NBS for hydro-meteorological risk management expected by stakeholders

In general, very positive effects are expected for changes in habitat quantity and quality (both mean scores of 5.7), biodiversity (5.6) and education and awareness raising (5.6), which is seen in many sites as a key lever for increasing acceptance. This last category of co-benefits is also the least controversial (standard deviation of 0.2). Stakeholders also have positive expectations regarding the impact on health and well-being (5.1), the availability of recreational opportunities (5.1) and the accessibility of the area (5.0).

On average, the lowest expectations are for positive effects on the development or use of new business models (4.5) and on the protection or preservation of (local) cultural values (4.4). It should be noted that the standard deviation of the mean values for these two categories of co-benefits is also the largest (both 0.6). This means that this is also the area where the opinions between the sites differ the most.

Overall, it is noticeable that the scores in the Bregana (minimum average score in 5 out of 11 categories) and Kamchia river basins (in 4 categories) are often among the lowest scores, taking into account the responses from all sites. On the other hand, stakeholders

in Pilica (maximum average score in 6 out of 11 categories) and in the Vrbanja river basin (in 4 categories) have above-average positive expectations of co-benefits.

It is also striking that the expectations for the realisation of economic co-benefits and promotion of business development are comparatively positive in the Vrbanja river basin, while in the Pilica river basin they are rather neutral with a tendency to be negative.
Other remarkable features are the high scores for improving accessibility to the area in the Tamnava river basin (5.6) and for improving the availability of recreational opportunities in the Vrbanja river basin (5.8), which are certainly due to very site-specific factors. For further details, see Figure 15.

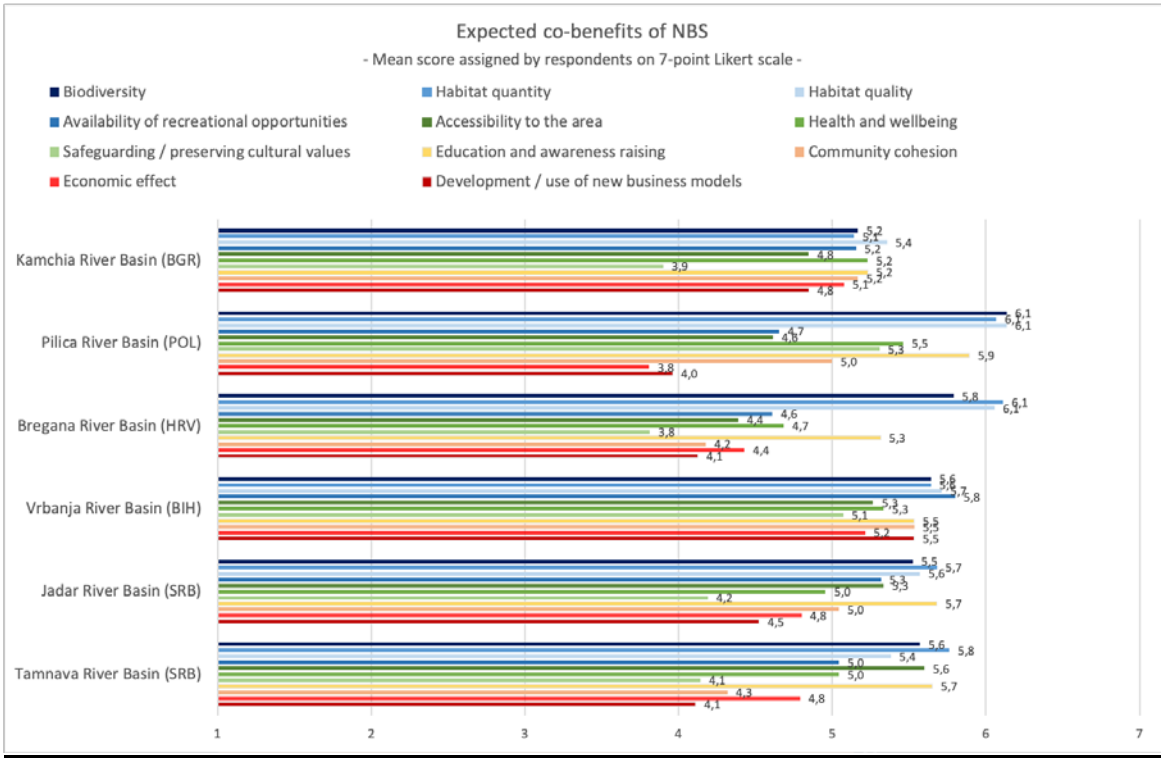

Figure 15 Co-benefits of NBS expected by stakeholders

The analysis of the reasons why stakeholders perceive NBS to be highly relevant for hydro-meteorological risk management shows a general agreement among them across sites. The proposed reasons, including effectiveness, efficiency, biodiversity and co-benefits, are considered highly relevant in most cases. The only exception - based on the standard deviation of the mean scores - is some disagreement on the relevance of the co-benefits of NBS. A graphical overview is provided in Figure 16.

In particular, there is strong consensus regarding the effectiveness and efficiency of NBS in the Kamchia river basin.

In the Pilica river basin stakeholders have noted that the positive biodiversity effects have a particularly positive impact on their perception of the relevance of NBS. All other factors are at a similar, somewhat lower level.

However, a slight disagreement arises when considering the importance of co-benefits of NBS in the Bregana river basin. Stakeholders at this site perceive co-benefits as being

less significant for their perception of the relevance of NBS. While NBS may still offer various co-benefits, they are not considered a primary focus in this particular context.

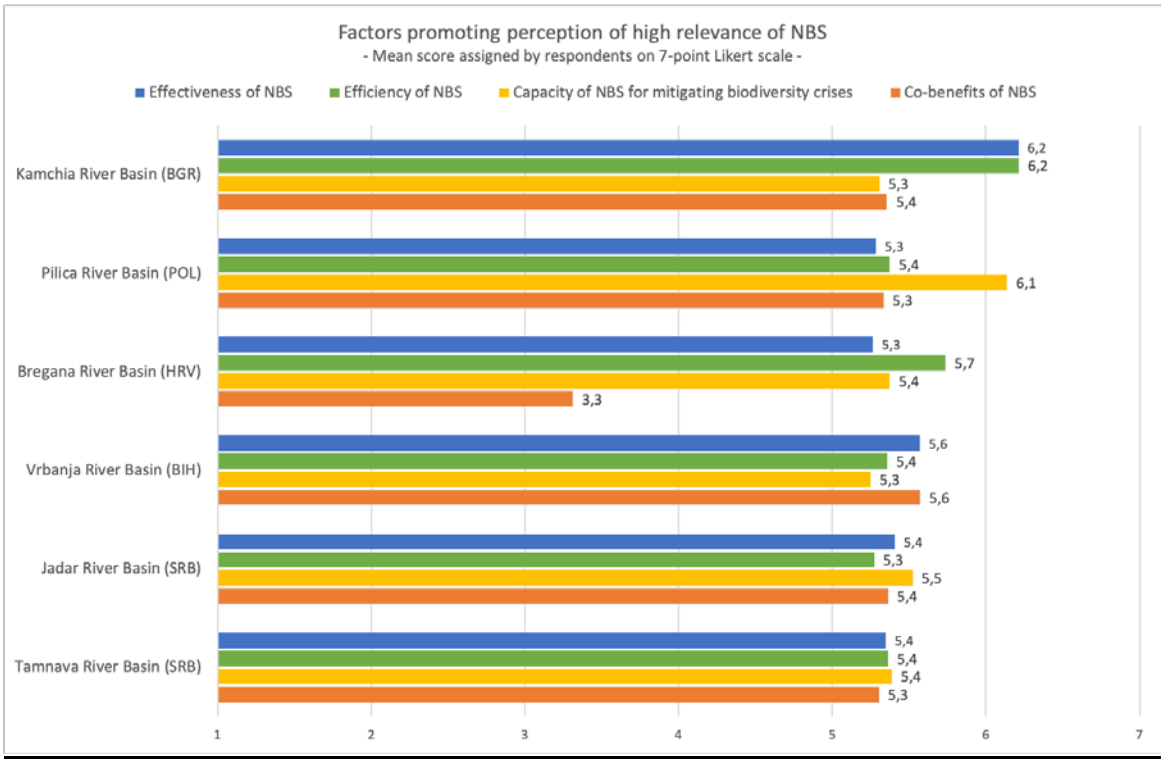

Figure 16 Factors promoting the perception of high relevance of NBS for hydro-meteorological risk management among stakeholders

Challenging realisation is generally not considered to be a significant reason for the possible perception of low relevance of NBS for the management of hydro-meteorological risks at the different sites. This is also consistent across sites (standard deviation of 0.4).

The importance of the time lag of effects (standard deviation of 0.8) and the uncertainty of effects (0.9) as possible reasons for a sceptical view is further divided. In the Kamchia river basin, all these reasons are considered least problematic. On the other hand, stakeholders in the Pilica River Basin consider the importance of the time lag of effects (mean score of 4.3) and in the Bregana River Basin the uncertainty of effects (4.3) to have a slightly negative impact on the perception of the relevance of NBS for hydro-meteorological risk management.

Overall, however, these results again underline the generally positive perception of NBS by stakeholders at all locations. Detailed information on stakeholders' perceptions of the importance of specific factors in promoting a more sceptical view of NBS among stakeholders is presented in Figure 17.

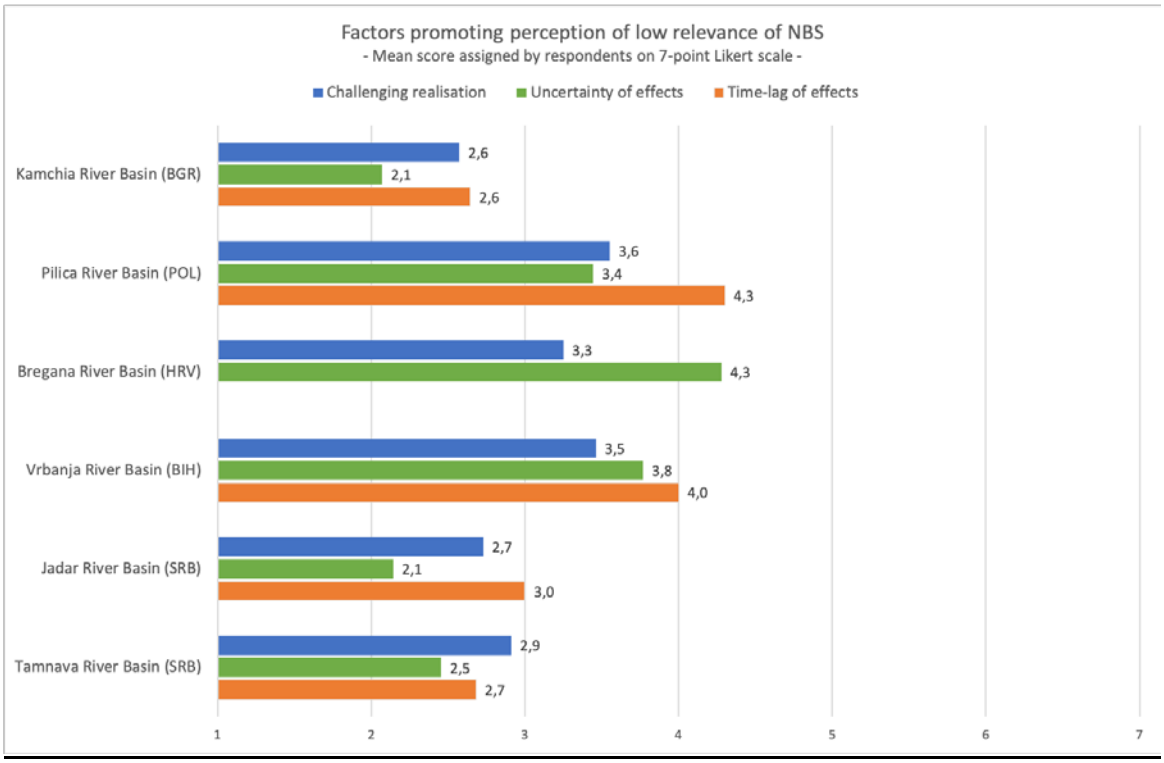

Figure 17 Factors promoting the perception of low relevance of NBS for hydro-meteorological risk management among stakeholders

4.4 Stakeholders' perspective on the main advantages and disadvantages

The opinion of stakeholders on the advantages of using NBS for the management of hydro-meteorological risks is of great importance for the development of strategies for mainstreaming NBS. This is because they provide a starting point for exchange with the various stakeholder groups as it is possible to link to them and build on them.

Hence, during the on-site workshops the stakeholders were asked individually for their views on the main advantages of using NBS for hydro-meteorological management. A total of 312 quotes were categorised using 63 categories. For a comprehensive inventory of the utilised categories, please refer to Annex F.

Figure 18 shows the most frequently mentioned advantages of NBS as a word cloud. The size of the benefits shown corresponds to the frequency of their mention, i.e. concerns mentioned very often (rarely) appear large (small). Of all the mentions, 'environmental protection' accounts for the largest share (10.9%), while the smallest term considered in this figure, 'ecological impact', accounts for 1.9% of all mentions across all locations. From this it is possible to deduce the approximate importance of the other benefits mentioned from the stakeholders' point of view.

Figure 18 Word cloud of most frequently mentioned advantages of NBS as perceived by stakeholders at all sites

In the RECONECT Collaborator sites, stakeholders have identified several advantages associated with NBS for managing hydro-meteorological risks. These highlight the positive attributes that NBS can offer, extending beyond just risk management.

Environmental protection (10.9%) emerges as a crucial advantage highlighted by stakeholders. NBS offer opportunities to protect and enhance the natural environment utilising natural processes and materials while managing hydro-meteorological risks. This advantage was mentioned particularly frequently in the Tamnava river basin (22.0%) and least frequently in the Pilica river basin (5.9%).

Nature friendliness (10.6%) is another key advantage that stakeholders recognize. NBS approaches are inherently aligned with the principles of ecological sustainability and emphasise the integration of natural elements into risk management strategies. By working with nature instead of against it, NBS promotes coexistence with the natural environment, ensuring the preservation of ecosystems and the services they provide. The Tamnava river basin (22.0%) stood out with the highest frequency of mentioning this advantage, while the Bregana (1.6%) and Kamchia river basin (2.6%) had the least frequent references to it.

Financial savings (8.3%) emerge as a compelling advantage of NBS. Implementing NBS can potentially yield cost savings compared to conventional solutions. By harnessing natural processes and ecosystem services, NBS can enable cost savings. These savings can be significant, particularly in the long term, by reducing reliance on costly infrastructure and maintenance. The Bregana river basin (3.1%) had the lowest frequency of mentioning this advantage, while the mentions were relatively similar for the other sites.

Aesthetics (6.4%) are an important aspect of NBS mentioned by stakeholders. NBS often exhibit visual appeal and can contribute to the overall aesthetic value of landscapes and urban areas. Integrating natural elements and green spaces into risk management measures can enhance the visual quality of the built environment and improve public perception and enjoyment of these spaces. The Bregana river basin (10.9%) stood out with a notably high frequency of mentioning this advantage, whereas the Pilica river basin (2.0%) had the lowest frequency of mentioning it.

The positive effects on biodiversity (6.1%) are a significant advantage associated with NBS. By creating or restoring habitats and promoting ecological connectivity, NBS can support biodiversity conservation. This aspect is particularly important in the face of ongoing biodiversity loss. Hence, NBS can contribute to the preservation and restoration of local ecosystems and their associated flora and fauna. The Bregana river basin (14.1%) exhibited a notably high frequency of mentioning this advantage, while the Tamnava river basin (2.0%) had the lowest frequency of mentioning it.

Health and wellbeing (3.2%) are another key advantage highlighted by stakeholders. NBS interventions can have positive effects on human health by improving air quality, reducing heat island effects, and providing recreational opportunities in natural settings. Access to green spaces and contact with nature can be linked to various health benefits, including stress reduction, increased physical activity, and improved mental well-being. The Jadar river basin (7.7%) stood out with a relatively high frequency of mentioning this advantage, while the mentions were fairly similar for the other sites.

The capacity of NBS to adapt to the local landscape (3.2%) is another notable advantage. NBS solutions can be designed and tailored to suit the specific characteristics and needs of local environments and landscapes. This adaptability ensures that NBS can integrate seamlessly into the existing context, effectively addressing hydro-meteorological risks while respecting and enhancing the unique features of the local landscape. The Jadar and Kamchia river basins (both 7.7%) were notable for the comparatively frequent mentions of this advantage. In contrast, the mentions for the other sites were quite similar.

As the opinion of relevant stakeholders on the drawbacks of using NBS to manage hydro-meteorological risks is crucial for the development of strategies to improve their acceptance and eventual mainstreaming as effective risk management measures, stakeholders were asked to share their views in this regard. For the analysis of the responses 269 quotes were categorised using 39 categories. For a complete list of the categories used, see Annex F.

Figure 19 provides an overview of the most frequently mentioned disadvantages of NBS as perceived by stakeholders at the RECONECT Collaborator sites in the form of a word cloud. It can be read in the following way: For example, the word "delay" represents all mentions that refer to the full protective effect of the NBS only occurring with a time delay from the perspective of the stakeholders with 8.2% of all mentions. The word "land acquisition", which appears smallest in the figure, refers to the numerous challenges associated with the acquisition of the necessary land, which accounts for 3.7% of all mentions across all locations.

Figure 19 Word cloud of most frequently mentioned disadvantages of NBS as perceived by stakeholders at RECONECT Collaborator sites

One major concern is the lack of knowledge (11.9%) surrounding NBS. Stakeholders feel that there is a limited understanding of the concept, its potential benefits and limitations. This lack of knowledge may hinder the widespread adoption and acceptance of NBS as a viable solution. This disadvantage was mentioned particularly frequently in the Tamnava river basin (17.4% of mentions) and less often in the Pilica river basin (7%) or not at all in the Kamchia river basin.

Another concern is the perceived low effectiveness (7.1%) of NBS in managing hydro-meteorological risks. Stakeholders question whether NBS can provide adequate protection against floods, droughts and other natural hazards. They may have doubts about the reliability and resilience of NBS structures and their ability to withstand extreme weather events and other impacts of climate change. This aspect was mentioned very often in the Vrbanja river basin (15.8%) and rather rarely in the Kamchia river basin (2.8%).

The high space requirements (7.1%) for implementing NBS is another commonly mentioned disadvantage. Stakeholders may worry about the availability of sufficient land or suitable areas to implement NBS measures. This concern is particularly relevant in urban settings where space is limited and valuable. They also see unclear and/or complex land ownership patterns as a bigger problem for the use of NBS than for conventional protection measures due to the higher space requirements. Many stakeholders in the Bregana river basin (11.7%) emphasised this concern and comparatively few in the Kamchia river basin (2.8%) and in the Pilica river basin (2.3%).

Troublesome maintenance (6.7%) is also cited as a disadvantage of NBS. Stakeholders recognize that NBS structures require regular monitoring, upkeep, and maintenance to remain effective. They express concerns about the resources, time, and effort needed to maintain these structures in the long term and the unclear responsibilities in this regard at the present time. This disadvantage is of particular concern to stakeholders in the Kamchia river basin (19.4%), where it is considered by far the greatest disadvantage, and is also overwhelmingly critical in the Tamnava river basin (10.9%). This aspect does not play a significant role in the perception of stakeholders in the Pilica river basin (2.3%)

and in the Vrbanja river basin (2.6%). It was not mentioned at all in the Bregana river basin.

Another concern are the expected additional costs (6.3%) associated with realising NBS. Stakeholders are worried about the financial implications of implementing and maintaining NBS measures. Some stakeholders express their concern that due to the expected additional costs the realisation of NBS can only be partially achieved from existing funding sources and that additional sources will have to be tapped. This aspect was given above-average importance in the Kamchia river basin (11.1%), while the perception was comparatively similar in the other locations.

Stakeholders also express concerns about the time-delayed effect (5.9%) of NBS as some of them may take time to fully deliver their intended effects. This expected delay in achieving desired outcomes is feeding the scepticism among stakeholders. This perceived disadvantage was of paramount importance in the Vrbanja river basin (18.4 %) and of great relevance to the stakeholders in the Jadar river basin (10.6 %). It did not matter in any way to stakeholders in the Bregana river basin.

Uncertainty especially regarding the costs, effectiveness and efficiency of NBS (5.9%) is an equally important concern. Among these three aspects stakeholders especially question the evidence and scientific basis supporting the effectiveness of NBS in managing hydro-meteorological risks. This scepticism again points to the need for more empirical data and studies to validate the claims and potential of NBS. The aspect of uncertainty plays the most prominent role in the Bregana river basin (20.0%). Uncertainties regarding the effectiveness of NBS are the greatest (11.7%), followed by cost-related (5.0%) and efficiency-related (3.3%) uncertainties. Whereas, uncertainty was not explicitly mentioned in the Kamchia, Pilica and Jadar river basin.

The challenging and time-consuming implementation process (4.8%) is another concern often mentioned. Stakeholders perceive the planning, design, and execution of NBS projects as complex and demanding. They point to expected struggles with navigating the regulatory frameworks, obtaining permits, and coordinating multiple stakeholders involved in the implementation process. The challenges associated with the implementation process are seen particularly critically in the Tamnava river basin (10.9%) and not addressed at all by stakeholders in the Kamchia river basin.

Low awareness of NBS (4.5%) is another issue raised by stakeholders. This implies that stakeholders, including the general public, but also relevant civil protection actors and policy makers, have limited knowledge or understanding of NBS and its potential benefits. Hence, this aspect is closely related to the lack of knowledge and experience (see above). It can hamper the consideration of NBS for hazard risk management by professionals and policy makers, as well as community support for NBS on the ground. At the different sites, there is broad agreement on the importance of this aspect compared to the others mentioned.

Troublesome land acquisition (3.3%) is another often mentioned disadvantage. Implementing NBS may require acquiring land or rights to use certain areas, which can present challenges in terms of negotiations, legal processes, adequate compensation schemes and managing conflicts of interest. This disadvantage is considered particularly problematic in Kamchia (11.1%).

High coordination requirements (2.6%) are highlighted as another concern. Successful implementation of NBS often requires collaboration and coordination among various stakeholders, such as authorities, local communities and non-governmental organisations. There is the fear that this coordination can be complex and time-consuming, potentially slowing down the implementation process.
Stakeholders placed particular emphasis on this drawback in the Pilica river basin, accounting for 11.6% of the responses.

The lack of experience with NBS (2.6%) is another significant disadvantage mentioned by stakeholders. This lack of familiarity and practical experience with implementing NBS measures can hinder their public acceptance. Stakeholders feel uncertain about the outcomes and potential risks associated with NBS implementation. But the stakeholders also problematise the lack of experience of those who have to prepare and implement the realisation of NBS politically and in terms of planning. There is a general consensus among the stakeholders at the different locations regarding the significance of this particular aspect when compared to the others mentioned.

Stakeholders assume that the realisation of NBS requires a great deal of expertise. Hence, the high expertise requirements (2.2%) for implementing NBS are also mentioned as a concern. Stakeholders question whether there are enough qualified professionals with the necessary skills and knowledge to design, implement, and manage NBS projects effectively. The various sites widely concur on the significance of this aspect in comparison to the others mentioned.

Stakeholders also note that the current lack of best practice examples (2.2%), which can serve as empirical evidence of the performance of NBS, is a disadvantage of NBS compared to well-established conventional solutions. The absence of successful case studies and tangible examples make it difficult for stakeholders to assess the potential benefits and risks associated with NBS. Across various RECONECT Collaborator sites, there is a widespread consensus regarding the relative importance of this aspect compared to the others mentioned.

Finally, stakeholders raise concerns about the low visibility (2.2%) of protective structures associated with NBS. NBS often involve natural elements, which may not be as visually prominent as traditional grey infrastructure. This low visibility may lead to scepticism or underestimation of the protective capabilities of NBS and hence, their acceptance. In the Jadar river basin (6.4%), this disadvantage was particularly emphasised by stakeholders.

The most frequently mentioned disadvantages of NBS at each of the RECONECT Collaborator sites are presented in Annex F.

The advantages and disadvantages discussed by the stakeholders are largely consistent. The various environmental and health-related effects, as well as the integration into the local natural environment, are viewed positively.

On the disadvantage side, the low level of current knowledge and the resulting uncertainties and gaps in awareness are described. In addition, there are perceived higher demands on implementation, maintenance and required space. Furthermore, there are still doubts about the effectiveness in general and the expectation that this will only occur with a time lag compared to conventional protective measures.

At first glance, there is an inconsistent perception that the costs associated with using NBS to manage hydro-meteorological risks are estimated to be both lower (advantage - 8.3% of all mentions) and higher (disadvantage - 6.3% of all mentions). On the one hand, these positions reflect two different camps within the stakeholders and, on the other hand, they once again point to the current knowledge gaps and uncertainties that need to be addressed with appropriate strategies.

Addressing these disadvantages will require efforts to improve knowledge dissemination and awareness, streamline implementation processes, develop robust cost-benefit analyses based on empirical data collected in local pilot studies, foster collaborations of relevant stakeholders and showcase successful examples of NBS in action. The analysis of the advantages and disadvantages of NBS perceived by the most important stakeholders in their concrete local context will form one of the pillars for the development of recommendations for action to promote the sustainable use of NBS at the individual locations in a next step.

4.5 Experts' perspective on relevance of NBS for managing hydro-meteorological risks and main (dis)advantages of NBS

The perception of NBS among surveyed experts is very positive. NBS are perceived as being highly beneficial and their use necessary if not even essential in water management. Experts emphasise that NBS should be used more and more often, in line with European trends. Positive effects on the reduction of air pollution, the improvement of the micro-climate as well as the mitigation of water shortages and flooding risk is highlighted. From their perspective, prompt and effective use of NBS should be ensured.

With regard to the effectiveness of NBS, the experts' opinions are divided: A few experts do not see themselves in a position to formulate a general statement, as there are still very few application examples and the effect of NBS is very site-specific. Very few experts consider the effectiveness to be lower or, on the contrary, NBS to be the most effective measures. The vast majority estimates the effectiveness to be at least as high, if not higher than the one of traditional measures.

There is disagreement among the experts regarding the assessment of the efficiency of NBS for managing hydro-meteorological risks, i.e. considering the resources employed to the effect obtained, compared to more traditional, technical measures. The majority assume a lower efficiency due to a lack of economies of scale and also refer to the lower visibility of the measures, fewer experts assume a higher or at least comparable efficiency. Still, other experts do not dare to pass judgement.

When experts were asked about the most important advantages of NBS several key aspects emerged consistently. Firstly, NBS solutions were praised for their universality, meaning they can be applied in almost any space, making them highly adaptable. Additionally, NBS solutions were lauded for their cost-effectiveness, resulting in savings in both implementation and maintenance expenditures compared to traditional methods. Their multi-functionality was also highlighted, as they were found to have positive impacts on various challenges such as pollution and the biodiversity crisis.

Another significant advantage of NBS solutions is their ability to better adapt to the existing landscape. Unlike conventional approaches, NBS solutions cause less interference with the environment and help preserve the natural appearance of the

surroundings. This preservation of the natural environment also contributes to higher aesthetic value, enhancing the overall visual appeal of the area.

Furthermore, NBS solutions were recognized for their positive social aspects. They were found to have recreational effects, improving the quality of life for individuals and providing opportunities to adapt to social needs. Moreover, NBS solutions help foster a favourable financial effect by creating opportunities for economic growth and job creation.

Despite these advantages, experts also pointed out several important disadvantages associated with NBS solutions. One significant challenge is the inadequate fit of NBS within current legal and administrative frameworks. Implementing NBS solutions is often more complicated than traditional measures, requiring additional work to obtain permits and gain consent from relevant authorities.

The effectiveness of NBS solutions was identified as another potential disadvantage. Some experts expressed concerns about the limited effectiveness of these solutions in addressing certain issues. Additionally, the lack of immediate effect was seen as a drawback, as the benefits of NBS solutions may take time to manifest fully.

Costs and maintenance requirements were also highlighted as potential disadvantages of NBS solutions. While they are generally considered cost-effective, NBS solutions still require ongoing maintenance, which can incur additional costs. Furthermore, the lack of sufficient knowledge and specialists for planning and implementing NBS solutions poses a challenge.

NBS solutions were seen as less suitable in heavily built-up or dense areas due to their higher space requirements. This may lead to problems related to land ownership or expropriation, adding to the complexity of implementation. Another significant disadvantage is the higher effort required to ensure social acceptance and mitigate social resistance, particularly from residents who are directly affected by the changes.

Moreover, the general public's lack of confidence in the reliability of NBS solutions due to a low level of public awareness was identified as a major concern. Finally, the fear of the unknown was highlighted as a disadvantage, as people may be hesitant to embrace NBS solutions due to uncertainty about their effectiveness and potential consequences.

The usefulness of a statistical comparison of the statements of stakeholders and experts is very limited. The reason for this is not only the far smaller number of experts who shared their opinion, but also the strong bias in favour of actors from academia & research and public authorities. Hence, as expected the descriptive statistical analysis of the experts' statements reveals that they emphasised the problems at the legal, administrative and political level much more than the stakeholders, stressing the negative effects of the lack of legal regulations, the systemic inertia and the short-term (political) planning horizon of politicians.

Among the disadvantages that accounted for at least 5% of the total number of responses, lack of funding (11.8%) was the most frequently cited and the delayed effect of NBS (7.9%) was second most mentioned drawback as the benefits of NBS may take time to manifest fully. Experts also stressed the relevance of system inertia (6.6%), i.e. the resistance or reluctance to change existing systems and practices, particularly those that are well-established and familiar. NBS solutions are expected to face resistance

from different stakeholder groups including political decision-makers who are hesitant to adopt new approaches, making it important to address this inertia and encourage the acceptance and integration of NBS into existing systems. Uncertainty (5.3%) especially with regard to costs and the effectiveness of NBS as well as maintenance requirements (5.3%) were also highlighted as potential disadvantages of NBS solutions.

Overall, experts at the RECONECT Collaborator sites believe that while NBS solutions offer numerous advantages such as universality, cost-effectiveness, and positive social impacts, they also face challenges related to legal frameworks, effectiveness, maintenance, lack of knowledge, and social acceptance. Addressing these disadvantages will be crucial for the successful implementation and widespread adoption of NBS solutions.

5 Summary and implications for RECONECT

5.1 Comprehensive evaluation of the results of Q-methodology

The radar chart (Figure 20) and Table 32 present a comprehensive overview of the variations observed across six collaborator's sites, utilising the average scores obtained from Q-methodology across 11 topics. This visual representation offers valuable insights into the distinct perceptions held by stakeholders in each site, providing a deeper understanding of the factors that shape their opinions regarding NBS. By acknowledging and comprehending these differences, it becomes possible to develop targeted strategies aimed at fostering positive perceptions and ensuring the successful implementation of NBS initiatives in each specific site. These visual aids serve as valuable tools for guiding decision-making processes and tailoring approaches to meet the unique needs and challenges of each collaborator's site.

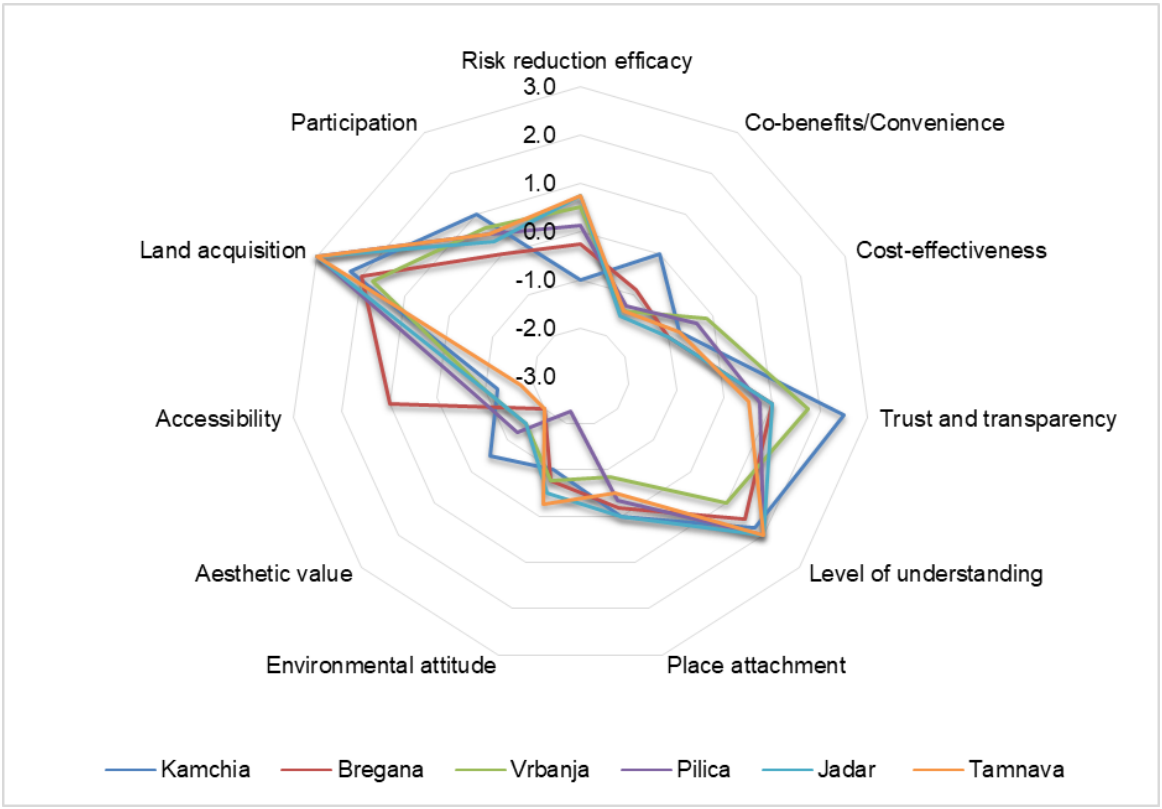

Figure 20 Radar chart for cross-site evaluation of topics

Table 31 Topic average per topic per site

	Kamchia	Bregana	Vrbanja	Pilica	Jadar	Tamnava
RISK REDUCTION EFFICACY	-1.0	-0.3	0.5	0.1	0.8	0.8
CO-BENEFITS / CONVENIENCE	0.0	-0.9	-1.4	-1.3	-1.5	-1.4
COST EFFECTIVENESS	-0.8	-1.0	-0.1	-0.4	-1.0	-0.8
TRUST AND TRANSPARENCY	2.5	1.0	1.8	0.8	1.0	0.5
LEVEL OF UNDERSTANDING	1.8	1.5	1.0	2.0	2.0	2.0
PLACE ATTACHMENT	0.0	-0.2	-0.8	-0.3	0.0	-0.5
ENVIRONMENTAL ATTITUDE	-1.0	-0.8	-0.8	-2.3	-0.5	-0.3
AESTHETIC VALUE	-0.5	-2.0	-1.5	-1.3	-1.5	-2.0
ACCESSIBILITY	-1.3	1.0	-1.0	-0.8	-1.0	-1.8
LAND ACQUISITION	2.3	2.0	1.8	3.0	3.0	3.0
PARTICIPATION	1.0	0.0	0.7	0.5	0.3	0.5

One notable observation from the radar chart is that the peaks indicate site-specific points that exert significant influence over stakeholders' perceptions. These points, specific to each site, play a pivotal role in shaping the overall perception of NBS within that particular context. To provide a precise illustration of each topic, a bar chart is constructed using the average score for each topic and shown in the following figures.

Interestingly, the variations observed were not limited to specific sites alone but extended to differences between countries as well. For instance, when examining the Jadar and Tamnava sites in Serbia, similarities were found in most aspects, yet there were distinctions in site-specific topics such as *aesthetic value* and *accessibility*.

From the comprehensive overview, among the 11 topics examined, the aspect of *land acquisition* stands out as critically important in shaping stakeholders' perceptions of NBS overall (Figure 21). Particularly in Tamnava, Jadar, and Pilica, *land acquisition* is viewed as the most crucial factor influencing stakeholders' perceptions. In the other sites, the importance assigned to this aspect ranges from moderate to high. This indicates that stakeholders across the various sites recognize the significance of land acquisition in determining their views on NBS, with the highest level of importance attributed to it in the aforementioned sites.

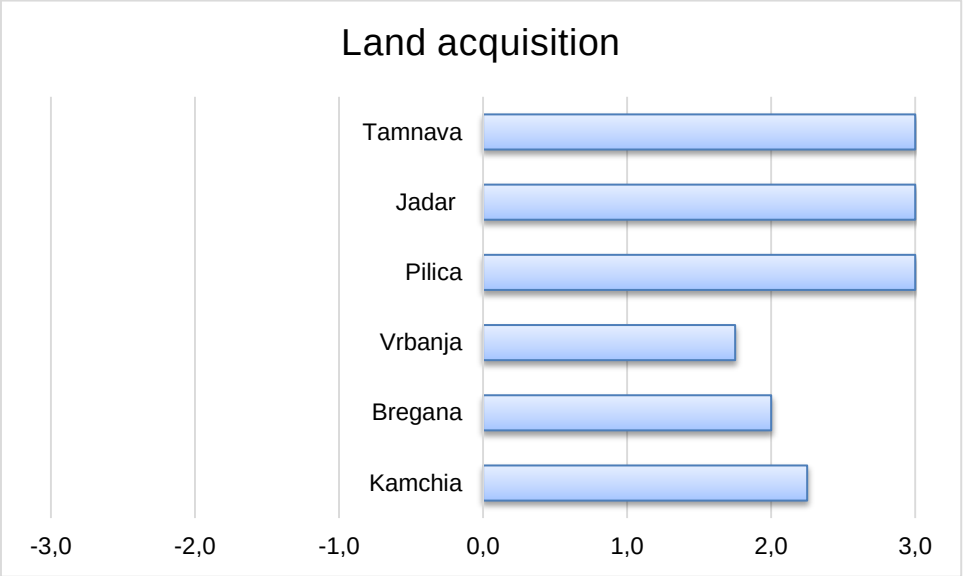

Figure 21 Average score for 'land acquisition' topic per site

Next, in the majority of the sites, a common obstacle to fostering positive perceptions of NBS is a *lack of understanding* (Figure 22). Stakeholders across these sites acknowledge a deficit in comprehension regarding NBS, which hampers their ability to develop favourable opinions. This underscores the importance of implementing enhanced education and awareness initiatives to address this barrier effectively. By providing stakeholders with accurate and accessible information about NBS, these initiatives can bridge the knowledge gap and empower individuals to form more informed and positive views about the benefits and potential of NBS.

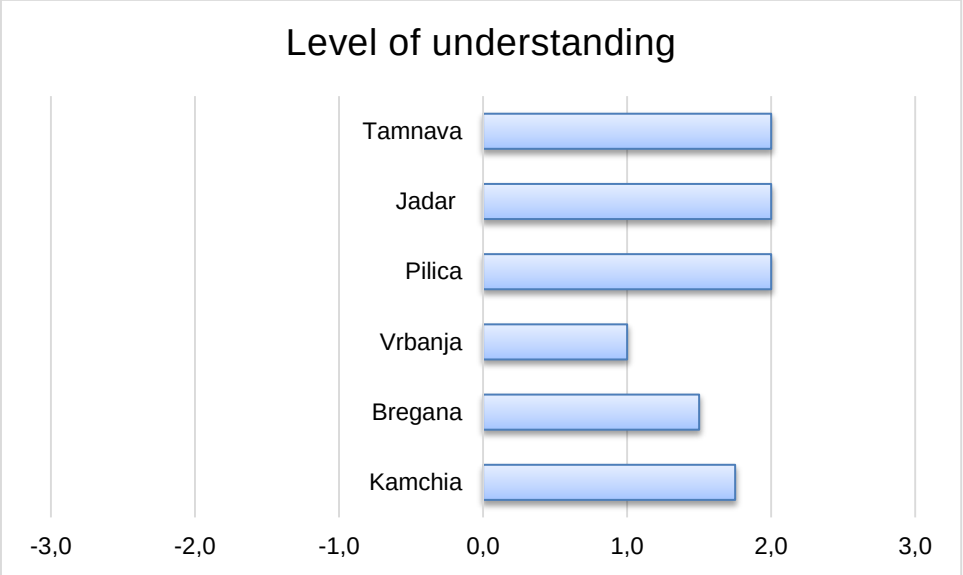

Figure 22 Average score for 'level of understanding' topic per site

The findings of the study indicate that several factors, including *co-benefits/convenience, cost-effectiveness, environmental attitude, and aesthetic values of NBS*, are not perceived as decisive barriers to fostering positive perceptions. When examined

collectively, these aspects do not significantly hinder stakeholders' positive views of NBS.

Specifically, *co-benefits* and *convenience* are generally not seen as barriers to positive perceptions of NBS, except for the Kamchia site, which displayed a more neutral stance(Figure 23). However, it is important to note that the Q-set for *co-benefits* and *convenience* in this study predominantly describes the negative aspects of NBS for this topic. This limitation suggests that the study did not thoroughly explore the catalytic aspect of NBS in fostering positive perceptions. Rather, they indicate that these factors do not significantly impede stakeholders' favourable views of NBS when compared to other barriers that may have a stronger influence. Future research should consider further investigating the potential positive catalysts associated with NBS and their impact on stakeholders' perceptions.

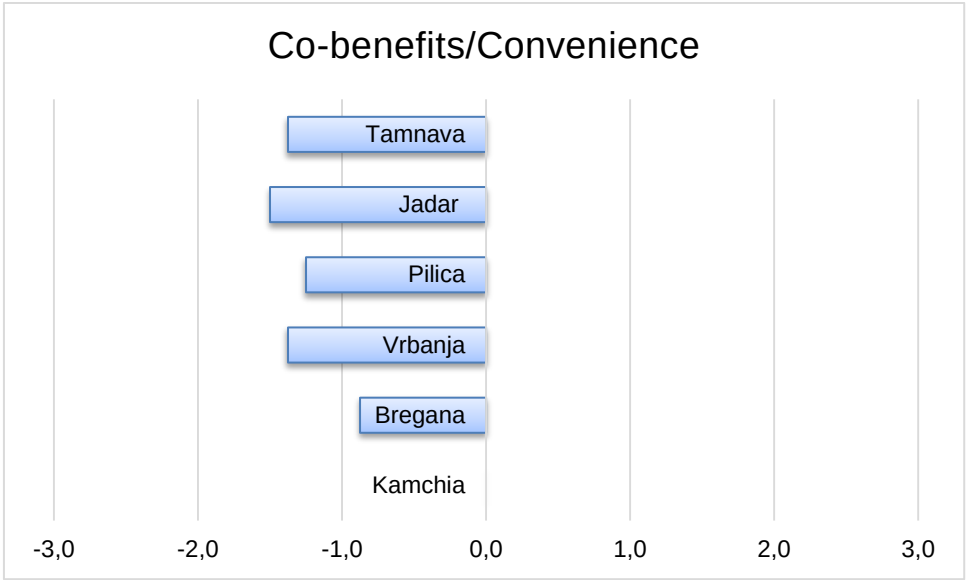

Figure 23 Average score for 'co-benefits/convenience' topic per site

Similarly, the participants in the workshops reached a consensus that the *cost-effectiveness* of NBS does not pose a barrier to fostering positive perceptions (Figure 24). In general, they agreed that NBS is cost-effective when compared to traditional measures, or at the very least, the cost-effectiveness of NBS did not significantly influence their decision-making process. This alignment among the participants highlights their recognition of the economic viability and efficiency of NBS, further supporting their positive perceptions of this approach to risk management.

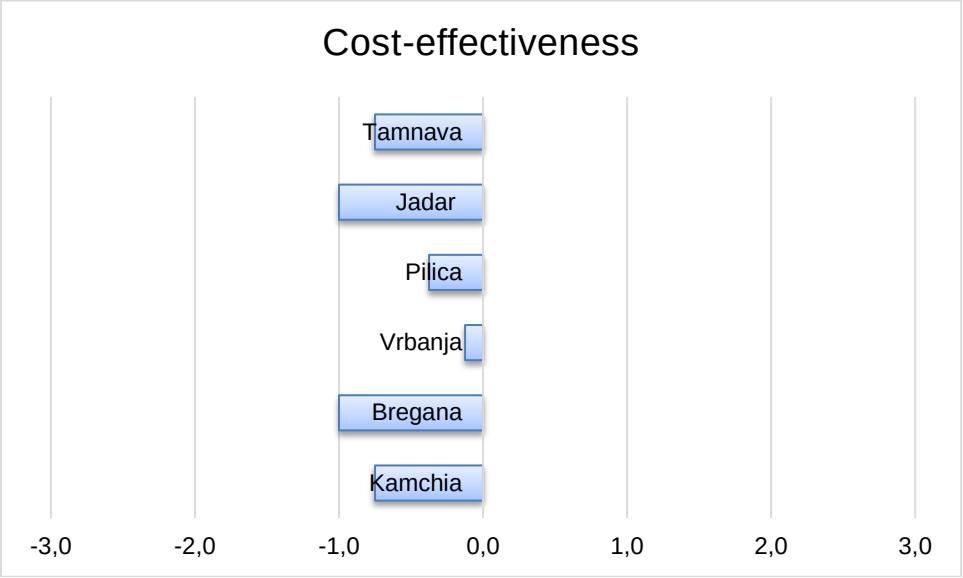

Figure 24 Average score for 'cost-effectiveness' topic per site

Additionally, participants perceived the aspect of *place attachment* as being either neutral or not significantly influencing their positive perceptions of NBS (Figure 25). The participants' neutrality towards or limited influence of place attachment indicates that other factors may have stronger influences on their perceptions of NBS.

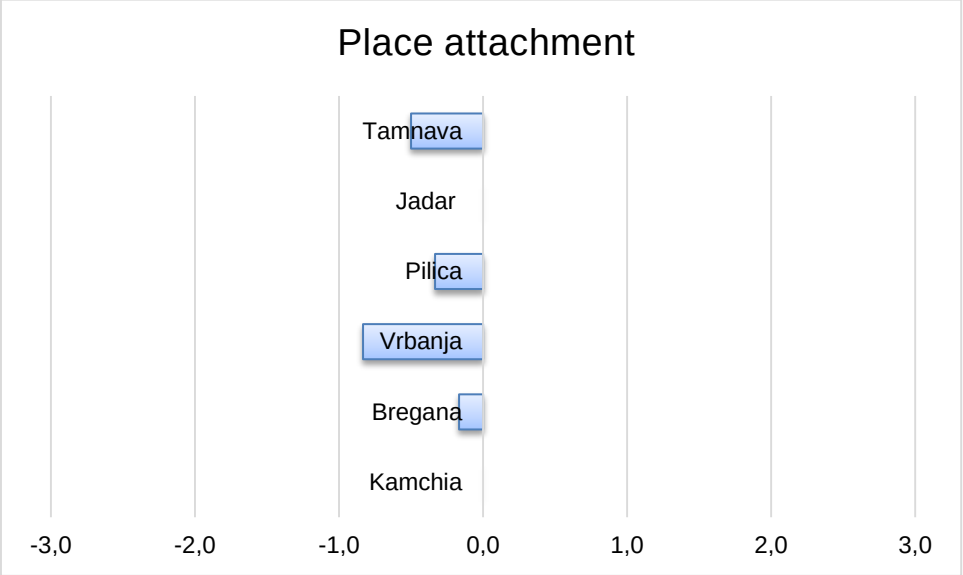

Figure 25 Average score for 'place attachment' topic per site

When it comes to the environmental *attitude* and *aesthetic/landscape value of NBS*, it was not seen as critical for positive perceptions of NBS (Figure 38).

Regarding *environmental attitude* and *aesthetic/landscape value* of NBS, the result is that these factors were not perceived as critical in shaping positive perceptions of NBS(Figure 26 and Figure 27). Stakeholders did not consider environmental attitude or aesthetic/landscape value to be decisive factors influencing their views on NBS. This suggests that stakeholders' perceptions of NBS are not primarily driven by their

environmental attitudes or the aesthetic and landscape value associated with these solutions.

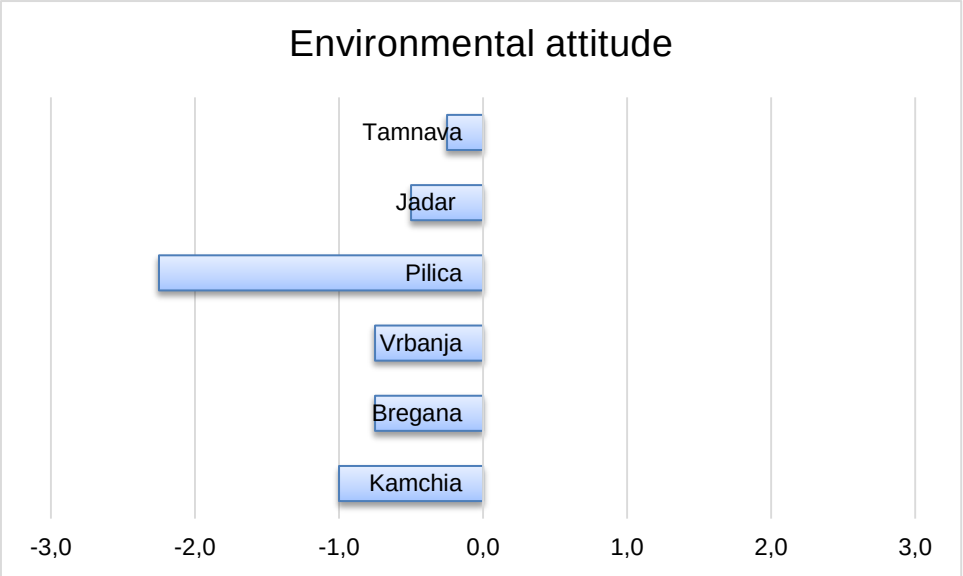

Figure 26 Average score for 'environmental attitude' topic per site

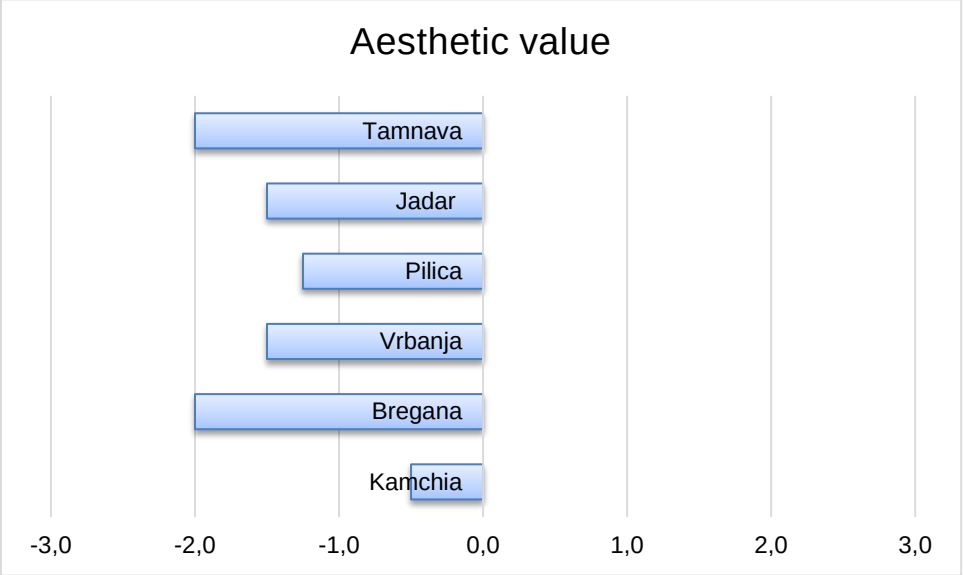

Figure 27 Average score for 'aesthetic/landscape value' topic per site

Interestingly, the study reveals that *accessibility* did not play a significant role in shaping perceptions of NBS across most of the sites, except for Bregana (Figure 28). This finding highlights the importance of considering site-specific factors that may influence stakeholders' perceptions of NBS.

While accessibility did not emerge as a decisive factor in most sites, the significance attributed to it in Bregana suggests that this aspect should be carefully considered and addressed in the context of that particular site. Understanding the unique grounding and specific conditions of each site is crucial for effectively implementing NBS and ensuring that accessibility-related challenges are appropriately identified and addressed.

By acknowledging the variations in the importance of *accessibility* across different sites, stakeholders and decision-makers can tailor their strategies and interventions accordingly, ensuring that NBS initiatives are designed and implemented in a manner that accounts for the specific needs and characteristics of each location.

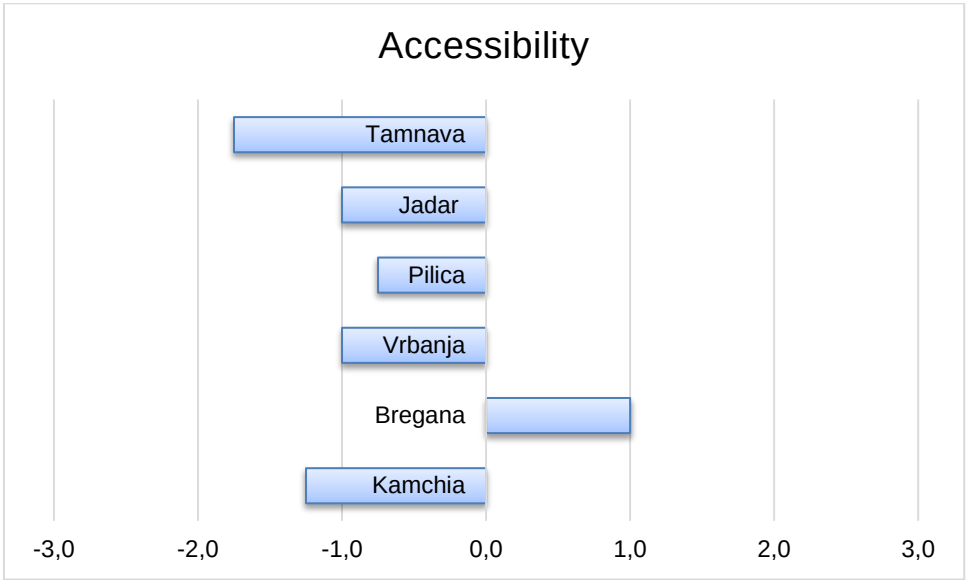

Figure 28 Average score for 'accessibility' topic per site

For the *risk reduction efficacy of NBS,* Tamnava, Jadar, and Vrbanja showed that this can act as a barrier for people's perceptions (Figure 29). One potential explanation for this divergence lies in the varying levels of risk context observed in each location. As previously observed, when faced with higher levels of risk, individuals may exhibit a reluctance to embrace NBS, instead opting for more conventional approaches to risk management.

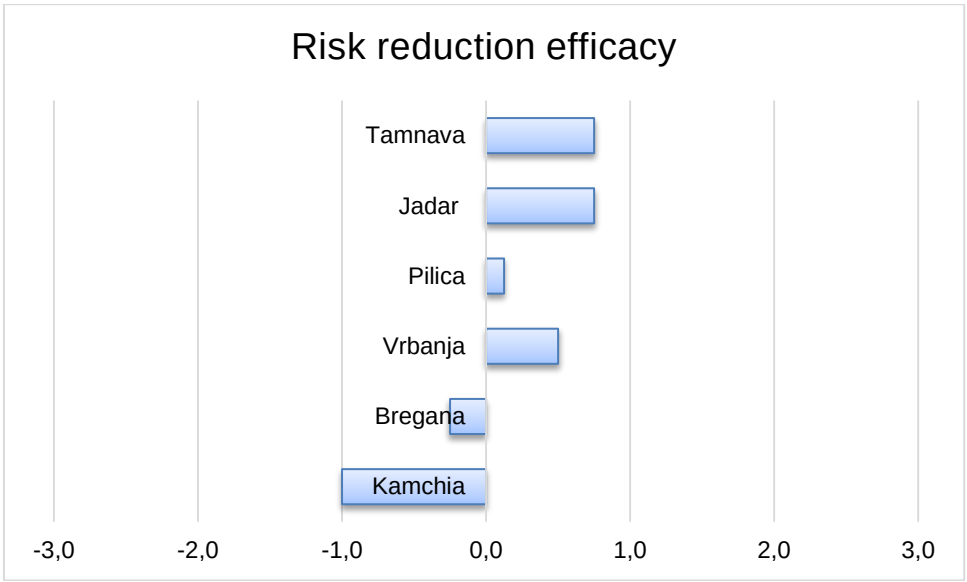

Figure 29 Average score for 'risk reduction efficacy' topic per site

In terms of the *participation* aspect, findings from various sites indicate that participants generally hold a slight inclination towards the belief that participation can contribute to shaping positive perceptions of NBS (Figure 30). This suggests that while participants acknowledge that the coalition of stakeholder groups may pose challenges to achieving successful NBS outcomes, they also recognize that increased opportunities for participation can lead to more favourable perceptions of NBS. In essence, participants perceive a delicate balance between the potential hindrances posed by stakeholder coalitions and the positive impact that enhanced participation can have on shaping perceptions of NBS.

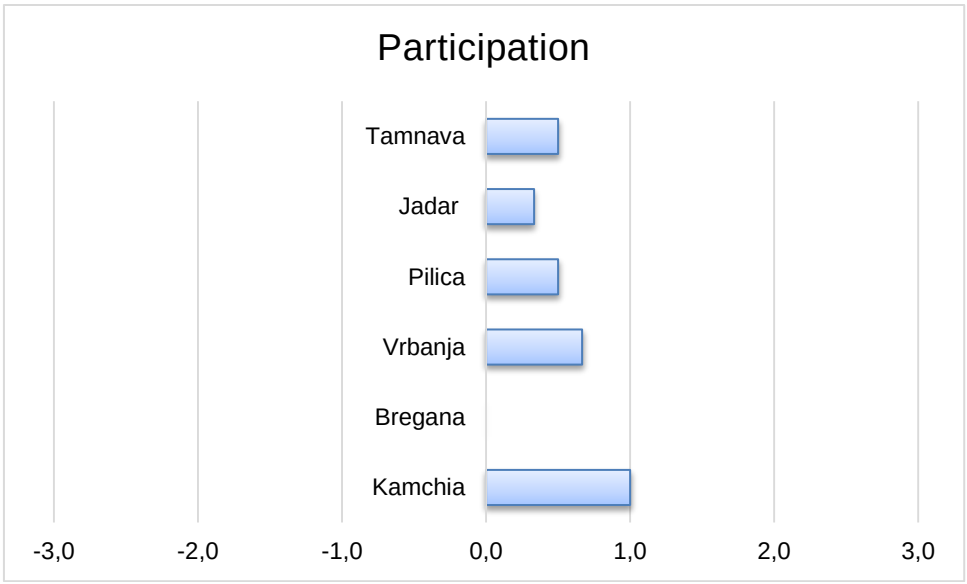

Figure 30 Average score for 'participation' topic per site

Lastly, it is worth noting that *trust and transparency* emerged as influential factors across all the sites examined Figure 31. In particular, the Kamchia site demonstrated the strongest influence of trust and transparency on the perceptions of NBS. Conversely, in the Tamnava and Pilica sites, these factors were found to have a slightly to moderately influencing effect. This suggests that the level of trust and transparency exhibited in the implementation and communication of NBS initiatives plays a significant role in shaping perceptions, with the Kamchia site showing the highest reliance on these factors for fostering positive attitudes towards NBS.

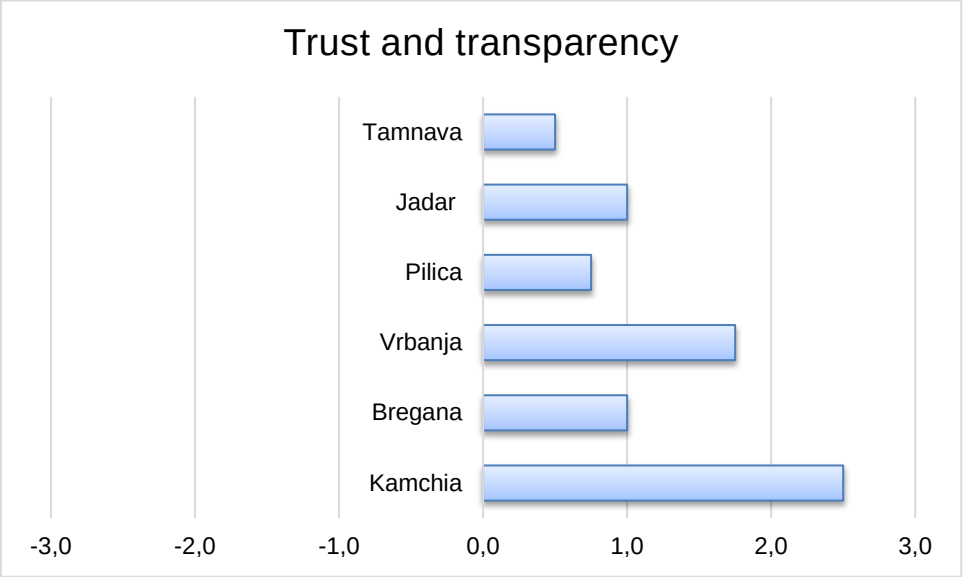

Figure 31 Average score for 'trust and transparency' topic per site

Above all, despite all, it is important to also note that different viewpoints exist within the sites, as discussed in the previous chapter, indicating that site-specific variations in perception are present.

5.2 Potential of using Q-methodology for further decision-making process at Collaborator sites

It is crucial to recognize the existence of diverse viewpoints among the collaborators at each site. To ensure effective implementation and acceptance of NBS, it becomes imperative to carefully consider and understand the perspectives of various stakeholder groups involved. These viewpoints are held by a range of different groups of people, including research, civil society, commercial sector, political representatives, authority and media sector. Each group brings their own unique experiences, concerns, and interests to the table, shaping their thinking regarding NBS.

As previously shown, several factors contribute to these differing viewpoints. Amongst all, two of the most challenging topics identified by stakeholders are land acquisition, including compensation issues, and gaining a proper understanding of NBS. To address these challenges, it is crucial to establish fair and transparent processes for land acquisition, ensuring that affected individuals or communities are adequately compensated and involved in decision-making. Furthermore, efforts should be made to enhance awareness and knowledge about NBS through targeted education and outreach programs, highlighting the benefits and showcasing successful case studies.

Moreover, site-specific factors that hinder the acceptance of NBS should be thoroughly considered. Factors such as accessibility or user inconvenience need to be addressed through thoughtful design and planning, ensuring that NBS solutions are tailored to the specific needs and characteristics of each site. By taking into account these site-specific considerations, the implementation of NBS can be made more effective and sustainable, leading to increased acceptance and support from stakeholders.

In summary, navigating the diverse viewpoints surrounding planned NBS requires careful consideration of each stakeholder group's perspectives. Factors such as

awareness, experiences, and interests influence their thinking. Overcoming these challenges entails fostering effective communication, involving stakeholders in decision-making, addressing compensation and understanding issues, and considering site-specific factors. By addressing these aspects, stakeholders can collaborate towards successful implementation and widespread acceptance of NBS.

5.3 Reflection on institutional feasibility and political acceptance at Collaborator sites

The information available on the institutional framework conditions for the Collaborator sites leads to the conclusion that the current legal, administrative and policy systems are still in their infancy when it comes to considering NBS in the risk management process. Information from interviews and workshop activities, in particular Q-methodology, was analysed as part of this report. A document-based policy analysis will go into more detail on the institutional aspects in Deliverable 4.7.

Existing structures, processes and funding schemes are primarily geared towards the use of traditional hard infrastructure measures. The main obstacles to the adoption of NBS include lack of legal provisions, administrative and legal procedures, unclear responsibilities, lack of dedicated budgets for planning, implementation and maintenance, and limited institutional capacity to mainstream NBS.

This current low uptake of NBS is attributed to several factors. The lack of political and public awareness of the positive role that NBS could play in risk management is seen to be linked to incomplete knowledge including existing uncertainties and related concerns about the effectiveness, cost and efficiency of NBS, as well as still rather rare (local) first-hand experiences of best practice. It is also noted that a reactive rather than a proactive approach in the field of disaster risk management often adopted. Furthermore, coordination between different organisational units, sectors and different spatial levels, which is particularly necessary for the use of NBS, is - diplomatically speaking - considered to be in need of improvement. It can be seen that many of the challenges are relevant to the uptake of NBS but are not exclusive to NBS but are of a general nature.

Experts at all sites broadly agree that the current use of NBS to manage hydro-meteorological risks is extremely limited to virtually non-existent.

Against the background of the adoption of the Green Deal by EU Member States and Candidate Countries, and the implementation of a wide range of EU policies and strategies, many observers expect an increased use of NBS, e.g. for the management of hydro-meteorological risks. These legal and policy frameworks include, for example, the EU Nature Directives, the EU Biodiversity Strategy, the EU Climate Change Legislation, the EU Adaptation Strategy, forthcoming legislative proposals on forest monitoring, plant and forest materials and the EU Soil Health Legislation. All of these documents require policy makers to develop the legal basis for mainstreaming NBS. At present, despite the existence of these EU policies and directives that provide a solid legal basis for the use of NBS, the political acceptance of NBS in Collaborator countries is still not contributing to the mainstreaming of NBS.

Political actors are generally perceived as observers whose activities are often seen as declaratory rather than executive. While they may - at best - advocate the inclusion of NBS in relevant policy documents, their commitment to supporting the implementation of these policies is seen as rather low. This is not only due to a lack of awareness or the

politically more rewarding representation of entrenched, status quo-oriented stakeholder interests, but also, as several interviewees pointed out, to an inherent tendency in politics to favour highly visible and immediately effective safeguards that fit better with short electoral cycles. However, several experts stress the importance of persuading political actors to develop the legal basis for mainstreaming NBS and to ensure that the necessary resources are made available for its implementation.

Experts also highlight that although current legislation does not explicitly recognise NBS, it does not in principle prevent their implementation. The growing environmental awareness of the population and the related activities of grassroots initiatives as well as the increasing popularity of green and blue structures in the planning context nourish the hope that the social environment for the use of NBS is slowly but steadily improving.

In addition, it is emphasised that the pressure for reform emanating from the EU directives and policies described above will have a positive effect on the establishment of NBS not only in strategic policy documents, but also in binding legal regulations. However, the influence of the European level is not limited to this. The steady increase (albeit at a low level) of local best practice examples, often (co-)financed by the European Union, is also expected to improve the level of knowledge and awareness of NBS in the political sphere and society through accompanying benefit monitoring and information campaigns.

Even if the overall conclusion is that the current institutional system is not very conducive to the use of NBS for the management of hydro-meteorological risks and that the current use is negligible, the lessons learned along the way are important in order to make proposals on how to overcome the diagnosed challenges. A more detailed presentation of this information and the strategies developed on this basis will be presented in RECONECT Deliverable 4.7.

6 Conclusion

This report provided insights into the factors shaping the local acceptance of proposed NBS in European Collaborator sites (including an understanding of how stakeholders perceive potential co-benefits). The report explored the feasibility of realising NBS in the Collaborator sites; i.e. to what extent the uptake of such measures is currently supported.

The report is based on a multi-method approach and includes extensive fieldwork and document analysis:

- **Expert interviews (n=57):** By means of the expert interviews, we explored institutional and political feasibility of NBS, assessed the potential challenges and opportunities within the existing regulatory framework and current political situation. We also explored expected site-specific benefits and co-benefits of NBS, taking also into account the advantages and disadvantages discussed at the respective sites.
- **Scorecard-assisted rating (n=131):** Allowed us to assess the attitudes of stakeholders in the different sites towards NBS, this includes their perception of the most pressing hazards and risks, the expected risk reduction efficacy, expected ecological, social and economic co-benefits.
- **Q-methodology (n=114):** By combining qualitative and quantitative methods to investigate subjective perspectives key factors shaping the local acceptance of NBS from the perspective of stakeholders in the different sites were explored: This included their view on risk reduction efficacy, co-benefits, cost-effectiveness, trust, level of understanding, place attachment, environmental attitudes, aesthetic values, accessibility, land acquisition and participation.

It was initially planned that the project partners in the lead for this task, i.e. Helmholtz-Centre for environmental research – UFZ, would directly support the local co-creation process in the different sites of Collaborators. However, such an approach turned out to be not effective. Next to the sheer number of sites to be supported, conceptual factors, cultural factors as well as language barriers also played a key role. Therefore, it was decided to contract local consultants with experience in stakeholder engagement and participatory processes in the respective countries. Three roles in these co-creation processes on-site were defined: 1) Collaborators responsible for delivering organizational support on site; 2) academia and research centre (in our case it is UFZ) who provides methodological framework for co-creation activities, supports their organization, data collection and analysis; 3) local partners with social science expertise were responsible for facilitation, organization and documentation of on-site activities for co-creation process, incl. data collection and analysis. Such an approach with a clear role definition in co-creation process and involvement of local partners turned out to be highly effective and productive. It also helped to once again broaden the basis of stakeholder engagement in the sites as the local consultants were already well connected.

6.1 Summary of key findings with respect to acceptability of NBS

- **Process-related factors play a central role in shaping acceptability of NBS.** Across all Collaborator sites, process-related factors are perceived as having the strongest influence on the acceptability of NBS to reduce hydro-meteorological risks. Five out of ten of the most relevant factors point towards the design of the process, including a fair land acquisitions process (1/10), proper compensation schemes (2/10), an open and transparent decision-making process (3/10), a properly designed and implemented participatory process (7/10) and trusted public authorities in flood risk management (10/10). In addition, a good understanding of the operation of NBS (4/10) as well as their as well as scientific proof (9/10) are considered as relevant. Also, if people place high value to the natural environment in the NBS area they are also more likely to support NBS (8/10). In addition, some factors point towards scepticism, either by people preferring physical structures (5/10), or general scepticism (6/10).
- **High disagreement with statements pointing towards negative outcomes of NBS**: The local stakeholders expressed high disagreement with several statements that suggested negative outcomes of implementing NBS. This suggests that the participants believed that an NBS landscape could potentially be aesthetically pleasing and acceptable to the community. Furthermore, the participants did not agree with the statement that the cultural and historical aspects of the town area would be harmed due to NBS, indicating that they may have perceived NBS as compatible with preserving the town's cultural and historical heritage. Finally, the participants did not agree with the statement that the quality of life would not increase with NBS, suggesting that they believed that NBS could potentially offer a range of benefits to the community beyond just ecological outcomes.
- **Acceptability also depends on site-specific features:** The analysis also revealed quite profound site-specific factors shaping local acceptability, including the following statements: “After the NBS implementation, people cannot access the river area where they used to go. This can cause frustration”; “The town is so highly exposed that it cannot be protected by NBS”; “Trust in public authorities involved in flood risk management is lacking. Therefore, people will not accept NBS”.
- **Overall finding:** The results of the acceptability studies suggests that stakeholders were generally supportive of NBS and had a positive outlook towards implementing such projects in their communities if process related factors are well realised (fairness, transparency, compensation, trust, participation) and if the benefits of NBS are well understood.

6.2 Summary of key findings with respect to institutional/political feasibility and perceived co-benefits

Our analysis of the institutional framework conditions and the broader political context indicates that the present systems and arrangements are in their initial phases regarding the integration of NBS into the risk management process. The existing structures and procedures are predominantly oriented towards traditional hard infrastructure measures. Key barriers to the acceptance of NBS encompass the absence of legal provisions, complications in administrative and legal procedures, ambiguous responsibilities, insufficient dedicated budgets for planning, implementation, and maintenance, and a constrained institutional capacity to incorporate NBS into mainstream practices.

The current limited uptake of NBS can be attributed to several factors. Inadequate awareness among policy makers and the general public of the positive role that NBS could play in risk management is linked to incomplete knowledge, including existing uncertainties and concerns about the effectiveness, cost and efficiency of NBS. In addition, the lack of (local) first-hand experience of best practice contributes to this lack of uptake. The tendency to adopt a reactive rather than a proactive approach to disaster risk management is another contributing factor. In addition, it is acknowledged that coordination between different organisational units, sectors and spatial levels, which is crucial for NBS implementation, needs to be improved. Many of these challenges, while relevant to the uptake of NBS, are not exclusive to NBS and are general in nature.

Experts at all Collaborator sites agree that the current use of NBS for the management of hydro-meteorological risks is highly restricted, ranging from extremely limited to virtually non-existent.

At present, despite the existence of numerous EU policies and directives that provide a strong legal basis for the use of NBS, political endorsement of NBS at collaborator sites has not yet contributed significantly to its integration into mainstream practice. Policy makers are generally perceived as mere spectators and their actions are often seen as declarative rather than operational. At best, they may advocate the inclusion of NBS in relevant policy documents, but their commitment to actively support the implementation of these policies is perceived as rather limited. Nevertheless, several experts emphasise the crucial need to persuade policy-makers to create the legal basis for the mainstreaming of NBS and to ensure the allocation of the necessary resources for its effective implementation.

Experts point out that while existing legislation does not explicitly recognise NBS, it does not fundamentally hinder their implementation. The growing environmental awareness of the public, coupled with the initiatives of grassroots movements and the growing preference for green and blue structures in planning, gives rise to optimism that the social conditions for the adoption of NBS are gradually but steadily improving.

It is also expected that the pressure for reform resulting from the impact of the EU regulatory framework will have a positive impact on the inclusion of NBS, not only in strategic policy documents but also in legally binding regulations. However, the influence of the European level goes beyond this aspect. The gradual emergence, albeit at a modest level, of local examples of good practice, often supported by European Union (co-)funding, is also expected to increase understanding and awareness of NBS in the political and social spheres through related monitoring of benefits and information campaigns.

Even if the overall conclusion is that the current institutional system is not very conducive to the use of NBS for the management of hydro-meteorological risks and that the current use is negligible, the lessons learned along the way are important in order to make proposals on how to overcome the diagnosed challenges.

Despite the overarching assessment that the existing institutional system is not particularly supportive of employing NBS for hydro-meteorological risk management, and the present utilization is minimal, the insights gained throughout this process are crucial for formulating recommendations on how to address the identified challenges.

While the overarching assessment is that the existing institutional system is not highly favourable for utilizing NBS in the management of hydro-meteorological risks, and the current use is minimal, the insights gained during this process are crucial for formulating recommendations on how to address the identified challenges.

RECONECT Deliverable 4.7 will provide a more detailed overview of the institutional frameworks and appropriate strategies for mainstreaming NBS at Collaborator sites.

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Annex A: Scorecard

I. BACKGROUND INFORMATION

1. What is your professional / educational background?

……

2. Which organisation, political or administrative body, association, company or club are you representing?
   Please select the most applicable!
   a. □ Academia & research
   b. □ Private sector organization
   c. □ Public authority
   d. □ Political representation
   e. □ Civil society organizations
   f. □ Media
   g. □ Resident
   h. □ Other, please specify ……
   ……

3. How familiar are you with the concept of Nature-Based solutions (NBS)? Please, indicate on a scale of 1 to 5 whereby 1 means „Not familiar at all" and 5 means „Very familiar".

   Not familiar at all ☐1 ☐ ☐ ☐ ☐ ☐5 Very familiar

4. Have you already been involved in the planning, realization or operation of NBS?

   a) □ No

   b) □ Yes

   If yes, please, specify how you were involved?

   ……

II. RISK PERCEPTION

5. Which of the following hydro-meteorological risks, that were identified by local RECONECT partners knowledgeable of the area, do you consider relevant at the site? [PLEASE ONLY ADDRESS THE HYDRO-METEOROLOGICAL RISK WHICH ARE RELEVANT AT THE SITE]

   Please, indicate on a scale of 1 to 7 whether you agree that the risk referred to is high, whereby 1 means „I strongly disagree that there is high risk“ and 7 means „I strongly agree that there is a high risk“.

There is a high risk of fluvial flooding at the site.	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐
	Strongly disagree						Strongly agree	Don't know
There is a high risk of flash flooding at the site.	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐
	Strongly disagree						Strongly agree	Don't know
There is a high risk of pluvial flooding at the site.	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐
	Strongly disagree						Strongly agree	Don't know
There is a high risk of landslides at the site.	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐
	Strongly disagree						Strongly agree	Don't know
There is a high risk of soil erosion at the site.	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐
	Strongly disagree						Strongly agree	Don't know
There is a high dought risk at the site.	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐
	Strongly disagree						Strongly agree	Don't know
There is a high risk of ... at the site.	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐
	Strongly disagree						Strongly agree	Don't know

III. PERCEPTION OF NBS

A. RELEVANCE OF NBS FOR MANAGING HYDRO-METEOROLOGICAL RISKS

6. In general, what is your perspective on the relevance of NBS for managing hydro-meteorological risks?

---

7. In general, what are the three most important advantages of NBS compared to more traditional, technical risk-reducing measures, in your opinion?

---

8. In general, what are the three most important disadvantages of NBS compared to more traditional, technical risk-reducing measures, in your opinion?

B. SITE-SPECIFIC BENEFITS EXPECTED

9. How relevant do you consider the proposed NBS to be for mitigating the site-specific hydro-meteorological risks and what might be the reasons for your assessment? [PLEASE ONLY ADDRESS THE HYDRO-METEOROLOGICAL RISK WHICH ARE RELEVANT AT THE SITE]

Please, indicate to what extent do you agree or disagree with the following statements! Whereby 1 means „I strongly disagree" and 7 means „I strongly agree" .

The proposed NBS will be of high relevance for reducing the current fluvial flooding risk at the site.	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐
	Strongly disagree						Strongly agree	Don't know
The proposed NBS will be of high relevance for reducing the current flash flooding risk at the site.	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐
	Strongly disagree						Strongly agree	Don't know
The proposed NBS will be of high relevance for reducing the current pluvial flooding risk at the site.	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐
	Strongly disagree						Strongly agree	Don't know
The proposed NBS will be of high relevance for reducing the current landslide risk at the site.	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐
	Strongly disagree						Strongly agree	Don't know
The proposed NBS will be of high relevance for reducing the current risk of soil erosion at the site.	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐
	Strongly disagree						Strongly agree	Don't know
The proposed NBS will be of high relevance for reducing the current drought risk at the site.	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐
	Strongly disagree						Strongly agree	Don't know
The proposed NBS will be of high relevance for reducing the current ... risk at the site.	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐
	Strongly disagree						Strongly agree	Don't know
The proposed NBS will be of <u>high relevance</u> for reducing the current risk at the site as they will be <u>effective</u>, i.e. the expected effect of risk reduction will occur.	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐
	Strongly disagree						Strongly agree	Don't know

The proposed NBS will be of high relevance for reducing the current risk at the site as they will be efficient, i.e. the effect to be expected is very favourable relation to the resources employed.	☐1	☐2	☐3	☐4	☐5	☐6	☐7		Strongly disagree	Strongly agree	☐ Don't know
The proposed NBS will be of high relevance for reducing the current risk at the site as they will help to mastering the biodiversity crises.	☐1	☐2	☐3	☐4	☐5	☐6	☐7		Strongly disagree	Strongly agree	☐ Don't know
The proposed NBS will be of high relevance for reducing the current risk at the site as they will provide many additional (co-)benefits.	☐1	☐2	☐3	☐4	☐5	☐6	☐7		Strongly disagree	Strongly agree	☐ Don't know
The proposed NBS will be of low relevance for reducing the current risk at the site as they will be very difficult to realise.	☐1	☐2	☐3	☐4	☐5	☐6	☐7		Strongly disagree	Strongly agree	☐ Don't know
The proposed NBS will be of low relevance for reducing the current risk at the site as their benefits will be very uncertain.	☐1	☐2	☐3	☐4	☐5	☐6	☐7		Strongly disagree	Strongly agree	☐ Don't know
The proposed NBS will be of low relevance for reducing the current risk at the site as their benefits will only become apparent in the future.	☐1	☐2	☐3	☐4	☐5	☐6	☐7		Strongly disagree	Strongly agree	☐ Don't know

C. SITE-SPECIFIC CO-BENEFITS EXPECTED

10. Which of the following additional co-benefits do you expect from the realisation of NBS proposed by RECONECT project in your area and what will be their magnitude?

    Please, indicate on a scale of 1 to 7 whether you expect a beneficial effect with regard to the specific aspect, whereby 1 means „I strongly disagree that the realisation of the NBS has a high beneficial effect" and 7 means „I strongly agree that the realisation of the NBS has a high beneficial effect".

I expect a high beneficial effect on biodiversity, e.g. species richness or functional trait diversity.	☐1	☐2	☐3	☐4	☐5	☐6	☐7		Strongly disagree	Strongly agree	☐ No effect	☐ Don't know
I expect a high beneficial effect on habitat quantity,	☐1	☐2	☐3	☐4	☐5	☐6	☐7		Strongly	Strongly	☐	☐

i.e. expansion of habitat for flora and fauna.	disagree						agree	No effect	Don't know
I expect a high beneficial effect on habitat quality, i.e. improvement of the habitat for flora and fauna.	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐	☐
	Strongly disagree						Strongly agree	No effect	Don't know
I expect a high beneficial effect on the availability of recreational opportunities.	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐	☐
	Strongly disagree						Strongly agree	No effect	Don't know
I expect a high beneficial effect on the accessibility to the area where NBS will be realised.	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐	☐
	Strongly disagree						Strongly agree	No effect	Don't know
I expect a high beneficial effect on health and wellbeing, e.g. improvement of mental well-being and physical health.	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐	☐
	Strongly disagree						Strongly agree	No effect	Don't know
I expect a high beneficial effect on safeguarding / preserving cultural values.	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐	☐
	Strongly disagree						Strongly agree	No effect	Don't know
I expect a high beneficial effect on education and awareness raising, e.g. about the ecosystem services provided by nature.	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐	☐
	Strongly disagree						Strongly agree	No effect	Don't know
I expect a high beneficial effect on community cohesion i.e. encouragement of community bulding/strengthening effects.	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐	☐
	Strongly disagree						Strongly agree	No effect	Don't know
I expect a high beneficial economic effect, e.g. through increased level of protection or usage of the NBS.	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐	☐
	Strongly disagree						Strongly agree	No effect	Don't know
I expect a high beneficial effect on the development / use of new business models, i.e. encouragement of development of new business models.	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐	☐
	Strongly disagree						Strongly agree	No effect	Don't know

Annex B: Guideline expert interviews

Note to the interviewer

The interview should start with a short introduction by the interviewers describing:

- Main purpose of the RECONECT project, i.e. demonstrating, referencing and upscaling Nature based Solutions in rural and natural areas in Europe and beyond
- Specific context in which the interview is conducted, i.e. feasibility and acceptability of the proposed NBS at the respective site
- Hydro-meteorological hazards addressed at the respective sites, i.e.
    - Bregana river basin: Fluvial flooding, flash flooding, soil erosion
    - Kamchia river basin: Fluvial flooding, flash flooding, pluvial flooding
    - Jadar river basin: Fluvial flooding, flash flooding, landslides, soil erosion
    - Tamnava river basin: Fluvial flooding, landslides, drought
    - Vrbanja river basin: Fluvial flooding, flash flooding, landslides
    - Pilica river basin: Fluvial flooding, drought
- Localisation of the planned site of the proposed NBS
- Essential aspects of the type of the proposed NBS

Please ask experts to conduct a separate online activity focused on the acceptance of NBS (based on the Q-Methodology). Please either give the experts some instructions on how to use the online tool so that they can do the activity on their own, or, if the experts do not feel confident to do this, please share your screen (in case of a video interview) or otherwise jointly conduct the activity.

I. BACKGROUND INFORMATION

1. What is your professional / educational background?

……

2. Which organisation, political or administrative body, association, company or club are you representing?“
   Please select the most applicable!
   a. □ Academia & research
   b. □ Private sector organization
   c. □ Public authority
   d. □ Political representation
   e. □ Civil society organizations
   f. □ Media
   g. □ Resident
   h. □ Other, please specify ……
   ……

3. How familiar are you with the concept of Nature-Based solutions (NBS)? Please, indicate on a scale of 1 to 5 whereby 1 means „Not familiar at all” and 5 means „Very familiar“.

   Not familiar at all ☐1 ☐ ☐ ☐ ☐ ☐5 Very familiar

4. Have you already been involved in the planning, realization or operation of NBS?

   a) □ No

   b) □ Yes

   If yes, please, specify how you were involved?

   ……

II. PUBLIC AND POLITICAL ACCEPTANCE OF NBS

5. Are you aware of any experiences of using NBS in your area / region / country? If so, which ones?

6. How do relevant actors in the following arenas position themselves on the use of NBS for the management of hydro-meteorological risks?

   a) Political sector

   b) Corporate sector

   c) Civil society

7. Which advantages of NBS for managing hydro-meteorological risks are being discussed by these actors?

8. Which disadvantages of NBS for managing hydro-meteorological risks are being discussed by these actors?

III. INSTITUTIONAL FRAMEWORK CONDITIONS

Based on our research the main body of legal and policy documents guiding the management of hydro-meteorological risks, includes [PLEASE LIST DOCUMENTS ACQUIRED THROUGH DESKTOP RESEARCH HERE].

9. Are there any relevant documents missing? If so, please specify!

Based on our research, the main body of legal and policy documents guiding the management these risks in relevant bordering sectors such as water management, land use management and/or natural resource management, includes [PLEASE LIST DOCUMENTS ACQUIRED THROUGH DESKTOP RESEARCH HERE].

10. Are there any relevant documents missing? If so, please specify!

11. As far as you are aware of, how are NBS addressed in these documents (on management of natural hazards, water management, land use management and/or natural resource management)?

Based on our research, the main actors directly or indirectly involved in management of hydro-meteorological risks on the local, regional and national level are [PLEASE LIST ACTORS IDENTIFIED THROUGH DESKTOP RESEARCH HERE].

12. Are any relevant actors missing? If so, please specify which actors are missing and what are their responsibilities in the management process!

13. What is your personal impression, how relevant are NBS in the current practice of managing hydro-meteorological risks?

14. From your perspective, how does the regulatory system encourage or hinder the use of NBS for managing hydro-meteorological risks, i.e. which incentives / disincentives does it provide? Please explain your position!

15. How is the management of hydro-meteorological risks financed? Can the planning, realization and operation of NBS in this context also be financed from these sources? Are there any (additional) specific funding sources for NBS?

16. From your perspective, do actors in charge of managing hydro-meteorological risks possess the appropriate administrative capacity to take into account NBS? Please explain reflecting how the following aspects impact the consideration and/or use of NBS as risk-mitigating measure!

    a) Supporting or hindering nature of existing bureaucratic structures
    b) Actors' expertise
    c) Actors' experience
    d) Financial capacity

17. From your perspective, which singular or continuous windows of opportunity exist to enforce the uptake of NBS in general or in specific projects (e.g. in the aftermath of disasters, before/after elections, in specific phases of planning processes, etc.)?

18. Which type of entities (e. g. public water management companies, local authorities, private property owners) can implement, operate and/or own NBS for mitigating hydro-meteorological risks? Please describe them, if possible, by adressing some of the following criteria:

    (1) Long-term viability of the entity operating the NBS
    (2) Interest to engage
    (3) Technological capabilities/ability to develop these NBS with reasonable effort,
    (4) Administrative, human resource and financial capabilities,
    (5) Local knowledge / responsiveness to local concerns,
    (6) Access to financing,
    (7) Ability to achieve expected outcomes at reasonable costs

19. Which entities are currently operating NBS for the management of hydro-meteorological risks in your region / country? Please name both the entity and the operated NBS!

20. Are there currently any institutional reforms to be foreseen in the field of managing hydro-meteorological risks which could have an impact on the future use of NBS? If so, what are they and please reflect on their potential impact?

IV. BARRIERS AND DRIVERS TO REALISATION OF NBS

21. From your perspective, what are the three most important drivers, i.e. supporting or enabling forces, for the use of NBS for managing hydro-meteorological risks in your region / country?

22. From your perspective, what are the three most important barriers, i.e. hindering forces, for the use of NBS for managing hydro-meteorological risks in your region / country?

23. What could be promising options for overcoming these barriers?

V. RISK PERCEPTION

24. Are you familiar with the site where the proposed NBS are planned to be realized?

a) □ Yes. Please, proceed to question no. 25.

b) □ No. Please, proceed to question no. 26.

25. Which of the following hydro-meteorological risks, that were identified by local RECONECT partners knowledgable of the area, do you consider relevant at the site? [PLEASE ONLY ADDRESS THE HYDRO-METEOROLOGICAL RISK WHICH ARE RELEVANT AT THE SITE]

Please, indicate on a scale of 1 to 7 <u>whether you agree that the risk referred to is high</u>, whereby 1 means „I strongly disagree that there is high risk“ and 7 means „I strongly agree that there is a high risk“.

There is a high risk of fluvial flooding at the site.	☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 Strongly disagree … Strongly agree	☐ Don't know
There is a high risk of flash flooding at the site.	☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 Strongly disagree … Strongly agree	☐ Don't know
There is a high risk of pluvial flooding at the site.	☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 Strongly disagree … Strongly agree	☐ Don't know
There is a high risk of landslides at the site.	☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 Strongly disagree … Strongly agree	☐ Don't know

There is a high risk of soil erosion at the site.	☐1	☐2	☐3	☐4	☐5	☐6	☐7		☐
	Strongly disagree						Strongly agree		Don't know
There is a high drought risk at the site.	☐1	☐2	☐3	☐4	☐5	☐6	☐7		☐
	Strongly disagree						Strongly agree		Don't know
There is a high risk of ⋯ at the site.	☐1	☐2	☐3	☐4	☐5	☐6	☐7		☐
	Strongly disagree						Strongly agree		Don't know

VI. PERCEPTION OF NBS

A. RELEVANCE OF NBS FOR MANAGING HYDRO-METEOROLOGICAL RISKS

26. In general, what is your perspective on the relevance of NBS for managing hydro-meteorological risks?

27. In general, how do you perceive the effectiveness of NBS, i.e. the risk-reducing effect, compared to more traditional, technical measures?

28. In general, how do you perceive the efficiency of NBS, i.e. relation of resources employed to the effect obtained, compared to more traditional, technical measures?

29. In general, what are the three most important advantages of NBS compared to more traditional, technical risk-reducing measures, in your opinion?

30. In general, what are the three most important disadvantages of NBS compared to more traditional, technical risk-reducing measures, in your opinion?

31. Are you familiar with the site where the proposed NBS are planned to be realized?

    a) □ Yes. Please, proceed to question no. 32.

    b) □ No. Please, proceed to question no. 34.

B. SITE-SPECIFC BENEFITS EXPECTED

32. How relevant do you consider the proposed NBS to be for mitigating the site-specific hydro-meteorological risks and what might be the reasons for your assessment? [PLEASE ONLY ADDRESS THE HYDRO-METEOROLOGICAL RISK WHICH ARE RELEVANT AT THE SITE]

Please, indicate to what extent do you agree or disagree with the following statements! Whereby 1 means „I strongly disagree" and 7 means „I strongly agree ".

The proposed NBS will be of high relevance for reducing the current fluvial flooding risk at the site.	☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 Strongly disagree … Strongly agree	☐ Don't know
The proposed NBS will be of high relevance for reducing the current flash flooding risk at the site.	☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 Strongly disagree … Strongly agree	☐ Don't know
The proposed NBS will be of high relevance for reducing the current pluvial flooding risk at the site.	☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 Strongly disagree … Strongly agree	☐ Don't know
The proposed NBS will be of high relevance for reducing the current landslide risk at the site.	☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 Strongly disagree … Strongly agree	☐ Don't know
The proposed NBS will be of high relevance for reducing the current risk of soil erosion at the site.	☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 Strongly disagree … Strongly agree	☐ Don't know
The proposed NBS will be of high relevance for reducing the current drought risk at the site.	☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 Strongly disagree … Strongly agree	☐ Don't know

The proposed NBS will be of high relevance for reducing the current ... risk at the site.	☐1	☐2	☐3	☐4	☐5	☐6	☐7		☐
	Strongly disagree						Strongly agree		Don't know
The proposed NBS will be of high relevance for reducing the current risk at the site as they will be effective, i.e. the expected effect of risk reduction will occur.	☐1	☐2	☐3	☐4	☐5	☐6	☐7		☐
	Strongly disagree						Strongly agree		Don't know
The proposed NBS will be of high relevance for reducing the current risk at the site as they will be efficient, i.e. the effect to be expected is very favourable relation to the resources employed.	☐1	☐2	☐3	☐4	☐5	☐6	☐7		☐
	Strongly disagree						Strongly agree		Don't know
The proposed NBS will be of high relevance for reducing the current risk at the site as they will help to mastering the biodiversity crises.	☐1	☐2	☐3	☐4	☐5	☐6	☐7		☐
	Strongly disagree						Strongly agree		Don't know
The proposed NBS will be of high relevance for reducing the current risk at the site as they will provide many additional (co-)benefits.	☐1	☐2	☐3	☐4	☐5	☐6	☐7		☐
	Strongly disagree						Strongly agree		Don't know
The proposed NBS will be of low relevance for reducing the current risk at the site as they will be very difficult to realise.	☐1	☐2	☐3	☐4	☐5	☐6	☐7		☐
	Strongly disagree						Strongly agree		Don't know
The proposed NBS will be of low relevance for reducing the current risk at the site as their benefits will be very uncertain.	☐1	☐2	☐3	☐4	☐5	☐6	☐7		☐
	Strongly disagree						Strongly agree		Don't know
The proposed NBS will be of low relevance for reducing the current risk at the site as their benefits will only become apparent in the future.	☐1	☐2	☐3	☐4	☐5	☐6	☐7		☐
	Strongly disagree						Strongly agree		Don't know

C. SITE-SPECIFIC CO-BENEFITS EXPECTED

33. Which of the following additional co-benefits do you expect from the realisation of NBS proposed by RECONECT project in your area and what will be their magnitude?

Please, indicate on a scale of 1 to 7 whether you expect a beneficial effect with regard to the specific aspect, whereby 1 means „I strongly disagree that the realisation of the NBS has a high beneficial effect“ and 7 means „I strongly agree that the realisation of the NBS has a high beneficial effect“.

I expect a high beneficial effect on biodiversity, e.g. species richness or functional trait diversity.	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐	☐
	Strongly disagree						Strongly agree	No effect	Don't know
I expect a high beneficial effect on habitat quantity, i.e. expansion of habitat for flora and fauna.	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐	☐
	Strongly disagree						Strongly agree	No effect	Don't know
I expect a high beneficial effect on habitat quality, i.e. improvement of the habitat for flora and fauna.	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐	☐
	Strongly disagree						Strongly agree	No effect	Don't know
I expect a high beneficial effect on the availability of recreational opportunities.	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐	☐
	Strongly disagree						Strongly agree	No effect	Don't know
I expect a high beneficial effect on the accessibility to the area where NBS will be realised.	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐	☐
	Strongly disagree						Strongly agree	No effect	Don't know
I expect a high beneficial effect on health and wellbeing, e.g. improvement of mental well-being and physical health.	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐	☐
	Strongly disagree						Strongly agree	No effect	Don't know
I expect a high beneficial effect on safeguarding / preserving cultural values.	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐	☐
	Strongly disagree						Strongly agree	No effect	Don't know

I expect a high beneficial effect on education and awareness raising, e.g. about the ecosystem services provided by nature.	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐	☐
	Strongly disagree						Strongly agree	No effect	Don't know
I expect a high beneficial effect on community cohesion i.e. encouragement of community bulding/strengthening effects.	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐	☐
	Strongly disagree						Strongly agree	No effect	Don't know
I expect a high beneficial economic effect, e.g. through increased level of protection or usage of the NBS.	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐	☐
	Strongly disagree						Strongly agree	No effect	Don't know
I expect a high beneficial effect on the development / use of new business models, i.e. encouragement of development of new business models.	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐	☐
	Strongly disagree						Strongly agree	No effect	Don't know

VII. SNOWBALL SAMPLING

34. Are there any other experts you know of whom we should talk about the topics addressed in this interview?

b) □ No.

c) □ Yes, in fact ……

……

Annex C: Roadmap for co-creation

The work on task 4.5 started with the development of the main ideas/goals and research framework (part 1: conceptualization) and continued with the formulation of methodological steps (part 2: operationalization) to be undertaken for achieving the goals. Figure 1 shows the roadmap of the activities within this task.

- In order to develop, test and adapt/improve this framework, two preparatory activities were organised: Session on public acceptance of NBS in context of 7th GA meeting (24 May 2022) and the survey (25 May 2022 – 06 June 2022) with the follow-up Twining webinar for Demonstrators and Collaborators on "Public acceptance of NBS" (9 May 2022). The outcomes of these activities helped to refine the research framework, discuss and select the subcontracting partners responsible for the implementation of activities on each Collaborator site as well as to adapt the process of operationalization (activities needed to be realised).
- Preparation of service description, contractual documents for subcontracting experts (Subcontractors) as well as an active communication with the Collaborators and Subcontractors took place from to October 2022 (*Organisational matter 1*).
- The first online *Get-to-know meeting* between the UFZ team, Collaborators and Subcontractors was organised on 11 October 2022 aimed to exchange on experiences, explain the roles and clarify on tasks, timeline and responsibilities. The Subcontractors received support from the UFZ team in organisation and conducting of desktop research, interviews and local workshop: for that purpose, UFZ has developed and sent to each Subcontractor specific guidelines and consulted on the certain questions (*Organisational matter 2*).
- *Desktop research* and expert interviews were conducted by Subcontractors in each Collaborator site starting from November 2022.
- In order to exchange on the data collection activities (especially in regard to preparation and organisation of the local workshops at Collaborator sites) and explain some specific aspects of applying the certain co-creation tools (e.g. Q-methodology, Fuzzy cognitive mapping), a *Training webinar 1* was organised on 4 November 2022 for both Subcontractors and Collaborators.
- *Local workshops (face-to-face) at each Collaborator site* were organised from December 2022 to January 2023. It was followed by the debriefing meeting on 19 December 2022 to reflect on the outcomes of the conducted local workshops, main achievements and feedback.
- Summary of preliminary findings at each Collaborator site were provided by Subcontractors until 15 January 2023. This interim reporting was prepared as agreed in contract and almost all aspects were addressed. The required minor edits to be undertaken were discussed during the preparatory meeting to validation workshop on 20 January (and also communicated bilaterally – each got feedback asking for minor revisions). Shared templates for structuring the inputs for reporting were provided by UFZ. Excel template was additionally shared to assist the reporting of scorecard results and preparation of validation workshop.
- To support the organisation of validation workshops (as follow up of first local workshops), a *Preparatory meeting* was organised on 20 January 2023. This meeting highlighted a need for a specific training webinar (2) on Fuzzy cognitive mapping using *Mental Modeler* (was conducted on 30 January 2023).

- *Validation workshops* were realised at each Collaborator site (both face-to-face and virtual) in the period from February to March 2023, with the goal to present the preliminary results to the stakeholders and collect their feedback. More particular, during the validation workshop the following activities were realised: a) presentation of essential preliminary results, b) collection of feedback from stakeholders regarding these preliminary results and the conclusions drawn; c) clarification of open questions, explanation of counterintuitive results and alike; d) deepening the barriers' and drivers' analysis by focusing on the nature and strength of their links; e) sharing further details regarding NBS planning; f) encouragement of further stakeholder involvement.
- *Final reports* presenting summary of main findings and data collection process were obtained from the Subcontractors from March to May 2023 (along with the documents sent by Subcontractors in digital form and via post).

Co-creation activities within the task 4.5 prepared and organised by UFZ

Activity	Date / format	No. of partici-pants	Participants	Objectives
Co-creation activities for scoping acceptability and feasibility of NBS in Collaborator session at 7th project meeting	24.05.2022 in-person and online	68	All project partners present and online	Presentation of and exchange about planned activities and challenges foreseen in Task 4.5 by UFZ Brief statements of the involved RECONECT partners on progress and challenges foreseen Interactive dialog with all partners: Opportunities for Twinning among Collaborators Overview of co-creation activities with respect to T4.5 Discussion and next steps
RECONECT Twinning webinar for Demonstra-tors and Collaborators on the topic of "Public acceptance of NBS"	09.06.2022 online	29	RECONECT Demon-strators & Collaborators	Support of WP4-related work of Collaborators (e.g. update of roadmaps) and Inspiration through exchange with Demonstrators: presentation of results of the survey conducted among Demonstrators on "Assessing the acceptability of NBS" and discussion on factors which influenced the public acceptance of NBS at the Demonstrator sites

Activity	Date / format	No. of partici-pants	Participants	Objectives
				Reflection on how public acceptance was built and/or enhanced by leveraging those factors (recommendations from Demonstrators to support and inspire Collaborators)
Getting-to-know-you meeting for RECONECT task 4.5: Getting the content right and getting people connected	11.10.2022 online	23	RECONECT Collaborators & Subcon-tractors	Stock-taking previous experiences of Subcontractors Sharing of expectations regarding the cooperation and tasks to be fulfilled, presenting and discussing the roadmap and timeline developed by UFZ Clarification of the basic concepts to be dealt with Discussion on division of responsibilities among partners and challenges foreseen First indication of needs (of Subcontractors) for support (from UFZ) Interactive dialogue & reflection (Q&A)
RECONECT training webinar "Task 4.5 data collection" with Collabora-tors and Subcon-tractors	04.11.2022 online	27	RECONECT Collaborators & Subcon-tractors	Exchange on upcoming data collection activities, including organisational matters Demonstration of the appropriate participatory methods and tools to be applied by the partners within the data collection process (desktop research, expert interview, data collection workshop, Fuzzy cognitive mapping – FCM, scorecards) Clarification of open questions to enhance the mutual understanding regarding the particular tasks to be fulfilled

Activity	Date / format	No. of partici-pants	Participants	Objectives
Collabora-tors and Subcon-tractors local workshops' debriefing meeting	19.12.2022 online	18	RECONECT Collaborators & Subcon-tractors	Exchange on the process of the workshops conducted (how it in general went, what worked well, what did not work well and what might have been reasons for that) Dialogue on challenges and uncertainties regarding the upcoming data collection activities Overview of the next steps
Preparatory meeting for the validation workshop	20.01.2023 online	19	RECONECT Collaborators & Subcon-tractors	Explanation of the main goals of the validation workshop Presentation and discussion of preliminary results of the acceptance analysis (Exemplary results of Q-methodology) Presentation of FCM as method to deepen barriers' and drivers' analysis (using Mental Modeler) Discussion of proposed validation workshop structure
Training Session for Fuzzy Cognitive Mapping using Mental Modeler	30.01.2023 online	23	RECONECT Collaborators & Subcon-tractors	Training of Subcontractors on use of FCM methodology using the tool Mental Modeler – step-by-step Manual was prepared and presented, all participants tested the program, questions were addressed.

The co-creation process was supported by

Dvokut-ECRO Ltd - Bregana River Basin, Vrbanja River Basin

For the data collection at the Collaborator sites Bregana River Basin (Croatia) and Vrbanja River Basin (Bosnia andHerzegovina), Dvokut-ECRO Ltd a service provider in the field of environmental and nature protection with more than 30 years of experience based in Zagreb was subcontracted. Dvokut's team consisted of the following members who were responsible for the specified activities.

- Antonija Trlaja Magdić: Preparation of workshops, conducting interviews, moderating discussions, desktop research, data collection

- Ema Svirčević: Preparation of workshops, conducting interviews, moderating discussions, desktop research, data collection
- Tajana Uzelac Obradović: Preparation of workshops, moderating discussions

Dvoper Ltd - Jadar River basin, Tamnava River Basin

For the data collection at the Collaborator sites Serbian sites Jadar River basin and Tamnava River Basin, Dvoper Ltd a company in the field of environmental protection consulting and engineering with more than 14 years of experience based in Belgrade was subcontracted. Dvoper's team consisted of the following members who were responsible for the specified activities.

- Nebojša Pokimica: Coordination
- Nataša Đokić: Preparation of workshops, conducting interviews
- Pavle Cvetić: Workshop preparation, data processing, desktop research
- Bojana Lalović: Workshop preparation, data processing, desktop research

ALISEV Ltd – Kamchia River Basin

For the data collection at the Bulgarian site Kamchia River Basin ALISEV Ltd. was subcontracted. The company has a record in business analyses, perceptibility and capacity surveys. Its team includes experts in environmental planning who have been engaged for many years with public consultations and with involving different social sectors in the implementation of the plans and programs developed by the Black Sea Basin Directorate in all sectors of water management, including flood risk reduction.

ALISEV Ltd was subcontracted to carry out the data collection at the Kamchia River Basin site in Bulgaria. The company has a track record in economic analysis, perception and capacity surveys. Its team includes experts in environmental planning who for many years have been involved in public consultation and the implementation of plans and programmes developed by the Black Sea Basin Directorate in all areas of water management, including flood risk reduction.

ALISEV's team consisted of the following members who were responsible for the specified activities.

- Vladymir Ivanov: Logistical and legal support, event management, reporting
- Evgenia Nencheva: Data collection, conducting interviews, primary processing, reporting
- Maria Dimitrova: Data collection, conducting interviews, primary processing, reporting

University of Lodz Foundation – Pilica River Basin

For the data collection at the Polish site Pilica River Basin the University of Lodz Foundation was subcontracted. Its experts had the required rare experience of combining both knowledge of Poland's water management system and techniques for working with stakeholders. University of Lodz Foundation's team consisted of the following members who were responsible for the specified activities.

- Kinga Krauze: Preparation of workshops, conducting interviews, moderating discussions, data processing, desktop research
- Martyna Kuzior: Preparation of workshops, conducting interviews, moderating discussions, data processing
- Renata Włodarczyk-Marciniak: Preparation of workshops, conducting interviews, moderating discussions, data processing
- Wojciech Frątczak: Preparation of workshops, conducting interviews

Annex D: Data collection & validation workshop

Data collection workshop

The main objectives of the data collection workshop are to provide information on the planned NBS to the participants and to collect data on the acceptance of NBS by the participants, possible barriers and drivers of the proposed implementation, participants' perception of the site-specific hydro-meteorological risks as well as their expectations regarding the direct (risk-related) and indirect (risk-unrelated) effects from the implementation of the NBS.
The proposed structure for the data collection workshop is as follows:

Welcome Note (Host, 10 minutes)
The workshop starts with a warm welcome by the host, setting a positive and inclusive tone for the day.

Introductory Note (Subcontractors, 20 minutes)
Local subcontractors or other knowledgeable experts provide an introductory note, summarising the workshop's objectives and background of the analysis. They outline the significance of the anticipated outcomes of the workshop.

Presentation of plans for the proposed NBS (Collaborators, 30 minutes)
Collaborators present the plans for implementing Nature-Based Solutions (NBS). They can share insights, strategies, and proposed actions for utilising the findings to inform decision-making processes.

Coffee break (20 minutes)
A short coffee break allows participants to process the information received and recharge before being activated for a reciprocal exchange.

Analysis of acceptance of the proposed NBS (All, facilitation by Subcontractors, 60 minutes)
Subcontractors provide an introduction to the Q-Methodology as a tool for analysing the acceptance of the proposed NBS and facilitate the data collection process.

Reflection round (Stakeholder Group Discussion) (All, facilitation by Subcontractors, 30 min)
Following the presentation, participants engage in a stakeholder group discussion to reflect on the Q-Methodology activity and provide their feedback, insights, and suggestions. The documentation of this interactive session supports the comprehensive analysis of the data collected.

Lunch break (60 minutes)
The lunch break provides participants with an opportunity to refresh and network with one another.

Identification of barriers and drivers for NBS realisation (All, facilitation by Subcontractors, 70 minutes)
Subcontractors lead a session focusing on the identification of barriers and drivers for the realisation of NBS. Furthermore, they engage participants in brainstorming solutions and strategies to overcome the barriers and enhance the drivers.

Reflection round (All, facilitation by Subcontractors, 30 minutes)
Participants come together for a reflection round, discussing the barriers, drivers, and potential solutions identified. This session will enable a more intense exchange among participants.
Coffee break (20 minutes)
A short coffee break allows participants to recharge before the final session.

Assessment of perceived risks, expected effects, and co-benefits of proposed NBS (All, guidance by Subcontractors, 30 minutes)
Subcontractors guide participants through an assessment of the perceived risks, expected effects, and co-benefits of implementing the proposed NBS. A scorecard is utilised to gather quantitative and qualitative data which is completed by participants individually.

Wrap-up & next steps (Subcontractors, 30 minutes)
In the final session, subcontractors summarise the workshop's key findings, insights, and recommendations. They present the next steps, such as preparing the analysis and preparing a validation activity to ensure that the conclusions to be drawn are in line with the participants' beliefs.

Timeline	Activity	Responsibilities
9:00 – 09:10	**Welcome note**	Host, 10 minutes
9:10 – 09:30	**Introductory note**	Subcontractors, 20 minutes
9:30 – 10:00	**Presentation of plans for proposed NBS**	Collaborators, 30 minutes
10:00 – 10:20	**Coffee break**	20 minutes
10:20 – 11:20	**Analysis of acceptance of proposed NBS** Q-Methodology-based activity	Subcontractors, 60 minutes
11:20 – 11:50	**Reflection round** Stakeholder group discussion	Subcontractors, 30 minutes
11:50 – 12:50	**Lunch**	60 minutes
12:50 – 14:10	**Identification of barriers and drivers for NBS realization**	Subcontractors, 70 minutes
14:10 – 14:40	**Reflection round** Stakeholder group discussion	Subcontractors, 30 minutes
14:40 – 15:00	**Coffee break**	20 minutes

15:00 – 15:30	**Assessment of perceived risks, expected effects and co-benefits** Scorecard-based activity	Subcontractors, 30 minutes
15:30 – 16:00	**Wrap-up & next steps**	Subcontractors, 30 minutes

Validation workshops

The validation workshop is prepared in detail through a coordination meeting. Ideally, the participants of the previously held data collection workshop take part in the validation workshop, ensuring continuity and consistency in the analysis process. If possible, the involvement of experts who have contributed to the data collection process through the interviews can also generate added value for the achievement of the workshop's objective.

The aim of the validation workshop is twofold: on the one hand, the preliminary results based on the data collected at the first on-site workshop, e.g. on public acceptance of NBS, stakeholders' risk perceptions and their expectations of benefits and additional co-benefits of NBS, should be validated and discussed. This will ensure that everything has been properly understood. Participants and researchers should be given the opportunity to react to results that they do not find intuitive and to exchange ideas on possible causes. On the other hand, the barrier and driver analysis is to be further deepened by looking at the direction and strength of the links between the facilitating and hindering aspects. This second aspect is included to provide the input for RECONECT project deliverable 4.6 (upcoming report) and is not dealt with in this report. In the following, reference will only be made to those workshop parts that were aimed at validating the preliminary results.

The workshop structure is designed to facilitate in-depth discussions and reflections among the participants. The proposed structure for the validation workshop is as follows:[4]

Introduction (Subcontractors, 10 minutes)

The workshop starts with an introduction by the subcontractors, who provide an overview of its objectives. They outline the workshop's structure and set the context for the activities that will be conducted.

Check-in round (All, facilitated by Subcontractors, 30 minutes)

A check-in round is conducted to allow participants to share their expectations, and any initial insights or questions. This activity activates participants and helps establish a collaborative and inclusive environment for the workshop.

Presentation of preliminary results I: Barriers and drivers to realisation of NBS (Subcontractors, 15 minutes)

Subcontractors present the results of the analysis of barriers and drivers for the realisation of Nature-Based Solutions (NBS) that was conducted using the information shared by the participants of the data collection workshop. They will highlight key findings and insights, providing a foundation for further discussions.

Coffee Break (15 minutes) & lunch break (45 minutes)
Breaks provides participants with an opportunity to network, engage in informal conversations, and recharge for the next session.

Presentation of preliminary results II: Perception of NBS (Subcontractors, 20 minutes)
Subcontractors present the preliminary results related to the general perception of advantages and disadvantages of NBS, site-specific hydro-meteorological risks, relevance of NBS and possible reasons for this, and the expected co-benefits of proposed NBS. This presentation serves as a basis for the further discussion validating these results.

Reflection round on preliminary results presented (All, facilitated by Subcontractors, 25 minutes)
Participants engage in a group discussion in a plenary session to reflect on the presented results. They will provide their feedback, insights, and perspectives on these. The facilitators guide the discussion to ensure active participation and the exploration of different viewpoints.

Wrap-up (Subcontractors, 5 minutes)
The subcontractors provide a brief wrap-up of the workshop, summarising the key discussions, insights, and outcomes. They highlight the importance of the validation process and express gratitude to the participants for their contributions.

Next steps (Collaborators, 10 minutes)
Collaborators present the next steps of the analysis and/or of the overall project. They comment on how the validated findings will be utilised, and outline the plans for further analysis or implementation.

Timeline	Activity	Responsibilities
09:00 – 09:10	**Introduction** – Objectives of validation workshop – Workshop structure	Subcontractors, 10 minutes
09:10 – 09:40	**Check-in round**	All, facilitation by Subcontractors, 30 minutes
09:45 – 10:00	**Presentation of preliminary results I** – Barriers and drivers to realisation of NBS	Subcontractors, 15 minutes
10:00 – 10:15	**Coffee break**	15 minutes
10:15 – 11:45	**Linking of identified drivers and barriers** Mental modeler-based activity	All, facilitation by Subcontractors, 90 minutes
11:45 – 12:15	**Reflection round on linking activity** Discussion in plenary	All, facilitation by Subcontractors, 30 minutes

12:15 – 13:00	**Lunch break**	45 minutes
13:00 – 13:20	**Presentation of preliminary results II** – General perception of dis-/advantages of NBS – Perception of site-specific risks – Perception of relevance of NBS & causes – Expected co-/benefits of proposed NBS – Site-specific public acceptance of NBS	Subcontractors, 20 minutes
13:20 – 13:45	**Reflection round** Discussion in plenary	All, facilitation by Subcontractors, 25 minutes
13:45 – 13:50	**Wrap-up**	Subcontractors, 5 minutes
13:50 – 14:00	**Next steps**	Collaborators, 10 minutes

Annex E: Detailed information Q-methodology

Results of factor analysis for each case study site

Factor loadings by participant and viewpoints in Kamchia site

Participants	Viewpoint 1	Viewpoint 2	Viewpoint 3
AU1	0.06	0.53*	0.03
AU2	0.33	0.37	0.44
AU3	0.61*	0.09	0
AC1	0.21	0.38*	0.14
AC2	0.58*	0.32	-0.14
AC3	0.44	0.48	0.12
C1	-0.01	0.65	0.48
C2	-0.19	0.67	-0.06
C3	0.88*	-0.05	0.22
PR1	0.26	0.23	0.79*
PR2	0.51	0.58	-0.11
PR3	0.77*	-0.26	0.18
PO1	-0.06	-0.13	0.86*
PO2	0.66*	0.30	0.25

Note 1. * denotes a flagged person for each viewpoint.
Note 2. AU refers to local authority representatives, AC refers to academic and research community representatives, C refers to civil society, PR refers to the private sector, PO refers to political representatives.

Factor loadings by participant and viewpoints in Bregana site

Participants	Viewpoint 1	Viewpoint 2	Viewpoint 3
AU5	0.60*	0.05	0.33
C2	0.13	0.05	0.81*
AU-n	0.69*	0.07	-0.06
AU-n1	0.77*	0.17	0.13
AU7	0.07	0.64*	-0.07
PO4	0.22	0.71*	-0.11
PR4	0.51*	0.43	0.24

PO1	0.58*	0.09	0.26
AU1	0.17	0.66*	-0.01
AU6	0.32	0.29	0.69*
PR1	0.30	-0.28	0.82*
PO6	-0.06	0.68*	0.49
PO5	-0.40	0.62*	0.21
PR2	0.70*	-0.21	0.41

Note 1. * denotes a flagged person for each viewpoint.
Note 2. AU refers to local authority representatives, AC refers to academic and research community representatives, C refers to civil society, PR refers to the private sector, PO refers to political representatives.

Factor loadings by participant and viewpoints in Vrbanja site

Participants	Viewpoint 1	Viewpoint 2	Viewpoint 3
M1	0.65*	0.01	0.15
AC5	-0.01	0.79*	-0.01
PR1	0.58*	0.31	-0.16
AC3	0.87*	0.07	0.17
AC4	0.18	0.67*	-0.12
AC2	0.15	0.6*	0
PO2	0.46	0.22	-0.5
PO4	0.19	0.56*	0.35
AU2	0.09	0.08	0.85*
AC1	0.8*	0.27	-0.27

Note 1. * denotes a flagged person for each viewpoint.
Note 2. M refers to media, AC refers to academic and research community representatives, PR refers to the private sector, PO refers to political representatives, and AU refers to local authority representatives.

Factor loadings by participant and viewpoints in Pilica site

Participants	Viewpoint 1	Viewpoint 2	Viewpoint 3
AU1	0.23	0.44	0.51*
AU2	0.29	-0.18	0.73*
AU3	0.65*	0.08	0.23
AU4	-0.11	0.66*	0.06
AU5	0.08	0.24	0.64*
AU6	0.22	0.39	0.38
AU7	0.62*	0.11	0.31
AU8	0.54	0.49	0.41
AU9	0.13	0.11	0.53*
AU10	0.15	0.78*	-0.02
AU11	0.63*	0.39	0.05
AU13	0.63*	0.37	0.17
C1	0.67*	-0.02	-0.35
C2	0.38	0.48*	-0.25
C3	0.81*	-0.11	0.36
PR1	0.57*	0.07	0.26
PR2	0.62*	-0.14	0.44
PR3	0.63*	0.39	0.09
PO1	0.5*	0.41	0.19
PO2	0.35	0.22	0.58*
PO3	0.3	0.51	0.42
PO4	0.04	0.29	0.62*
PO5	0.54*	0.43	0.07
PO6	0.26	0.47*	0.23
PO7	0.1	0.37*	0.11
AC1	0.48*	0.19	0.34
AC2	0.17	0.53*	0.43
AC3	0	0.73*	0.37

Note 1. * denotes a flagged person for each viewpoint
Note 2. Factor analysis and varimax rotation extracted three opinion types (viewpoints).

Factor loadings by participant and viewpoints in Jadar site

Participants	Viewpoint 1	Viewpoint 2	Viewpoint 3
AU1	0.1	0.24	0.58*
AU2	0.59*	0.38	0.39
AU3	0.55	0.57	0.27
AU4	0.46	0.5	0.43
AU5	0.08	0.13	0.5*
AU6	0.43	0.41	0.55
AU8	0.79*	0.07	-0.04
AU9	0.47	0.39	0.48
C1	0.16	0.64*	0.11
C2	0.76*	0.36	0.18
C3	0.61*	0.37	0.17
C4	0.34	0.68*	0.3
PR1	0.71*	0.1	0.44
PR2	0.27	-0.09	0.73*
PR3	0.55*	0.18	0.38
PR4	0.16	0.69*	0.26
PR5	0.38	0.44	0.46
PR6	0.45	0.7*	0.27
PO1	-0.1	0.87*	-0.09
PO2	0.52	-0.33	0.46
M1	0.31	0.52*	0.33
M2	0.15	0.29	0.61*
AC1	0.69*	0.15	-0.09
AC2	0.45	0.5	0.33
AC3	-0.15	0.18	0.78*

Note 1. * denotes a flagged person for each viewpoint.
Note 2. AU refers to local authority representatives, C refers to civil society, PR refers to the private sector, PO refers to political representatives, AC refers to academic and research community representatives.

Factor loadings by participant and viewpoints in Tamnava site

Participants	Viewpoint 1	Viewpoint 2	Viewpoint 3
AU1	0.73*	0.01	0.4
AU3	-0.25	0.25	0.68*
AU5	0.56*	0.45	0.3
AU6	0.48	-0.03	0.75*
AU7	0.66*	-0.04	0.31
AU9	-0.05	0.7*	0.44
AU10	0.15	0.67*	0.44
AU11	0.4	0.18	0.69*
C2	0.14	0.56*	0.4
C6	0.57*	0.19	0.52
PR1	0.67*	0.14	0.04
PR3	0.71*	0.12	-0.19
PR4	0.19	0.37	0.66*
PR6	-0.01	0.8*	0.01
PO1	0.33	0.06	0.55*
PO3	0.14	0.75*	0.27
PO5	0.3	0.59*	-0.16
M1	0.33	0.64*	0.17
M2	0.1	0.29	0.53*
M3	0.71*	0.33	0.19
AC1	0.61*	0.25	0.28
AC3	0.27	0.33	0.28

Note 1. * denotes a flagged person for each viewpoint.
Note 2. AU refers to local authority representatives, C refers to civil society, PR refers to the private sector, PO refers to political representatives, M refers to media representatives, and AC refers to academic and research community representatives.

Results of the factor score analysis for each case study site

Statement factor scores by viewpoints in Kamchia site

	Statement	Viewpoints		
		1	2	3
1	Hard infrastructure provides better protection than NBS.	-3	-2	-4
2	The NBS project can result in inconveniences (e.g. increased insects, decreased parking space, and increased traffic), therefore, people will not welcome the NBS project.	-4	2	4
3	Trust in public authorities involved in flood risk management is lacking. Therefore, people will not accept NBS.	-1	4	2
4	More scientific proof is needed to show the effectiveness of NBS.	-2	1	-1
5	The NBS project can harm the cultural and historical aspects of the town area.	1	0	3
6	Maintenance of NBS is complicated.	0	3	-4
7	After the NBS implementation, people cannot access the river area where they used to go. This can cause frustration.	-4	1	-1
8	Strong stakeholder groups' coalition makes it difficult to bring the NBS process to a successful conclusion.	1	0	-2
9	The NBS project implies landscape change. Therefore, people will not welcome the NBS project.	-1	-3	0
10	The NBS project does not meet the local resident's preference for the place.	0	0	2
11	People place a high value on the natural environment in the NBS area, which leads to the support of NBS projects.	3	-2	4
12	If the land acquisition process is fair, it is more likely that they accept the NBS project.	2	3	1
13	The quality of life won't increase much as a result of the NBS project.	1	-3	0
14	People worry that NBS can impact wildlife negatively.	-3	-3	3
15	People prefer a more visible and physical way of reducing flood risks.	4	1	0

16	The NBS site does not correspond well to the people's ideal conception of the river, and this will cause dissatisfaction amongst the residents.	0	-1	2
17	After the NBS implementation, it takes more time from one place to another. This can cause frustration.	-2	-1	-1
18	If stakeholders do not have a proper opportunity to participate in the process of NBS, they will not support it.	3	2	-2
19	People prefer the previous landscape before the NBS implementation.	1	-1	-4
20	Taxpayers' money should be spent more wisely than demolishing existing risk management infrastructure and constructing a new one.	-3	0	-2
21	It is costly to maintain NBS.	-2	3	-3
22	Instead of implementing an NBS project, other ways of using the area are more beneficial to the town/area.	-1	-4	-3
23	Most people do not understand well how the NBS project will work for their town/area.	3	0	1
24	Despite the benefits of NBS, not everyone is convinced of the superiority of NBS.	2	1	1
25	If people are compensated properly for their property/land, it's more likely that they accept the NBS project.	2	2	1
26	The overall process of the NBS project should be open and transparent. This will increase the support for the NBS project.	4	4	3
27	Stakeholders are not willing to participate in the NBS process and, therefore, they are not supportive.	0	0	0
28	The changed landscape after the NBS project does not aesthetically please people.	0	-1	0
29	The town is so highly exposed that it cannot be protected by NBS.	-1	-4	-1
30	The benefits of NBS do not outweigh the costs.	0	-2	-1

Statement factor scores by viewpoints in Bregana site

	Statement	Viewpoints		
		1	2	3
1	Hard infrastructure provides better protection than NBS.	-1	2	-4
2	The NBS project can result in inconveniences (e.g. increased insects, decreased parking space, and increased traffic), therefore, people will not welcome the NBS project.	1	0	1
3	Trust in public authorities involved in flood risk management is lacking. Therefore, people will not accept NBS.	0	4	2
4	More scientific proof is needed to show the effectiveness of NBS.	-2	4	-2
5	The NBS project can harm the cultural and historical aspects of the town area.	-3	0	-2
6	Maintenance of NBS is complicated.	-1	0	-3
7	After the NBS implementation, people cannot access the river area where they used to go. This can cause frustration.	-1	3	0
8	Strong stakeholder groups' coalition makes it difficult to bring the NBS process to a successful conclusion.	1	-2	3
9	The NBS project implies landscape change. Therefore, people will not welcome the NBS project.	-2	1	-1
10	The NBS project does not meet the local resident's preference for the place.	-2	-1	-1
11	People place a high value on the natural environment in the NBS area, which leads to the support of NBS projects.	2	1	2
12	If the land acquisition process is fair, it is more likely that they accept the NBS project.	3	3	3
13	The quality of life won't increase much as a result of the NBS project.	-3	-3	0
14	People worry that NBS can impact wildlife negatively.	-4	1	-1
15	People prefer a more visible and physical way of reducing flood risks.	2	3	3
16	The NBS site does not correspond well to the people's ideal conception of the river, and this will cause dissatisfaction amongst the residents.	0	0	0

17	After the NBS implementation, it takes more time from one place to another. This can cause frustration.	2	2	0
18	If stakeholders do not have a proper opportunity to participate in the process of NBS, they will not support it.	1	2	1
19	People prefer the previous landscape before the NBS implementation.	0	-2	-1
20	Taxpayers' money should be spent more wisely than demolishing existing risk management infrastructure and constructing a new one.	0	-1	-4
21	It is costly to maintain NBS.	0	-3	-2
22	Instead of implementing an NBS project, other ways of using the area are more beneficial to the town/area.	0	-1	-3
23	Most people do not understand well how the NBS project will work for their town/area.	4	-1	1
24	Despite the benefits of NBS, not everyone is convinced of the superiority of NBS.	3	0	2
25	If people are compensated properly for their property/land, it's more likely that they accept the NBS project.	3	0	4
26	The overall process of the NBS project should be open and transparent. This will increase the support for the NBS project.	4	1	1
27	Stakeholders are not willing to participate in the NBS process and, therefore, they are not supportive.	-1	-2	-1
28	The changed landscape after the NBS project does not aesthetically please people.	-4	-4	-3
29	The town is so highly exposed that it cannot be protected by NBS.	1	-4	0
30	The benefits of NBS do not outweigh the costs.	-3	-3	4

Statement factor scores by viewpoints in Vrbanja site

	Statement	Viewpoints		
		1	2	3
1	Hard infrastructure provides better protection than NBS.	1	-3	2
2	The NBS project can result in inconveniences (e.g. increased insects, decreased parking space, and increased traffic), therefore, people will not welcome the NBS project.	0	-2	-3
3	Trust in public authorities involved in flood risk management is lacking. Therefore, people will not accept NBS.	4	1	4
4	More scientific proof is needed to show the effectiveness of NBS.	3	4	2
5	The NBS project can harm the cultural and historical aspects of the town area.	-3	-1	1
6	Maintenance of NBS is complicated.	-2	0	3
7	After the NBS implementation, people cannot access the river area where they used to go. This can cause frustration.	-3	-3	-1
8	Strong stakeholder groups' coalition makes it difficult to bring the NBS process to a successful conclusion.	0	0	0
9	The NBS project implies landscape change. Therefore, people will not welcome the NBS project.	-4	-4	3
10	The NBS project does not meet the local resident's preference for the place.	-3	0	-2
11	People place a high value on the natural environment in the NBS area, which leads to the support of NBS projects.	3	-4	0
12	If the land acquisition process is fair, it is more likely that they accept the NBS project.	4	-1	-1
13	The quality of life won't increase much as a result of the NBS project.	-2	-3	-2
14	People worry that NBS can impact wildlife negatively.	-1	-2	1
15	People prefer a more visible and physical way of reducing flood risks.	3	2	-3
16	The NBS site does not correspond well to the people's ideal conception of the river, and this will cause dissatisfaction amongst the residents.	1	1	-4

17	After the NBS implementation, it takes more time from one place to another. This can cause frustration.	-2	0	-1
18	If stakeholders do not have a proper opportunity to participate in the process of NBS, they will not support it.	0	3	3
19	People prefer the previous landscape before the NBS implementation.	-1	-2	-4
20	Taxpayers' money should be spent more wisely than demolishing existing risk management infrastructure and constructing a new one.	2	1	0
21	It is costly to maintain NBS.	-1	0	-1
22	Instead of implementing an NBS project, other ways of using the area are more beneficial to the town/area.	0	-1	1
23	Most people do not understand well how the NBS project will work for their town/area.	2	2	-2
24	Despite the benefits of NBS, not everyone is convinced of the superiority of NBS.	1	3	2
25	If people are compensated properly for their property/land, it's more likely that they accept the NBS project.	2	2	4
26	The overall process of the NBS project should be open and transparent. This will increase the support for the NBS project.	1	4	1
27	Stakeholders are not willing to participate in the NBS process and, therefore, they are not supportive.	0	1	-3
28	The changed landscape after the NBS project does not aesthetically please people.	-4	3	0
29	The town is so highly exposed that it cannot be protected by NBS.	-1	0	0
30	The benefits of NBS do not outweigh the costs.	0	-1	0

Statement factor scores by viewpoints in Pilica site

	Statement	Viewpoints		
		1	2	3
1	Hard infrastructure provides better protection than NBS.	-3	-3	-2
2	The NBS project can result in inconveniences (e.g. increased insects, decreased parking space, and increased traffic), therefore, people will not welcome the NBS project.	-4	1	0
3	Trust in public authorities involved in flood risk management is lacking. Therefore, people will not accept NBS.	3	-1	2
4	More scientific proof is needed to show the effectiveness of NBS.	-1	0	4
5	The NBS project can harm the cultural and historical aspects of the town area.	-4	-1	-4
6	Maintenance of NBS is complicated.	-3	1	-1
7	After the NBS implementation, people cannot access the river area where they used to go. This can cause frustration.	0	1	-4
8	Strong stakeholder groups' coalition makes it difficult to bring the NBS process to a successful conclusion.	1	3	0
9	The NBS project implies landscape change. Therefore, people will not welcome the NBS project.	0	-2	1
10	The NBS project does not meet the local resident's preference for the place.	1	-3	0
11	People place a high value on the natural environment in the NBS area, which leads to the support of NBS projects.	3	4	3
12	If the land acquisition process is fair, it is more likely that they accept the NBS project.	4	2	3
13	The quality of life won't increase much as a result of the NBS project.	0	0	-2
14	People worry that NBS can impact wildlife negatively.	-3	-2	-3
15	People prefer a more visible and physical way of reducing flood risks.	4	3	3
16	The NBS site does not correspond well to the people's ideal conception of the river, and this will cause dissatisfaction amongst the residents.	0	-3	0

17	After the NBS implementation, it takes more time from one place to another. This can cause frustration.	-2	0	-1
18	If stakeholders do not have a proper opportunity to participate in the process of NBS, they will not support it.	2	-2	2
19	People prefer the previous landscape before the NBS implementation.	-1	-4	1
20	Taxpayers' money should be spent more wisely than demolishing existing risk management infrastructure and constructing a new one.	-2	2	0
21	It is costly to maintain NBS.	-2	1	1
22	Instead of implementing an NBS project, other ways of using the area are more beneficial to the town/area.	0	0	-3
23	Most people do not understand well how the NBS project will work for their town/area.	1	4	2
24	Despite the benefits of NBS, not everyone is convinced of the superiority of NBS.	2	2	1
25	If people are compensated properly for their property/land, it's more likely that they accept the NBS project.	2	3	4
26	The overall process of the NBS project should be open and transparent. This will increase the support for the NBS project.	3	-1	0
27	Stakeholders are not willing to participate in the NBS process and, therefore, they are not supportive.	-1	-1	-2
28	The changed landscape after the NBS project does not aesthetically please people.	0	-4	-1
29	The town is so highly exposed that it cannot be protected by NBS.	1	0	-3
30	The benefits of NBS do not outweigh the costs.	-1	0	-1

Statement factor scores by viewpoints in Jadar site

	Statement	Viewpoints		
		1	2	3
1	Hard infrastructure provides better protection than NBS.	1	0	-1
2	The NBS project can result in inconveniences (e.g. increased insects, decreased parking space, and increased traffic), therefore, people will not welcome the NBS project.	-2	-2	-4
3	Trust in public authorities involved in flood risk management is lacking. Therefore, people will not accept NBS.	-1	3	-1
4	More scientific proof is needed to show the effectiveness of NBS.	-1	1	2
5	The NBS project can harm the cultural and historical aspects of the town area.	-3	0	-2
6	Maintenance of NBS is complicated.	1	-4	1
7	After the NBS implementation, people cannot access the river area where they used to go. This can cause frustration.	-4	-1	-3
8	Strong stakeholder groups' coalition makes it difficult to bring the NBS process to a successful conclusion.	0	-2	0
9	The NBS project implies landscape change. Therefore, people will not welcome the NBS project.	-2	-3	0
10	The NBS project does not meet the local resident's preference for the place.	0	0	2
11	People place a high value on the natural environment in the NBS area, which leads to the support of NBS projects.	3	-2	1
12	If the land acquisition process is fair, it is more likely that they accept the NBS project.	3	1	3
13	The quality of life won't increase much as a result of the NBS project.	-3	-3	-3
14	People worry that NBS can impact wildlife negatively.	-1	0	-2
15	People prefer a more visible and physical way of reducing flood risks.	1	4	4
16	The NBS site does not correspond well to the people's ideal conception of the river, and this will cause dissatisfaction amongst the residents.	0	2	3

17	After the NBS implementation, it takes more time from one place to another. This can cause frustration.	-1	-1	2
18	If stakeholders do not have a proper opportunity to participate in the process of NBS, they will not support it.	2	3	1
19	People prefer the previous landscape before the NBS implementation.	0	-1	1
20	Taxpayers' money should be spent more wisely than demolishing existing risk management infrastructure and constructing a new one.	0	0	0
21	It is costly to maintain NBS.	0	-4	-1
22	Instead of implementing an NBS project, other ways of using the area are more beneficial to the town/area.	-4	-1	0
23	Most people do not understand well how the NBS project will work for their town/area.	4	4	-2
24	Despite the benefits of NBS, not everyone is convinced of the superiority of NBS.	2	2	0
25	If people are compensated properly for their property/land, it's more likely that they accept the NBS project.	3	1	4
26	The overall process of the NBS project should be open and transparent. This will increase the support for the NBS project.	4	3	3
27	Stakeholders are not willing to participate in the NBS process and, therefore, they are not supportive.	2	0	-3
28	The changed landscape after the NBS project does not aesthetically please people.	-2	-3	-4
29	The town is so highly exposed that it cannot be protected by NBS.	1	1	0
30	The benefits of NBS do not outweigh the costs.	-3	2	-1

Statement factor scores by viewpoints in Tamnava site

	Statement	Viewpoints		
		1	2	3
1	Hard infrastructure provides better protection than NBS.	0	1	-1
2	The NBS project can result in inconveniences (e.g. increased insects, decreased parking space, and increased traffic), therefore, people will not welcome the NBS project.	-1	-1	-2
3	Trust in public authorities involved in flood risk management is lacking. Therefore, people will not accept NBS.	-3	1	-3
4	More scientific proof is needed to show the effectiveness of NBS.	1	3	1
5	The NBS project can harm the cultural and historical aspects of the town area.	-3	0	-4
6	Maintenance of NBS is complicated.	-3	-2	-3
7	After the NBS implementation, people cannot access the river area where they used to go. This can cause frustration.	-1	-4	-4
8	Strong stakeholder groups' coalition makes it difficult to bring the NBS process to a successful conclusion.	2	0	0
9	The NBS project implies landscape change. Therefore, people will not welcome the NBS project.	0	-1	-3
10	The NBS project does not meet the local resident's preference for the place.	0	0	-1
11	People place a high value on the natural environment in the NBS area, which leads to the support of NBS projects.	1	2	0
12	If the land acquisition process is fair, it is more likely that they accept the NBS project.	3	4	4
13	The quality of life won't increase much as a result of the NBS project.	-4	-3	1
14	People worry that NBS can impact wildlife negatively.	-1	0	0
15	People prefer a more visible and physical way of reducing flood risks.	1	2	3
16	The NBS site does not correspond well to the people's ideal conception of the river, and this will cause dissatisfaction amongst the residents.	1	-1	0

17	After the NBS implementation, it takes more time from one place to another. This can cause frustration.	0	-2	0
18	If stakeholders do not have a proper opportunity to participate in the process of NBS, they will not support it.	4	-3	0
19	People prefer the previous landscape before the NBS implementation.	-1	-2	-1
20	Taxpayers' money should be spent more wisely than demolishing existing risk management infrastructure and constructing a new one.	2	0	2
21	It is costly to maintain NBS.	-2	-4	2
22	Instead of implementing an NBS project, other ways of using the area are more beneficial to the town/area.	-2	-1	-2
23	Most people do not understand well how the NBS project will work for their town/area.	3	3	1
24	Despite the benefits of NBS, not everyone is convinced of the superiority of NBS.	3	1	2
25	If people are compensated properly for their property/land, it's more likely that they accept the NBS project.	2	3	4
26	The overall process of the NBS project should be open and transparent. This will increase the support for the NBS project.	4	2	3
27	Stakeholders are not willing to participate in the NBS process and, therefore, they are not supportive.	0	0	-1
28	The changed landscape after the NBS project does not aesthetically please people.	-2	-3	-2
29	The town is so highly exposed that it cannot be protected by NBS.	0	1	3
30	The benefits of NBS do not outweigh the costs.	-4	4	1

Annex F: Overview of advantages/disadvantages of NBS as perceived by stakeholders

Advantages	Share of mentions Kamchia river basin	Share of mentions Pilica river basin	Share of mentions Bregana river basin	Share of mentions Vrbanja river basin	Share of mentions Jadar river basin	Share of mentions Tamnava river basin	Share of total mentions	Number of sites addressing advantage
Environmental protection	12.8%	5.9%	7.8%	9.3%	9.2%	22.0%	10.9%	6
Nature friendliness	2.6%	13.7%	1.6%	14.0%	10.8%	22.0%	10.6%	6
Financial savings	7.7%	9.8%	3.1%	11.6%	9.2%	10.0%	8.3%	6
Aesthetics	2.6%	2.0%	10.9%	9.3%	4.6%	8.0%	6.4%	6
Biodiversity	7.7%	5.9%	14.1%	2.3%	3.1%	2.0%	6.1%	6
Ecosystem services	2.6%	2.0%	1.6%	2.3%	1.5%		1.6%	5
Flood risk reduction	5.1%	3.9%	1.6%			2.0%	1.9%	4
Ecological effects			1.6%	4.7%	1.5%	4.0%	1.9%	4
Sustainability	2.6%	3.9%	3.1%		1.5%		1.9%	4
Water storage	2.6%	3.9%		2.3%	1.5%		1.6%	4
Multiple benefits	2.6%	2.0%		2.3%	3.1%		1.6%	4

Health & wellbeing	7.7%				7.7%	4.0%	3.2%	3
Adaptation landscape		2.0%	6.3%		7.7%		3.2%	3
Recreation	7.7%				3.1%	2.0%	1.9%	3
Longevity			6.3%	2.3%	3.1%		2.2%	3
Combinability		2.0%		4.7%	1.5%		1.3%	3
Multipurpose character				2.3%	1.5%	4.0%	1.3%	3
Risk reduction		2.0%		2.3%	3.1%		1.3%	3
Touristic effects	2.6%	2.0%			1.5%		1.0%	3
Comprehensive approach		2.0%	1.6%	2.3%			1.0%	3
Efficiency		2.0%			1.5%	2.0%	1.0%	3
Limited intervention	2.6%		7.8%				1.9%	2
Effectiveness	7.7%	2.0%					1.3%	2
Habitat restoration		5.9%	3.1%				1.6%	2
Water runoff control		3.9%		2.3%			1.0%	2
Nature conservation			4.7%		1.5%		1.3%	2

Animal protection			1.6%			4.0%	1.0%	2
Public acceptance	2.6%			2.3%			0.6%	2
Community cohesion	2.6%	2.0%					0.6%	2
Acceptability				2.3%		2.0%	0.6%	2
Landscape enhancement	2.6%				1.5%		0.6%	2
Modernity	2.6%				1.5%		0.6%	2
Functionality			1.6%	2.3%			0.6%	2
Hydrological cycle benefits			1.6%	2.3%			0.6%	2
Soil protection			1.6%	2.3%			0.6%	2
Afforestation				2.3%	1.5%		0.6%	2
Local involvement		2.0%			1.5%		0.6%	2
Harmless implementation			1.6%		1.5%		0.6%	2
Connection with nature						4.0%	0.6%	1
Room for water						4.0%	0.6%	1
Coordination catalyst		3.9%					0.6%	1

Groundwater improvement		3.1%			0.6%	1
Natural mechanism		3.1%			0.6%	1
Quality of life			3.1%		0.6%	1
Climate change adaptation		1.6%			0.3%	1
Climate change mitigation			2.3%		0.3%	1
Circular economy	2.6%				0.3%	1
Damage prevention	2.6%				0.3%	1
Drainage control	2.6%				0.3%	1
Operability	2.6%				0.3%	1
Reliability	2.6%				0.3%	1
Education			2.3%		0.3%	1
Erosion reduction			2.3%		0.3%	1
Flexibility			2.3%		0.3%	1
Windshield function			2.3%		0.3%	1
Economic effects				2.0%	0.3%	1

Material saving			2.0%	0.3%	1
Adaptability	2.0%			0.3%	1
Continuity	2.0%			0.3%	1
Ecosystem resilience	2.0%			0.3%	1
Future viability	2.0%			0.3%	1
Likelihood of realisation	2.0%			0.3%	1
Local awareness	2.0%			0.3%	1
River restoration	2.0%			0.3%	1
Water quality	2.0%			0.3%	1
Accessibility		1.6%		0.3%	1
Area valorisation		1.6%		0.3%	1
Heat stress reduction		1.6%		0.3%	1
Risk analysis improvement		1.6%		0.3%	1
Surface water protection		1.6%		0.3%	1
Waterbody deepening		1.6%		0.3%	1

Air quality	1.5%	0.3%	1
Applicability	1.5%	0.3%	1
Energy savings	1.5%	0.3%	1
Innovativeness	1.5%	0.3%	1
Large area effect	1.5%	0.3%	1
Local benefits	1.5%	0.3%	1
Regional material	1.5%	0.3%	1

Disadvantages	Share of mentions Kamchia river basin	Share of mentions Pilica river basin	Share of mentions Bregana river basin	Share of mentions Vrbanja river basin	Share of mentions Jadar river basin	Share of mentions Tamnava river basin	Share of total mentions	Number of sites addressing disadvantage
Awareness	8.3%	2.3%	5.0%	2.6%	6.4%	2.2%	4.5%	6
Costs	11.1%	7.0%	6.7%	2.6%	4.3%	6.5%	6.3%	6
Effectiveness	2.8%	4.7%	3.3%	15.8%	6.4%	10.9%	7.1%	6
Space requirements	2.8%	2.3%	11.7%	5.3%	8.5%	8.7%	7.1%	6
Acceptance	2.8%	2.3%	1.7%	2.6%	2.1%		1.9%	5
Delay	2.8%	4.7%		18.4%	10.6%	2.2%	5.9%	5
Implementation		4.7%	3.3%	5.3%	4.3%	10.9%	4.8%	5
Knowledge		7.0%	15.0%	15.8%	12.8%	17.4%	11.5%	5
Maintenance	19.4%	2.3%		2.6%	8.5%	10.9%	6.7%	5
Expertise	5.6%	4.7%		2.6%	4.3%		2.6%	4
Land acquisition	11.1%		1.7%		4.3%	4.3%	3.3%	4
Legal barriers			1.7%	2.6%	4.3%	2.2%	1.9%	4
Procedures	2.8%		1.7%	2.6%	2.1%		1.5%	4

Visibility	2.8%			2.6%	6.4%	2.2%	2.2%	4
Best practices			5.0%		2.1%	4.3%	2.2%	3
Compensation	2.8%	4.7%		2.6%			1.5%	3
Complexity		2.3%		2.6%		2.2%	1.1%	3
Coordination		11.6%		2.6%		2.2%	2.6%	3
Experience		2.3%	5.0%		6.4%		2.6%	3
Funding		2.3%			2.1%	4.3%	1.5%	3
Inconveniences	2.8%	4.7%				2.2%	1.5%	3
Mistrust		2.3%	1.7%			2.2%	1.1%	3
Planning		2.3%	1.7%			2.2%	1.1%	3
Uncertainty			20.0%	5.3%		2.2%	5.9%	3
Decision-making		2.3%	1.7%				0.7%	2
Efficiency		2.3%		5.3%			1.1%	2
Landscape interventions	5.6%		1.7%				1.1%	2
Resident relocation	2.8%				2.1%		0.7%	2

Resistance		7.0%	3.3%		1.9%	2
Responsibility	2.8%	2.3%			0.4%	2
Social effects		2.3%	1.7%		0.7%	2
Climate risk		2.3%			0.4%	1
Conflict potential		7.0%			1.1%	1
Consensus	2.8%				0.4%	1
Dismantling protection				2.1%	0.4%	1
Institutional barriers	5.6%				0.7%	1
Political will			3.3%		0.7%	1
Vested interests			3.3%		0.7%	1
Waterlogging risk	2.8%				0.4%	1

Annex G: Word clouds of most frequently mentioned advantages of NBS at RECONECT Collaborator sites

Word cloud of most frequently mentioned advantages of NBS as perceived by stakeholders at Kamchia river basin

Word cloud of most frequently mentioned advantages of NBS as perceived by stakeholders at Pilica river basin

Word cloud of most frequently mentioned advantages of NBS as perceived by stakeholders at Bregana river basin

Word cloud of most frequently mentioned advantages of NBS as perceived by stakeholders at Vrbanja river basin

Word cloud of most frequently mentioned advantages of NBS as perceived by stakeholders at Jadar river basin

Word cloud of most frequently mentioned advantages of NBS as perceived by stakeholders at Tamnava river basin

Annex H: Word clouds of most frequently mentioned disadvantages of NBS at RECONECT Collaborator sites

Word cloud of most frequently mentioned disadvantages of NBS as perceived by stakeholders at Kamchia river basin

Word cloud of most frequently mentioned disadvantages of NBS as perceived by stakeholders at Pilica river basin

Word cloud of most frequently mentioned disadvantages of NBS as perceived by stakeholders at Bregana river basin

Word cloud of most frequently mentioned disadvantages of NBS as perceived by stakeholders at Vrbanja river basin

Word cloud of most frequently mentioned disadvantages of NBS as perceived by stakeholders at Jadar river basin

Word cloud of most frequently mentioned disadvantages of NBS as perceived by stakeholders at Tamnava river basin