RECONECT's Upscaling Strategy

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Abstract (for dissemination, 100 words)	The aim of this report is to lay out RECONECT's upscaling strategy. Generally, upscaling is a core element of the RECONECT project. RECONECT distinguishes three different pillars underpinning the project's upscaling strategy: Co-creating and replicating NBS and by doing so demonstrating its co-benefits; Enhancing the capacities of interested stakeholder; and supporting policies' changes for a more effective uptake of NBS across Europe and beyond. Based on an extensive literature review, the report outlines an upscaling framework which serves as conceptual backbone to the upscaling strategy. This report also presents the results of a standardized survey which was conducted among more than 220 stakeholders from across Europe and beyond. The results of the survey provide for the first time a systematic overview on upscaling activities of different stakeholders and organisations.
Key works	Upscaling, replication, capacities, co-creation, barriers, policies

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Executive Summary

The aim of this report is to lay out RECONECT's upscaling strategy. Generally, upscaling is a core element of the RECONECT project. By monitoring, evaluating and demonstrating the benefits of NBS with regard to hydro-meteorological risk reduction, RECONECT will contribute to a European reference framework on the benefits of NBS and develop an evidence-based proof-of-concept on how to implement NBS. The term upscaling is used to describe RECONECT's deliberate efforts to increase the impact of successfully tested social and nature-based innovations so as to benefit more people and to foster policy and programme development on a lasting basis. More specifically, we distinguish three different pillars underpinning the project's upscaling strategy: Co-creating and replicating NBS and by doing so demonstrating its co-benefits; Enhancing the capacities of interested stakeholders; and supporting policies' changes for a more effective uptake of NBS across Europe and beyond.

Upscaling is a cross-cutting activity that relies on the exchange and strategic cooperation of different WPs. With this report we provide a systematic structure that supports a comprehensive view on the project's upscaling approach. Based on the extensive literature review, the report outlines an upscaling framework which serves as conceptual backbone to the strategy. In a next step, the results of a RECONECT standardized survey are presented. More than 220 stakeholders from across Europe and beyond responded to the survey. The results of the survey provide for the first time a systematic overview on upscaling activities of different stakeholders and organisations. Furthermore, they serve as a basis for further specifying how RECONECT can help stakeholders overcome barriers and enhance their capacities, and by doing so to support the amplification of NBS for hydro-meteorological risk reduction.

On the one hand, this report is directed to all projects partners, as it shall help them to get a systematic overview of the project upscaling strategy and how single outputs contribute to our joint effort of amplifying NBS. On the other hand, the report can be beneficial also for a wide range of stakeholders (e.g. other scientists, policy-makers, planners, etc.) interested in realising NBS. The report provides empirical insights on the current state of upscaling activities, on the relevance of different barriers from the point of view of stakeholders, as well as a strategic approach on how to overcome them.

This report represents the findings of an empirical study with a focus on upscaling, which is at the same time a robust evidence base for further specifying RECONECT's upscaling strategy. The insights are based both on a group of respondents who have experience in realising NBS as well as on the knowledge needs of a group of respondents who has an interest but no prior experience in realising NBS. The results of the survey underline that stakeholders without experience in realising NBS have lower financial and knowledge capacities compared to stakeholders that were already involved in the realisation of an NBS project. Furthermore, all barriers are assessed as more relevant by respondents with an interest but no previous experience compared to respondents with experience. Stakeholder participation is considered as the most relevant innovation among those with experience underlining the relevance of social innovation/co-creation (scaling deep). Interactive formats are considered the most relevant for promoting/learning more about NBS.

First, the results of the survey underline the relevance of taking a broad perspective when it comes to co-evaluating NBS. Such a perspective needs to go beyond the immediate field of disaster risk reduction (e.g. avoided damage). The relevance of NBS is based on the fact that it allows to address a wider set of societal challenges. As an

implication this means also that it is vital for RECONECT to make sure that wider societal and economic co-benefits are monitored and evaluated to demonstrate the added value of NBS. Second, products and outcomes developed by RECONECT should address specific barriers and help stakeholders with an interest in realising NBS to overcome them. The results of the survey suggest that the perceived relevance of barriers is changing during the process of realising NBS. While barriers might appear initially as very severe and difficult to overcome, they seem to become less relevant and problematic with the realisation process. Products and outcomes of RECONECT should therefore be addressed towards specific barriers and help stakeholders to overcome them (scaling down). Third, demonstrating the benefits of co-creating NBS as a social innovation is of great reliance. The results of the survey underline that realizing NBS is not just a new way of managing risks, it can also lead to social innovation; this at least is suggested by the results of the upscaling survey. Participatory processes are considered by respondents as the most innovative aspects of their NBS project. As RECONECT has a strong emphasis on participatory processes, it needs to ensure that a robust methodology is developed that allows the project to generate strong evidence based on the added value of co-creating NBS (scaling deep). Fourth, upscaling activities should be built around interactive formats. The results of the survey suggest that interactive formats are preferred way of how stakeholders involved in NBS projects promote and upscale their insights and how interested stakeholders would like to learn more about NBS. This includes, among others, personal conversation with colleagues, workshops and seminars, on-site field trips, partnering with other organization.

Contents

List of figures

List of tables

1 Introduction

How can social innovations - e.g. new solutions and answers people have created to tackle a pressing problem - become more widely adopted and lead to a transformative impact beyond the immediate context they have been developed? What are the general strategic steps and which specific measures and actions need to be taken to support the amplification of NBS in the context of hydro-meteorological risk management, climate change adaptation, urban development or land use planning? How can a social innovation carried out successfully in a relatively sheltered niche (e.g. a NBS project realized in a support context), amplify its impacts so that it not only results in local changes but also is able to reach wider groups of stakeholders potentially interested in the experiences made?

The aim of this report is to lay out RECONECT's upscaling strategy by reflecting on the questions mentioned above. Generally, upscaling is a core element of the RECONECT project. By monitoring, evaluating and demonstrating the benefits of NBS with regard to hydro-meteorological risk reduction, RECONECT will contribute to a European reference framework on the benefits of NBS and develop an evidence-based proof-of-concept on how to implement large-scale NBS in Europe and beyond. Apparently, effective upscaling requires more than simply disseminating information about the outcomes of the RECONECT project or exploiting results (although both activities are relevant for scaling activities). As Moore et al. (2015, p. 2) state in a report about how to advance systemic social innovations:

> *"[S]caling social innovations to effect larger-scale change involves a more complex and diverse process than simply 'diffusing' or spreading a product or model. It is important to learn about the process of how social systems and institutions can be deliberately impacted through the work of organizations, foundations, and other agents of change*".

In this report, we describe how RECONECT aims at scaling its (social) innovations to support the amplification of NBS. Generally, the research on scaling processes is still an emerging field of research. There is not yet a mature body of knowledge on the strategies and actions that support effective scaling processes. As an implication there also appears no guidance on how to set-up effective scaling processes. The ideas presented in this report, therefore, need to be critically reflected upon, evaluated and, if necessary, locally adapted and further contextualized.

Attention to scaling up requires systematic planning of how pilot-tested innovations can be implemented on a larger scale and achieve broad impact. Typically, social and nature-based innovations are tested in pilot projects with special organizational, financial and human resources, which will not be available when innovations are being taken to scale. As a consequence, programme managers responsible for leading the process of "rolling out" the innovation to a sub-national or national level are faced with an enormous challenge: they have to implement the innovation on a large scale with few resources and in ecosystems / environmental conditions / local contexts that may be characterized by weak capacities and multiple, pressing priorities. Taking this into consideration, success with scaling up needs to balance between desired outcomes and practical realities and barriers.

This report provides guidance for such systematic strategy development highlighting the leading role of strategic thinking throughout the whole NBS co-creation process, requiring ongoing attention to the different factors and actors that affect upscaling, as well as adjustments to the strategy whenever necessary. The presented scaling-up strategy, once developed, is not something that should be rigorously adhered to. Some of its parts can quickly become obsolete as circumstances change (e.g. theory of change), or because some factors were not adequately considered in the planning process or this in a recent occurred phenomenon. However, the initial plan can provide the foundation for the necessary adjustments that have to be made as the scaling up proceeds.

This report provides an overview on RECONECT's scaling activities. The structure is as follows: Based on a comprehensive literature review, chapter 2 outlines RECONECT upscaling framework. RECONECT'S upscaling framework provides an analytical lens that helps to organise key ideas underpinning the project's efforts to upscale its lessons learned and by doing so contribute to the amplification of NBS across Europe and beyond. The framework is a rather abstract and conceptual representation of RECONECT's view on upscaling.

In the next chapter, we present the findings of our upscaling survey. While the concept of upscaling has become more prominent in recent years, there is still a considerable lack of empirical insights on how such strategies are set-up, how effective they are or to what kind of needs upscaling activities respond. Therefore, we aim to advance and deep the discussion on upscaling by providing an overview of the results of a RECONECT standardized survey, we conducted between April and June 2021 among more than 220 stakeholder from across Europe and beyond. The survey itself is based on the conceptual framework we presented in chapter 2 and addresses two different groups of actors: (1) Actors with in interest in realising NBS but no first-hand experience, knowledge and expertise. In the survey we predominantly focus on their current capacities and needs, as well as their perception of potential barriers for realising NBS; (2) Actors with experience in realising NBS. In the survey, we mainly set out to understand their capacities, the upscaling activities, as well as their perception of potential barriers. Generally, we assumed that having experience/no experience influences the attitudes, capacities and perception of respondents. Through a comparison of both groups we are able to draw first conclusions on not just how both groups are different with respect to their capacities and/or how they perceive the relevance of different barriers; we are also able to fine-tune RECONECT's upscaling strategy to the needs of those stakeholders with an interest in realising NBS in the future.

The final chapter lays out the project's upscaling strategy. The strategy departs again from the framework, but links the conceptual basis more specifically to the objectives and expected impacts as outlined in the Description of Action (i.e. the proposal). We understand both the objectives and expected impacts as relevant to further specify RECONECT's upscaling strategy as they allow to specify what outcomes the project aims to achieve and the wider impacts it aims to support after the end of the project. In addition to the objectives and expected impacts, which were defined during the project proposal stage, we will also take into account potential barriers stakeholders might face and will design our products in a way that they not just address specific barriers, but also support stakeholders in their attempt to overcome them.

Apparently, upscaling is a cross-cutting activity of the project. Table 1 provides the links to reports that were already published. In Section 4 we also outline how future reports further inform and support the upscaling strategy.

Table 1 Linkages to already published reports of the RECONECT project

	Report Name	Input provided to the scaling strategy
D1.2	Social Innovation approach of RECONECT	Sketch of the general scaling strategy of RECONECT and some practical examples of how to implement it
D2.2	Demand and Supply – Demonstrators	Provides details on scaling activities, with a focus on a demand and supply analysis (“Scaling Deep”)
D4.4	Demand analysis with a focus on Collaborators	Provides details on scaling activities, with a focus on a demand and supply analysis as well as twinning processes within the project (“Scaling Deep”).
D5.5	Report for describing the potential for implementation of large-scale NBS in Europe	Presents details on scaling activities by providing a first analysis of the replication potential of solutions developed and demonstrated by RECONECT (“Scaling Out”).
D5.7	Business models and sustainability plans	Provides details on scaling activities by presenting the information on business models and plans that ensure the sustainability of project results and outcomes. This includes also exploitation of results and exploration of the market potential (“Scaling Out”).
D6.9	Updated Exploitation Dissemination and Communication Plan for Outreach - v2	Highlights details on scaling activities by providing information on dissemination activities and how the project will reach out and engage with different groups of stakeholders (“Scaling Out”/”Scaling Up”).

2 Review of existing literature

Amplifying the impact of social and nature-based solutions/initiatives to foster transformations in urban and rural contexts and to address the current societal challenges has received increasing attention in sustainability transitions, resilience and social innovation research (Lam et al., 2020). The concept of upscaling has different meanings depending on the discipline and context.

A common understanding relates to a spatial expansion of information gathered in a particular place. Kunin et al. (2018), for instance, understand upscaling as taking information about biodiversity from a site-specific and fine scale to broader spatial scales. Upscaling can also mean a simple geographical expansion of a specific activity. Norton et al. (2018) see upscaling as a strategy to substantially increase a given area that is subject to restorative activities. Others point towards relevance of shared frameworks and a certain degree of formalization in upscaling processes. Artmann and Sartison (2018) view upscaling as providing a shared framework that allows a more standardized approach to integrating peri-urban agriculture into approaches for NBS.

More recent discussions on scaling centre on two different ideas. First, there is a strand of research that focuses on how information and knowledge can be progressed across different scales and, by doing so, increasing the impact of an activity beyond its immediate context of origin (i.e. local to international). This is often referred to “upscaling”. The second strand of research is less concerned about the spatial dimension of scaling activities, but rather about reaching a higher degree of impact. This is often referred to “amplification”. A closer reading of the literature reveals a great thematic overlap between both concepts, which can lead to confusion as “frameworks often describe different processes with similar terms and similar processes with different terms" (Lam et al., 2020, p. 10). Therefore, we outline different views on upscaling below (Section 2.1) in order to provide a synoptic view on key terms that underline RECONECT’s scaling strategy.

2.1 Upscaling and amplifying - increasing impacts of social innovations

Generally, a large number of pilots and experiments have been set up in recent years aiming at exploring options and ways to initiate transformative processes towards a more sustainable development. However, a key challenge remains how to upscale them. In this chapter we focus particularly on emerging debates in geography (van Doren et al., 2018) and transition theory (Aalbers and Sehested, 2018) as well as research on social innovations and sustainability transformations (Moore et al., 2015; Scoones et al., 2020).

A relatively large number of the papers we reviewed in the field of NBS research mention the term “upscaling”, but deal with this topic rather remotely. The focus is more likely on the outline of assessment frameworks that help to evaluate the performance of NBS and by doing so provide a robust evidence base that helps to demonstrate the benefits of NBS (Kabisch et al., 2016). It is often implicitly assumed that the provision of an evidence based on the co-benefits of NBS leads more or less automatically to a wider consideration of NBS in planning and management practices. Artmann and Sartison (2018) develop, for instance, an assessment framework for urban agriculture to evaluate effectiveness of such NBS. By applying such an integrative framework urban agricultural NBS can be successfully

upscaled, which is an important step towards mainstreaming NBS. However, it is not specified how this is done and what boundary conditions need to be considered.

Raymond et al. (2017) go a step further by making upscaling a key component of their "framework for assessing and implementing the co-benefits of nature-based solutions in urban areas". According to them, upscaling of NBS can occur during an initial phase of the realisation of an NBS project (i.e. during demonstrating their co-benefits) as well as during a later stage (i.e. what they call the mainstreaming phase) when other stakeholders interested in a specific NBS project are involved to learn from the project demonstrations. In this sense, upscaling can have various intentions: it can help to increase the large number of successfully realised NBS projects, it can help to build trust in NBS on the side of governmental bodies', stakeholders' and investors' confidence, and it can help to provide robust evidence on the benefits of NBS across scales. Although the authors reasons why upscaling is relevant, they do not provide the means of how to actually accomplish upscaling.

Norton et al. (2018) are concerned with how the upscaling of ecological restoration can help to stop degradation of biodiversity while at the same time help to meet restoration commitments as well as sustainable development goals. They understand upscaling as "substantially increasing the area of New Zealand that is subject to restorative activities involving tens to hundreds of thousands of hectares of new restoration" (ibid, p. 3). They provide a step-by-step approach on how to achieve such a spatial expansion (Table 2).

Table 2 Eight recommendation for upscaling restoration efforts

Recommendations for upscaling restoration efforts (Norton et al. 2018, p.27)
• Retain what is left and manage it properly. • Before starting restoration, address the factors that limit natural regeneration and hence will also limit any planting. • Consider how large-scale plantings can increase strategic linkages and habitat area, and enhance all-year-round food supplies for local fauna. • Eco-source an ecologically appropriate range of plant species and mycorrhizae. • Establish certification for seed and seedling supply. • Invest in new technologies for revegetation. • Adopt best-practice planting and early management, including appropriate monitoring, to ensure the long-term success of restoration. • Integrate all for an optimum result.

Source: Norton et al. 2018, p.27

While four out of eight steps are concerned with what one might call the "physical'" dimension of upscaling (e.g. assess factors limiting natural regeneration, systematically assess potential habitat linkages, assess range of plant species), they also provide some recommendations with respect to policies and investment strategies, including the certification for seeds and seeding supply, investment in new technologies for re-vegetation and adoption of best-practice planting and early management, including appropriate monitoring, to ensure the long-term success of restoration (ibid, p. 8).

Perring et al. (2018) put a stronger emphasis on "human agency" (p. 1019) involved in the process of upscaling. In a contribution overseeing 25 years of publication activities in the journal Restoration Ecology, they advocate a more systematic engagement with upscaling activities in order to fulfil global restoration commitments and meet sustainable development goals. They identify five key pillars that are at the core of their operational framework for

upscaling ecological restoration providing benefits for both nature and people: (1) governance and land ownership, (2) technological and educational capacity building, (3) practical science, (4) adoptable packages, e.g. to sustain livelihoods, (5) investment opportunities.

Kern (2019) offers an analytical perspective on upscaling by focusing on the role of cities. Generally, she argues that upscaling of local innovations and experiments over time involves three different processes:

- "Expansion: upscaling is limited to the city in which the experiment was conducted, for example, the planned roll-out of a place-based pilot project from one neighbourhood to other neighbourhoods, driven by project-to-project learning processes;
- Diffusion: upscaling between cities on a voluntary basis, based on various forms of networking, ranging from twinning to global city networks;
- Transformation: upscaling that leads to a transformation towards sustainability […] in a specific territory, such as a region or a nation-state, and requires climate action in all municipalities within that territory" (Kern 2019, p. 128).

In her analysis, she explores the role of cities in EU multilevel climate governance, more specifically on the integration of local initiatives in polycentric networks of actors at different scales and how cities drive both climate change mitigation and adaptation activities. In this context, different forms of upscaling have emerged, which are summarized by Kern as different types of scaling: (1) horizontal, (2) vertical, (3) hierarchical and (4) embedded upscaling (see table 3).

Table 3 Different forms of upscaling

Form	Description
Horizontal	"...involves the exchange of experiences, knowledge transfer, and learning between and among cities" (ibi, p. 129). Forms of horizontal upscaling are, among others: Twinning, polycentric networking (city networks). Functions: knowledge transfer and exchange of experience.
Vertical	Focuses on the interplay of policy and specific cases (i.e. how policies shape the realization of NBS and/or how successfully realized NBS cases inform and alter existing policy frameworks). It relates to the "interdependent relations between" places where an innovation is taking place and the respective policy context (Kern 2018, p. 129). Forms of vertical upscaling: Polycentric networking (city networks, associations of cities and towns); emergence of direct links between the EU and cities (bypassing and scale-jumping). Functions: representation, lobbying and funding.
Hierarchical	Describes initiatives at European, national, and regional levels, which force the interested parties to consider or even reach standards set by governmental bodies. Requires strong governments with an enforcing authority (e.g. by harmonizing policies and setting binding standards). Forms of hierarchical upscaling: National associations of cities and towns. Functions: representation and lobbying at national level.
Embedded	New hybrid form of upscaling; combination of horizontal, vertical, and hierarchical modes of governance. Reflects the main elements of polycentric governance with multiple governing authorities at different scale. Forms of embedded upscaling: Polycentric networking; emergence of new forms of networking from regional to EU levels: meta-networks, territorial networks, and functional networks. Functions: links a variety of governing authorities at different scales, offers new options for experimentation and learning, not restricted to leaders, and polycentric networking becomes embedded in existing governance systems. Combination creates

	opportunities for leaders, followers, and laggards; closing the gap between leaders and laggards.

Source: Based on Kern 2019

Another strand of research explores the conceptual underpinning of upscaling mechanisms by referring to the idea of transition theory (Geels, 2002; Geels, 2005). More specifically, it aims at identifying the processes that help to upscale small innovations to changes in larger governance regimes in society. Smith et al. (2012; 2015), for instance, argue that in order to understand how the gap between innovations taking place in more or less well protected niches and an uptake of such innovations on the wider governance level can be minimized, three specific perspectives are of relevance: (1) strategic niche management, (2) niche policy advocacy, and (3) critical niche. Strategic niche management approaches include two relevant approaches: "fit and conform" and "stretch and transform". While "fit and conform" implies to grow stronger and become competitive so that a social innovation is strong enough to survive within an existing regime, "stretch and transform" implies to upscale trough regime transformation. The idea behind "stretch and transform" is to gain influence and ultimately be able to transform an established regime, specifically established state and market practices. This can be achieved, according to the authors, on the one hand through "niche policy advocacy", which relays on communicating or advocating what should be different. On the other hand, through "critical niche", which is mobilizing critical knowledge and provoking debate through shared discussions. Aalbers and Sehested (2018) apply these perspectives in order to understand to what extent a citizens' initiative in urban green space in the Netherlands is able to influence and transform the management and development of green space at urban level.

Naber et al. (2017) discuss four different patterns of upscaling in regards to sustainable energy innovations: growing, replication, accumulation, and transformation:

- Growing refers to a dynamic in which an experiment continues and more actors participate in the experiment or market demand increases – the experiment grows in size or activity.
- Replication takes place when the main concept of an experiment is used in other locations. When the experiment is explicated in other geographical locations or contexts, (local) knowledge of the initial experiments can be used in other locations.
- Accumulation means that an experiment gets linked to other experiments. In this process, intermediary organisations play a key role in facilitating interaction between experiments that exist simultaneously. When the lessons learned in experiments at different locations are compared and aggregated, the experiments can contribute to a more stable technological trajectory at the global niche level.
- The last pattern proposed by the authors is transformation. This pattern does not refer to geographical or physical scaling; it is rather concerned with how experiments start to shape the wider institutional context.

Moore et al. (2015) provide a conceptual approach to scaling activities. Their approach is based on almost two decades of practical experience of attempting to generate greater impact of the Montreal based J.W. McConnell Family. During the late 1990s, the Foundation began to apply a strategy they called Applied Dissemination, which meant to move beyond discrete project-based funding towards supporting social innovators in disseminating new programs, processes, skills or knowledge in their work with communities and organizations.

In this context, a community of practice was hosted, comprised by different grantees. The aim was to provide a platform that would help to allow mutual learning processes, to integrate concepts of systems change into their practice, and to accelerate the impacts of funded innovations. In this context, scaling become a key topic:

> "*Although some efforts did not succeed, almost 17 years later, many participants from the AD [Applied Dissemination] learning group have scaled their initiatives through a variety of means: by reorienting their mission to address root systemic issues; by spreading geographically; and by leading the development of new policies and cultural shifts*" (Moore et al., 2015, p. 72).

Based on this experience, the authors identify three broad types of scaling: Scaling out, scaling up and scaling deep. This typology takes into account Westley et al. (2014) distinction between scaling out and up.

Scaling out was the most widely spread approach to scaling activities and is concerned with replicating a successful social innovation in a different context, with the ambition of spreading same results and procedures to more people. However, such an approach also has its limitations as replication strategies usually do not address the root of the problem, particularly if these are grounded within the wider institutional setting. Therefore, for many initiatives, the route to greater impact lays in changing institutions and laws, or 'scaling up' to affect policies. Thus, scaling up refers to institutional changes—in cultural beliefs or rules and policies. As a third type of scaling is labelled "scaling deep", an approach based on earlier work by Van den Bosch and Rotmans (2008). This notion reflects the insight that durable change is only possible when "people's hearts and minds, their values and cultural practices, and the quality of relationships they have, are transformed" (Moore et al. 2015, p. 74). Figure 1 provides an overview of the three different types of scaling identified by Moore et al. (2015).

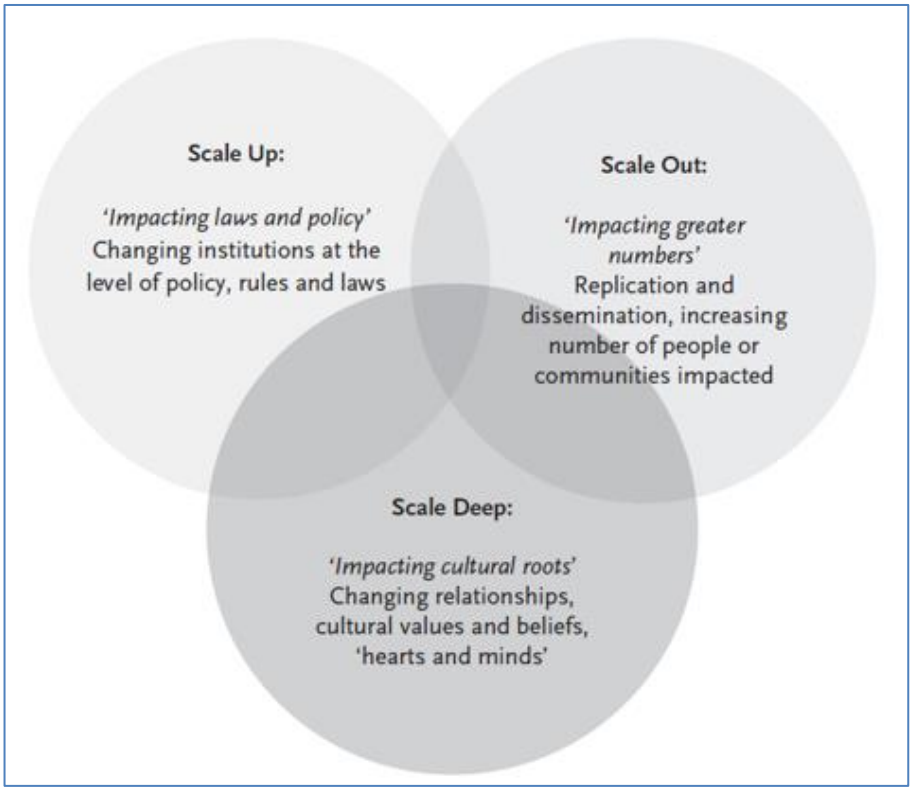

Figure 1 Different types of scaling
Source: Moore et al. 2015, p. 75

Lam et al. (2020) also provide a synoptic view on amplification processes that aim at scaling the impact of sustainability initiatives by developing a typology of amplification processes. The authors observe a great diversity of scaling and amplification processes in the literature and plea for a more consistent usage of key terms. Therefore, they propose a typology of amplification processes which is based on insights they derived from a systematic literature review. First, they argue that all of the frameworks they reviewed include processes that aim at reaching impact through preparing the ground for similar new initiatives (e.g. scaling out, replication, growing, etc.). Second, most of the frameworks share processes that aim to impact higher institutional levels (i.e., scaling up, transformation). Third, only few frameworks discuss processes that address the change of values and mind-sets (i.e., scaling deep). Fourth, only one framework addresses the speed of impact.

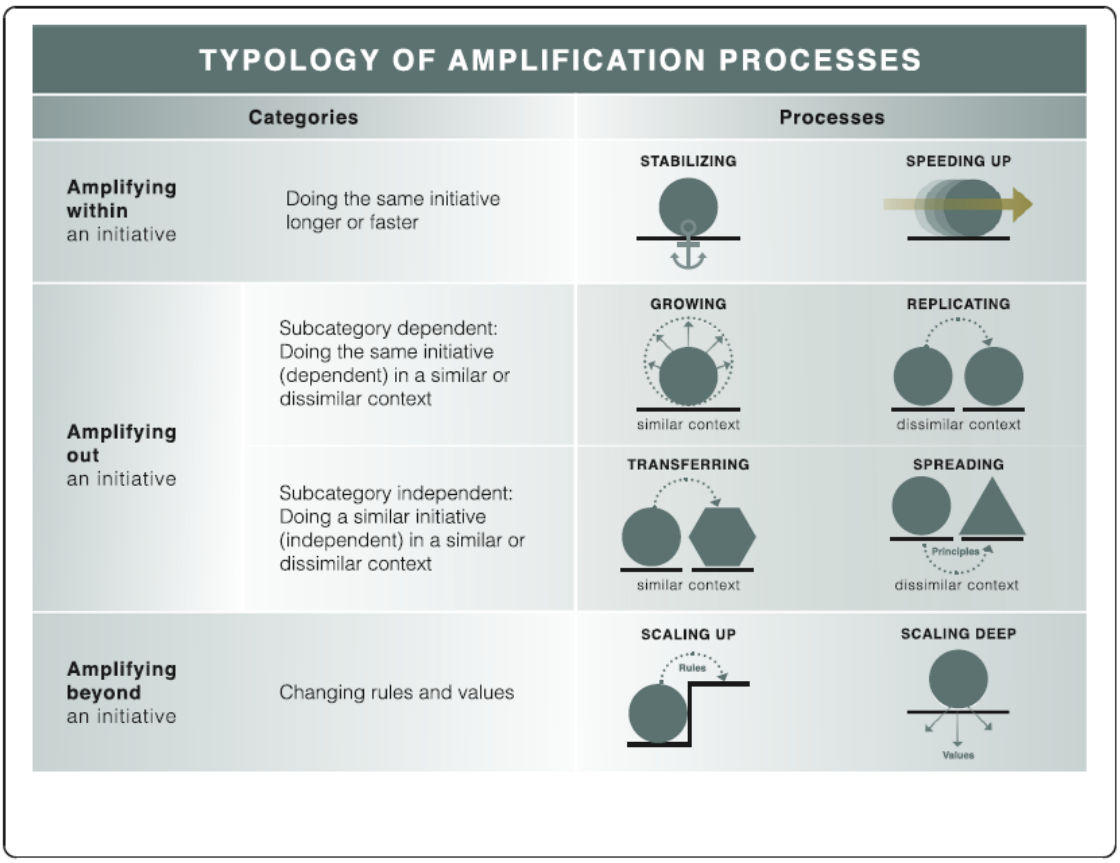

Figure 2 Typology of amplification processes
Source: Lam et al. 2020, p.11

Based on these insights, they identify three key amplification processes - amplifying within, amplifying out, and amplifying beyond – which are substantiated by eight different sub-processes (see Figure 2 and Table 4). According to Lam et al. (2020), sustainability initiatives in urban and rural contexts increase their impact through one or more of the identified amplification processes presented in the Table 4. As suggested by the authors, sustainability initiatives should apply a set of amplification processes to foster transformative change. In order to increase the impact, values and mind-sets referred to the 'scaling deep' should be changed and adapted to the local contexts.

Table 4 Amplification processes of sustainability initiatives

Amplification processes	Description
Amplifying within	"Amplifying within consists of processes which generally seek to increase the impact of one specific initiative by, for instance, stabilizing its existence (i.e., prolonging impact) or speeding up the way it impacts (i.e., accelerate impact)" (Lam et al. 2020, p. 16).
Amplifying out (dependent & independent)	Dependent: "Refers to processes that create initiatives, which are dependent on existing ones. This subcategory includes growing, when an existing initiative's impact range increases in a similar context, and replicating, when the existing initiative is replicated in a dissimilar context" (Lam et al. 2020, p. 16). Independent: "Refers to processes that create independent initiatives either by transferring an

	initiative to another place with a similar context, or by spreading the principles of an existing initiative to a similar initiative in another place with a dissimilar context" (Lam et al. 2020, p. 16).
Amplifying beyond	"Consists of processes that generally seek to increase their impact by scaling up to reach higher institutional levels or by scaling deep to change values. Processes of amplifying beyond are different from the other categories in that they suggest a reconsideration of how initiatives create impact" (Lam et al. 2020, p. 16).

Source: Lam et al. 2020

Augenstein et al. (2020) add another dimension to the discussion on upscaling. They argue that while upscaling processes are often regarded as an essential element of societal transformations towards sustainability, it often remains also a "fuzzy concept" (ibid, p. 143). They therefore identify some key dilemmas: a) The Babylon dilemma results from lack of understanding the very concepts and a lack of clear description of its key meanings; b) The Simplification dilemma reflects the need to use simple terms and identify practices which are replicable and scalable while at the same time acknowledging that bringing about social change or transformation is a complex process that eludes from direct control or prediction. The authors thus suggest that any scaling activity that aims to be effective, needs to also become reflexive about its theoretical assumptions, methods, but also about how to set up an effective dialogue at the interface of science, practice and policy-making.

3 RECONECT's upscaling framework

3.1 Key assumptions and outline of the framework

RECONECT's upscaling framework provides an analytical lens that helps to organise key ideas underpinning the project's efforts to upscale its lessons learned and by doing so contribute to the amplification of NBS across Europe and beyond. The framework is a rather conceptual representation of RECONECT's view on upscaling. It serves as a basis for both the upscaling survey conducted by the RECONECT project between April to June 2021 (see chapter 4 for results) as well as for the upscaling strategy presented in chapter 5.

The framework is based on the literature review highlighted above and our collaboration with the related NBS projects. It also takes into account the set-up of the RECONECT project (e.g. size, member of the consortium as well as structure of Work Packages) as well as its objectives and expected outputs.

In the following we outline some of the assumptions RECONECT's upscaling framework is based upon.

- It reflects the great diversity of partners involved in RECONECT as well as the diversity of audiences with a potential interest in the outputs of RECONECT. The framework therefore uses a rather simple terminology that grasps some of the key activities associated with different types of scaling. While a variety of different terms have been introduced to the discussion, we consider the terminology proposed by Moore et al. (2015) as particularly relevant in this context. It conveys some of the key messages without requiring a great depth of theoretical background knowledge on scaling processes.
- It understands upscaling as a complex task that builds, ideally, upon a variety of activities. The scaling strategy framework therefore aims at linking different activities that underpin the work of RECONECT. This includes both strengthening collaboration, exchange and mutual learning within the project, but also cooperation and learning between projects and among different stakeholders as well as standardisation and replication beyond the immediate context of the project. Reflecting this great diversity of potential upscaling activities and stakeholders involved, we suggest to take a rather broad perspective and understand upscaling as a cross-cutting activity that builds upon and links a variety of related activities and provides an overarching structure framework.
- It understands upscaling is an activity that requires adaptation and a reflexivity. The upscaling framework sketched out in this document therefore not just needs to be accessible to all project partners (and the wider community of practice), it also needs to be revised and updated as the project is evolving, and continuously assessed and evaluated.

Based on Moore et al. (2015), RECONECT upscaling framework includes diverse actions and types of scaling activities and is used here as an umbrella term that is made operational through five different types of scaling, sketched out in Figure 3.

At the heart of the project is the joint effort to provide robust evidences on the benefits and co-benefits of NBS and how they can be achieved through an inclusive social innovation approach. Both activities contribute to the establishment of a European reference framework.

In order to achieve a high impact, four different kinds of scaling are pursued. This includes activities aiming at:

- Changing the cultural roots of how hydro-meteorological risks are perceived and managed (**scaling deep**);
- Making a great number of stakeholders and people aware of the key outputs of RECONECT and building up capacities relevant for realising NBS (**scaling out**);
- Changing existing laws and regulations so they more effectively enforce the uptake of NBS (**scaling up**);
- Analysing drivers and barriers to the uptake and implementation of NBS (**scaling down**).
- Being aware of the respective context and capacities of those actors initiating and supporting upscaling activities as well as the context and capacities of stakeholders, communities and organisations which are the target of upscaling activities.

As an implication, upscaling not only becomes an explicit objective of RECONECT, it is also an activity that cuts across almost all activities pursued in the project (cross-cutting scaling).

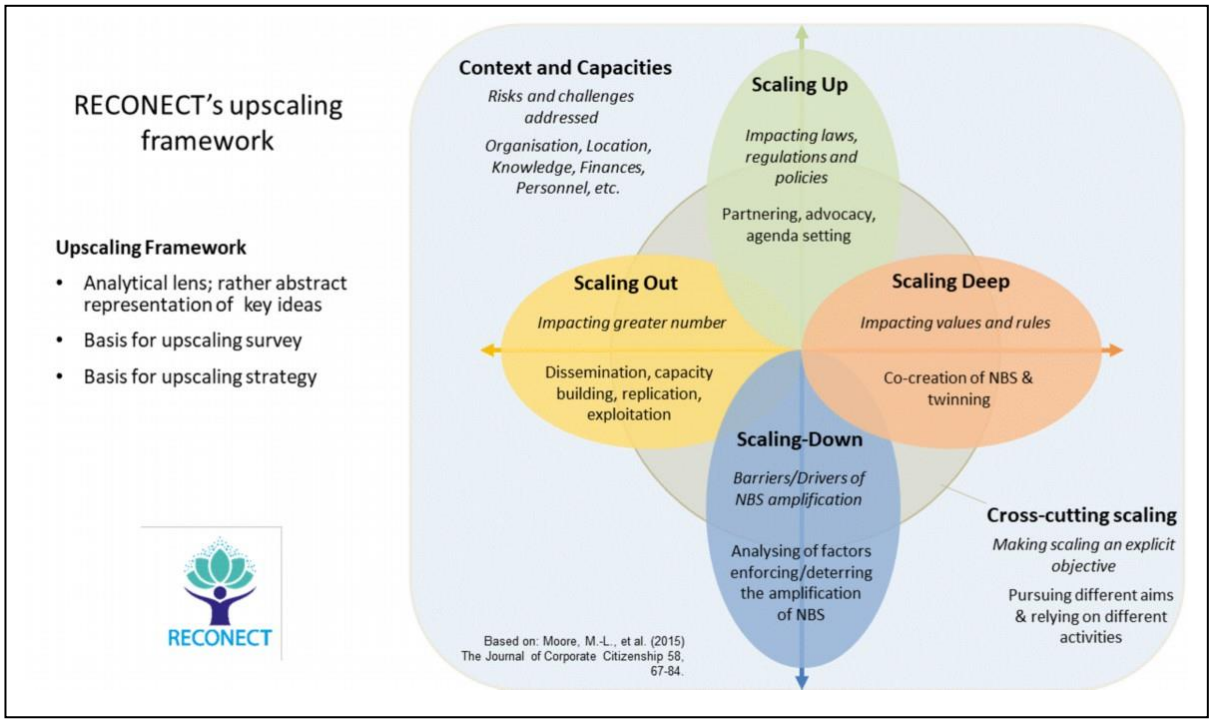

Figure 3 Different types of upscaling underpinning RECONECT's framework
Source: Adapted from Moore et al. 2015, p. 75

In Table 5 we provide a short definition and link the different types of scaling activities underpinning the framework to the work of other authors.

Table 5 RECONECT's scaling framework and how it relates to similar concepts

Type	Aims	Relation to similar concepts
Scaling out	Aims at impacting a great number of people and stakeholder, make them aware of the outcomes of RECONECT and supports capacities-building to realise NBS in the future. Activities include the dissemination of results to other stakeholder, the developing of training and capacity building modules, assessing the replication potential and an exploitation of RECONECT outputs, also economically.	- Similar to the idea of expansion and diffusion as outlined by Kern (2019). - Similar to the idea of replication and accumulation as outlined by Naber et al. (2017). - Similar to the idea of growing, replicating, transferring and spreading as outlined by Lam et al. (2020).
Scaling deep	Aims at impacting and changing rules and values and is about a deeper transformative process addressing social interactions and forms of participation and recognizes that culture plays a powerful role in shifting problem domains. It includes co-creation as well as twinning activities.	- Similar to the idea of horizontal upscaling as outlined by Kern (2019). - Similar to the idea of scaling deep as outlined by Lam et al. (2020).
Scaling up	Aims at impacting laws and policies in such a way that they help to amplify the uptake of NBS. This form of scaling is based on the recognition that the roots of social problems transcend particular places, and innovative approaches must be codified in law, policy and institutions. Activities include partnering, agenda setting and advocacy.	- Similar to the idea of transformation and/or vertical upscaling as outlined by Kern (2019). - Similar to the idea of transformation as outlined by Naber et al. (2017). - Similar to the idea of scaling up as outlined by Lam et al. (2020). - Similar to the idea of stretch and transform as outlined by Smith et al. (2015).
Scaling down	It is an additional element of scaling we propose. It takes predominantly an analytical perspective concerned with the setting and enforcement of specific standards with regard to NBS; such standards are set, for instance, by the EU, by its member states or by other international or national entities (Kern 2019, p. 134). It also includes the analysis of other drivers and barriers to the realisation of NBS.	- Similar to the idea of hierarchical upscaling as outlined by Kern (2019).
Cross-cutting scaling	In reality, scaling activities are often based on a mix of the previously outlined elements. This is also the case in RECONECT.	Own elaboration.

Source: Based on Moore et al. 2015

In the following, we outline the activities underpinning RECONECT's upscaling framework in more detail.

3.2 Scaling out: Dissemination, replication and capacity building

Scaling out is probably the most common strategy pursued in many sustainability oriented initiatives and projects. It aims at impacting a great number of people and stakeholders and make them aware of an ongoing project, disseminate results to other stakeholders, replicate a well-tested practice in another location with a similar context, exploit project results, also economically, and build up capacities among practitioners and policy-makers to support the amplification of NBS in the future. This includes, among others, disseminating project results aiming at increasing awareness and understanding of how large-scale NBS can improve resilience of people to hydro-meteorological risks and at the same time enhance biodiversity and ecosystem services. Dissemination is how RECONECT addresses pre-defined audience to ensure that the project's results are made available and accessible. A set of specific audiences are already defined, which will be addressed by RECONECT. This includes, for instance, municipalities, practitioners (such as water managers, water utilities, landscape architects, ecologists, design engineers, etc.), policy and decision makers (such as regulators, national and local government officials, etc.), public and private stakeholders (such as citizens, business community, etc.), financiers (commercial banks, development banks, etc.), industry and the scientific community.

Exploitation: Exploitation is about ensuring that the innovations developed have a long-lasting impact. This can be based on a strategy of commercialisation, but can also be based on a strategy ensuring a non-commercial exploitation. In RECONECT, exploitation is about ensuring that the results produced within the project are used during and after the projects' implementation for commercial, societal, political, improving public knowledge and action, and recommendations for policy-making, to improve policies, and/or for tackling economic and societal problems. This process is divided into the commercial and non-commercial exploitation.

3.3 Scaling deep: Co-creating NBS

Scaling deep describes a strategy that aims at impacting and changing rules and values (Moore et al. 2015). It is thus about a deeper transformative process addressing social interactions and forms of participation and recognizes that culture plays a powerful role in shifting problem domains, and change must be deeply rooted in people, relationships, communities and cultures.

In RECONECT, scaling deep is implemented through co-creation processes taking place in the sites of all Demonstrators and Collaborators as well as twinning activities supporting exchange of knowledge and experience and mutual learning among the project members.

Co-Creation: Co-creation is at the heart of RECONECT. Through co-creation, RECONECT's social innovation strategy is implemented at the sites of Demonstrators and Collaborators. The RECONECT co-creation process involves researchers and stakeholders in an iterative process that includes stages of co-assessment and planning; co-design; co-implementation, operations and maintenance; and co-monitoring and evaluation. While the relevance is evident for using NBS to address the climate change issues and other current

societal challenges, there is an emerging need to embed participatory – a more citizen-oriented engagement – approach within its implementation. Participatory approach to co-creating NBS is becoming increasingly popular and indicates a shift towards empowering the community rather than just informing, consulting or documenting. Using participatory approach in the whole NBS process means that local knowledge is not "extracted" by outsiders, but instead shared by its community, which is involved in problem-solving processes from the start.

Twinning and its value for facilitating the scaling deep through co-creation process. In RECONECT, twinning is an important means of designing, implementing and evaluation of the co-creation activities. Generally, the idea of twinning looks back at a relatively long history and is particularly prominent among cities and towns. It is based on the idea that cities with similar characteristics (e.g. demographic situation, economic prosperity) and that face similar challenges (e.g. shrinkage due to demographic change) pair so that they share experiences and develop solutions jointly. Generally, Twinning activities aim at initiating a substantive exchange of experience, information, expertise, and good practice across cases. In RECONECT, a broad perspective is pursued. Restricting twinning to single partners would result in exchange processes that might be too limited and too specific considering the thematic width of the project. Therefore, in RECONECT twinning is not just about establishing a partnership between two partners; it is also about partnering a larger group of partners. This can include the substantive exchange among a small group of partners, but it can also include a rather loose exchange among a larger number of project partners. The ambition of twinning activities is to produce knowledge and expertise and to enhance the relevant capacities of people and stakeholders. Outcomes of twinning can take many different forms, including mutual visits and exchange among stakeholders involved, joint workshops dedicated to specific topics, webinar series dedicated to a series of topics, and capacity building and training activities, but also short written reports on specific topics.

In RECONECT we organized forms of **Collective twinning** centring on topics of high relevance for a larger group of partners as well as **Bilateral twining** that is organized around Demonstrators and Collaborators that share similar characteristics and demands and that face similar challenges. Again, the different twinning activities can result in different means for how to make them operational. While activities centring on Demonstrators might rely on mutual field visits and two-day workshops, Collective twinning activities can be based on webinars, workshops, and training activities.

Based on preliminary insights, three types of Twinning cells are expected to be established in RECONECT with regard to scaling deep and co-creation:

- *Twinning cells centring on the needs of Demonstrators*. Such twinning cells match Demonstrators that share similar demands with respect to the realization of NBS with project partners that can provide expertise (e.g. on how to initiate co-creation for co-design NBS or how to best co-monitor and co-evaluate the benefits of NBS).
- *Twinning cells centring on the needs of Collaborators*. Such cells match Collaborators that share similar demands with respect to the realization of NBS with Demonstrators that can provide expertise (e.g. how to overcome barriers with regard to the initiating and realizing/facilitating the co-creation process of NBS).
- *Twinning cells centring on topics of high relevance for larger groups of networks*. Such twinning cells are based on thematic demands that are of high relevance to a larger number of project partners and where there is a general need for exchange

(e.g. how to co-monitor and co-evaluate the benefits of NBS, especially in the absence of data, how to promote NBS and raise public awareness about its impact based on the participatory approach?).

3.4 Scaling up: Partnering and advocacy

As social innovations are often not just about findings context-specific solutions to an existing problem: often such innovations also aim at addressing and overcoming some of the deeper root causes of a problem. Therefore, scaling activities need to address specific institutional patterns in order to be effective in the long-run.

Scaling up is a strategy that implies that some higher "scale" or "level" is involved to increase impact. In this sense, upscaling implies some kind of scale-related progression and "involves a mechanism where information from one scale is transferred to another, thereby reaching a higher level of scale and a greater impact" (van Doren et al. 2018, p. 177). The aim of upscaling processes is therefore to have an impact on laws and policies in such a way that they help to amplify the uptake of NBS. This form of upscaling is based on the recognition that the roots of social problems transcend particular places, and innovative approaches must be codified in law, policy and institutions (Moore et al. 2015). Scaling up aims at initiating "structural learning and changing the institutional roots" (van Doren 2018, p. 178) and refers to the process where social innovations made in a particular context "inform institutions at higher administrative and organizational levels with wider reaching impact" (ibid).

Partnering and Advocacy. In RECONECT, upscaling is done through strategic partnering and advocacy for the topic of NBS. Generally, the European Commission has set up various policies that support the uptake of NBS and is by far the most relevant policy level supporting the realization of NBS (See D1.3). Therefore, RECONECT has established connection to various EU activities. These activities need to be seen in the context of the wider EU Research and Innovation policy agenda on Nature-Based Solutions and Re-Naturing Cities, which aims to position the EU as leader in 'Innovating with nature' for more sustainable and resilient societies. This policy ambition brings together and capitalizes on major strands of knowledge and results from past EU Framework Programmes on biodiversity and ecosystems, sustainable urban development, natural resources management, climate change mitigation and adaptation, and disaster risk reduction.

3.5 Scaling Down: Analysis of barriers and drivers

Scaling down is an additional element of scaling we propose. It takes predominantly an analytical perspective and is concerned with barriers and enablers that hinder/block or enforce the uptake of NBS as well as with the replication potential.

Barriers/drivers: In more recent years, researchers have paid attention to the barriers and drivers behind the mainstreaming and successful implementation of NBS (e.g. O'Donnell et al. 2017; Sarabi et al. 2019; Wells et al. 2019). In previous research, barriers and drivers were identified by reviewing secondary literature (e.g. Sarabi et al. 2019), conducting surveys in the context of project implementation (e.g. Kabisch et al. 2016; Piacentini and Rossetto 2020), or interviewing practitioners (e.g. Matthews et al. 2015). It is important to be aware of such barriers as they will have a

large impact on the amplification of NBS across Europe and beyond (see also: Wellstead et al. 2016).

RECONECT's analytical perspective on barriers was developed inductively and was inspired by a thorough analysis of the Room for the River Programme, the Dutch Demonstrator site included in RECONECT, as well as a literature study. By means of an extensive interviews key personal involved in the realisation of the Room for the River Programme, a set of relevant barriers were identified. The interviews were conducted in the context of a Master Thesis (Hernandez, 2021). The outcome of the analysis serve as a basic heuristic that allows the project to develop a shared and comprehensive view on barriers, including environmental, technical, social/cultural, institutional and economic/financial aspects (Fig. 4).

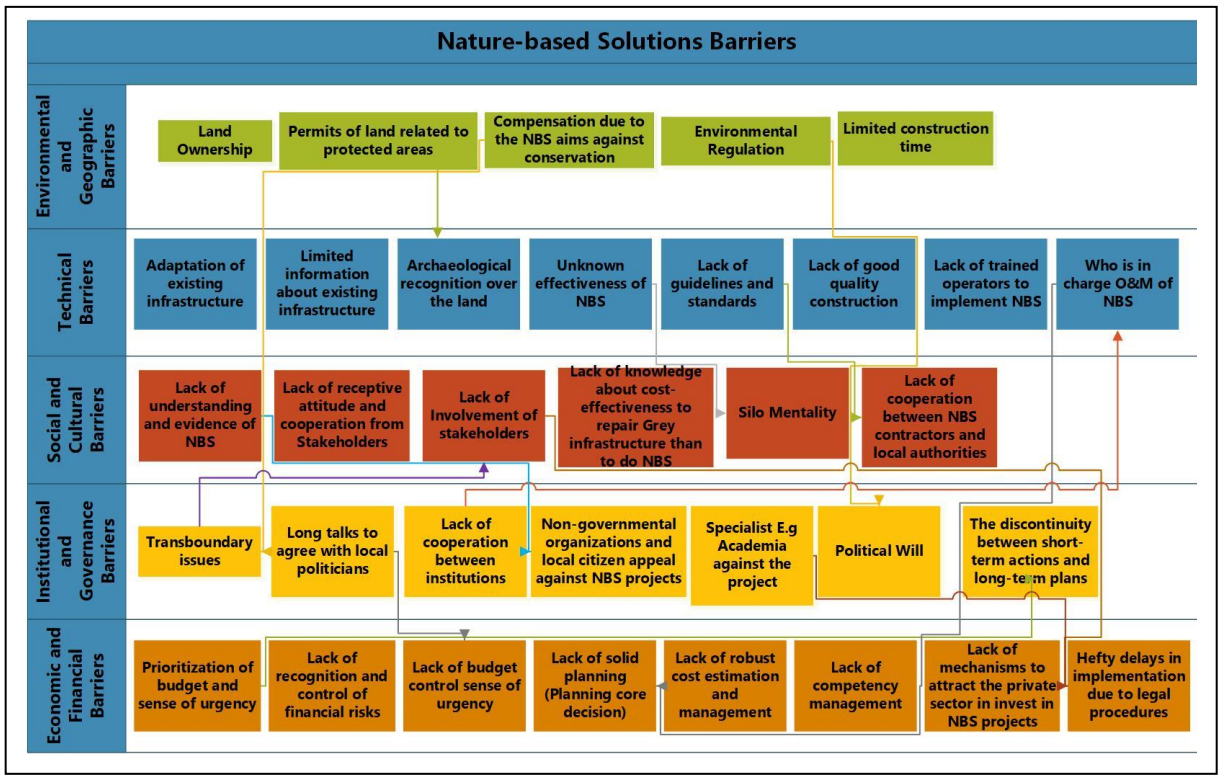

Figure 4 Catalogue of Barriers for realising NBS
Source: Hernandez, 2021.

Replication: Another key step of activities of scaling down, is assessing the replication potential of a social innovation. Reflecting the complexity of social innovations, this task should not be restricted to assessing, for instance, specific physical or technical aspects of an innovation; it rather needs to also consider the wider institutional and cultural parameters that drive or hinder a social innovation. It is thus an analysis of the wider contextual setting that needs to be performed to assess the replication potential of a social innovation and is thus closely connected with the analysis of barriers and drivers.

4 Results of RECONECT's upscaling survey

4.1 General set up and aims of RECONECT's upscaling survey

While the concept of upscaling has become more prominent in recent years, there is still a considerable lack of empirical insights on how such strategies are set-up, how effective they are or to what kind of needs upscaling activities respond. The scientific discussion is currently dominated by conceptual papers or single case studies contributions. In this chapter, we therefore aim at advancing the discussion on upscaling by providing an overview on the results of a RECONECT standardized survey on innovative strategies for co-creation, upscaling and amplification of NBS that we conducted between April and June 2021 among more than 220 stakeholders from across Europe and beyond. The survey itself is based on the conceptual framework we presented in chapter 3 and addresses two different groups of actors (Fig. 5):

- Actors with an interest in realising NBS but no first-hand experience and expertise. In the survey we predominantly focus on their current capacities, needs and perceptions of potential barriers for realising NBS;
- Actors with experience in realising NBS. In the survey, we mostly examined their capacities, the upscaling activities their developed and/or participated in as well as on their perception of barriers to NBS implementation and uptake.

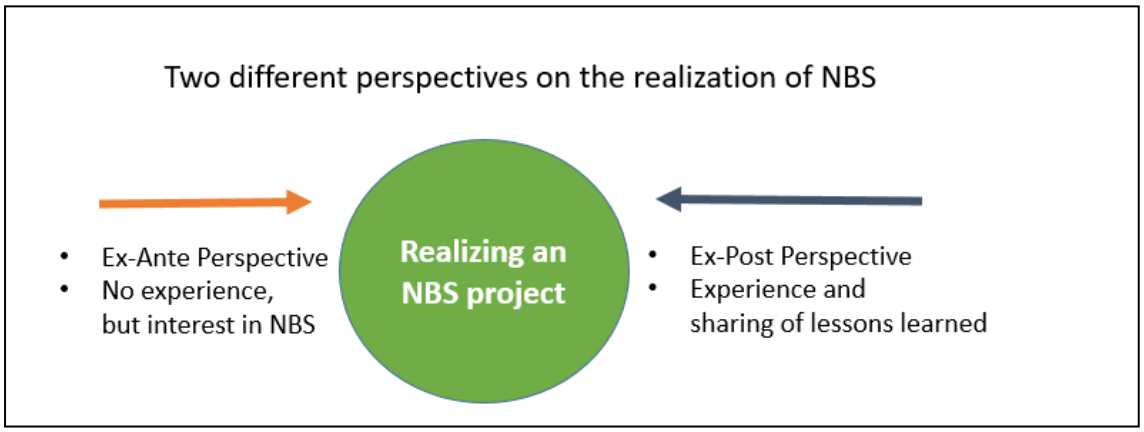

Figure 5 Two different perspectives underlying the upscaling survey

Source: own visualization

Generally, we assumed that having experience/no experience influences the attitudes, capacities and perception of respondents. Furthermore, we concluded that the group with an interest but no experience will perceive barriers as more severe than the group with experience in realising NBS. We also hypothesized that the inexperienced groups would assess own capacities as lower compared to the group with experience in NBS projects. As an implication, the group with NBS experience perceives the barriers as less severe, and their own capacities as higher. We also assumed that important lessons can be learned from this group for RECONECT's upscaling activities.

Through a comparison of these two groups we are able to draw the first conclusions not just on how both groups are different with respect to their capacities and/or how they perceive the relevance of different barriers; we are also able to fine-tune RECONECT's upscaling strategy to the needs of those stakeholders with an interest in realising NBS in the future.

4.2 Methodology

The work on the survey included three-stage procedure:

1) Preparing the survey: a) analysis of different surveys related to NBS issues; b) literature review presenting the results of such surveys; c) development of two survey templates – one for experts involved in the realization of NBS and another one for those who have not yet been involved in the realisation of NBS but have an interest in NBS and plan or start to design it; d) participatory co-design of the survey, including internal (by the project partners) and external (by the international NBS experts) review of the survey and thereon-based revision process and pre-testing; e) announcement of the survey via different NBS related platforms, projects as well as via social and professional networks;

2) Conducting the on-line survey (using SoSci survey tool): thematic constructs are presented in the Tables 6-7;

3) Survey analysis using SPSS statistical software packages.

The standardized survey was developed based on the conceptual framework and thus deduced from the key concepts underpinning the framework. Based on the concept we developed a set of variables which were then translated into specific questions. Participatory co-design of the survey, including internal (by the project partners) and external (by the international NBS experts) review of the survey and thereon-based revision process and pre-testing along with the fruitful discussion regarding the survey's issues have greatly contributed to improve the quality of the survey content and were carefully considered in the final version of the survey. We are thankful to the project team and international NBS experts for this.

Reflecting the two groups we were interested in (one group with interest, but no experience, another ones - with NBS experience), we developed two different surveys, which are, however, still comparable as the variables underlying both survey are similar or even the same.

Tables 6 and 7 provide an overview on how the concepts were made operational in the two different surveys.

Table 6 Survey with a focus on actors with experience in realising NBS

Constructs	Variables included in the survey
Context	• Engagement in the realisation of NBS (Yes/No) • Organisational background (e.g. public authority, civil society, private sector) • Involvement in particular activities (i.e. practical, policy, research, others)
Terminology and information about the NBS project	• Use of terminology (e.g. NBS, EBS, etc.) • Change of terminology • Location of NBS project • Focus on Hydro-meteorological risk (Yes/No and type of hazard) • Societal challenges addressed (e.g. climate resilience, disaster risk reduction) • Role of actors involved (e.g. initiator, partner)
Existing capacities	• Knowledge capacities (personally, organisation, authorities; 7 point-scale) • Financial support of NBS project (e.g. organisation, authorities, politicians, generally; 7 point-scale) • Additional support needed (open question)
Innovative elements of the NBS projects	• Topics organised along NBS realisation phases (e.g. assessment, planning, design etc.).
Scaling down	• General support of NBS project (e.g. generally, personally, organisation, policies, authorities, politicians; 7 point-scale) • List of 18 potential factors hampering the realisation of NBS for selection and ranking (e.g. land-ownership, lack of political support, lack of education about NBS)

Source: own representation

Table 7 Survey with a focus on actors with no prior NBS experience

Construct	Variables included in the survey
Context	• Engagement in the realisation of NBS (Yes/No) • Organisational background (e.g. public authority, civil society, private sector) • Location
Terminology and information about the NBS project	• Use of terminology (e.g. NBS, EBS, etc.) • Change of terminology • Realisation stage of the NBS project (7-point scale; not developed at all/fully developed and ready for implementation) • Potential location of the NBS project • Potential focus on hydro-meteorological risk (Yes/No and type of hazard) • Potential societal challenges to be addressed (e.g. climate resilience, disaster risk reduction, etc.) • Potential role of actors involved (i.e. initiator, partner)
Existing capacities	• Expertise about NBS (personally, organisation, authorities; 7 point-scale) • Financial support of NBS project (e.g. organisation, authorities, politicians, generally; 7 point-scale) • Knowledge capacities (e.g. organisation, authorities, politicians, generally; 7 point-scale)
Scaling down (barriers and support)	• General support of NBS project (e.g. generally, personally, organisation, policies, authorities, politicians; 7 point-scale) • List of 18 potential factors hampering the realisation of NBS for selection and ranking (e.g. land-ownership, lack of political support, lack of education about NBS)
Topics to learn more about	• Topics organised along NBS realisation phases (e.g. assessment, planning, design etc.).
Preferred ways of learning more about NBS	• Level of informing about NBS in the past and degree of doing this systematically (Yes/No; 7-point scale; not at all systematically/very systematically)

(based on scaling out, up, deep)	• Relevance of 15 activities of learning more about NBS (based on different types of scaling; e.g. website, workshops, field trips, networks etc.) • Additional ideas (open questions)

Source: own representation

The survey was prepared and distributed via the online survey platform SoSciSurvey – https://www.soscisurvey.de/. The survey was advertised and distributed through different channels, including contacts enclosed in different NBS platforms, personal contacts, personal and professional contacts from project partners (including all Demonstrators and Collaborators) as well as professional mailing lists. Figure 6 provides an overview on the flyer through which the survey was advertised.

Figure 6 Advertisement for the upscaling survey

Privacy and Data Policy

"In order to guarantee confidentiality and anonymity, all responses to this survey questionnaire will be assigned a code number. We hereby confirm, that data collected will not be shared with any other organisation beyond the RECONECT consortium. The research findings will be presented in an aggregated format without any personal data.

Your participation in this survey is entirely voluntary. In case of any questions or concerns about this survey, please contact RECONECT project researchers [contact details of Christian Kuhlicke and Diana Dushkova]

Privacy and Data Policy Consent

By filling out this survey, I confirm that I understand what is involved in this research and I agree to participate in the study"

Before entering the survey, respondents were asked to agree with the privacy and data policies. Respondents needed to actively confirm that they understood that they are involved in a research project and that they agree to participate in this study (Figure 7).

Figure 7 Privacy and Data Policy Statement of the survey

The survey focusing on actors with experience in realising NBS project included in total 22 questions; the survey focusing on actors with an interest but no experience comprised of 25 questions.

The survey was open from 27 April to 15 June 2021. Figure 8 provides an overview on the number of responses during the entire duration of the campaign.

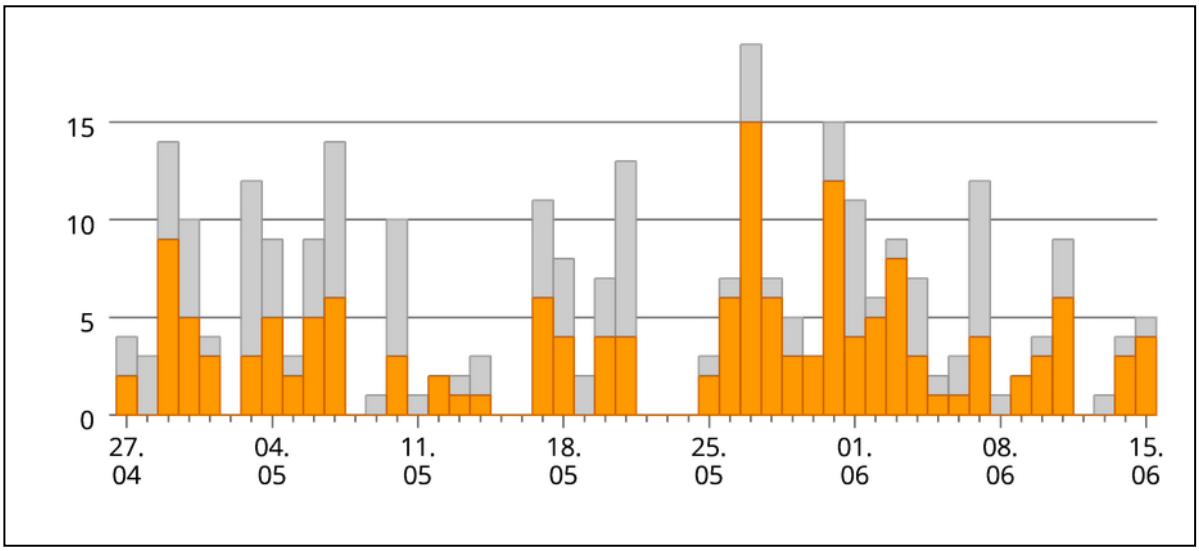

Figure 8 Number of respondents during the surveying campaign*

*orange: fully completed surveys; grey: partially completed surveys

In total 223 people responded to the first question asking whether they have been involved in the realisation of an NBS project or not. The response rate dropped with the progression

of the survey. The final question was filled out by 159 respondents. However, the data set is still of good quality and provides a robust overview on key topics addressed by the survey.

4.3 Results of the upscaling survey

Based upon the answer to the first question about the experience with NBS projects, respondents were directed to their respective survey (with experience/without experience).

Context of the respondents

As Figure 9 shows, the majority of respondents (74%) have been involved in the realisation of an NBS project in the past.

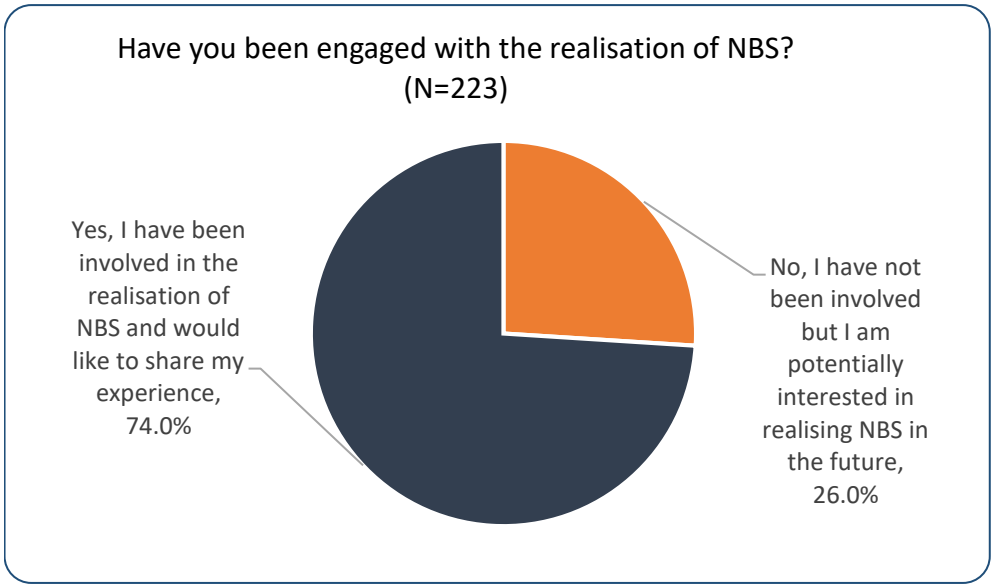

Figure 9 Number of respondents with experience/with no experience in realising NBS

Respondents' work places are distributed across different countries in Europe and beyond indicating a sound coverage of the situation in Europe, which was the emphasis of this survey. This includes also a very sound representation of countries from Eastern and South-Eastern Europe. The Nordic countries are, however, under-represented.

Most respondents stem from Italy, followed by Switzerland, Denmark, Germany, Russia, Spain, Poland, Croatia, Bulgaria, UK, France, Scotland and the Netherlands (Figure 10). Most of the countries at the top 13 of the sample are also countries with Demonstrators or Collaborators case studies (i.e. Italy, Switzerland, Denmark, Germany, Spain, Poland, Croatia, Bulgaria, France and Netherlands) indicating that the survey could allow a more specific analysis on the country level. However, at the current stage the numbers of responses for individual countries are too low to conduct statistically meaningful analyses.

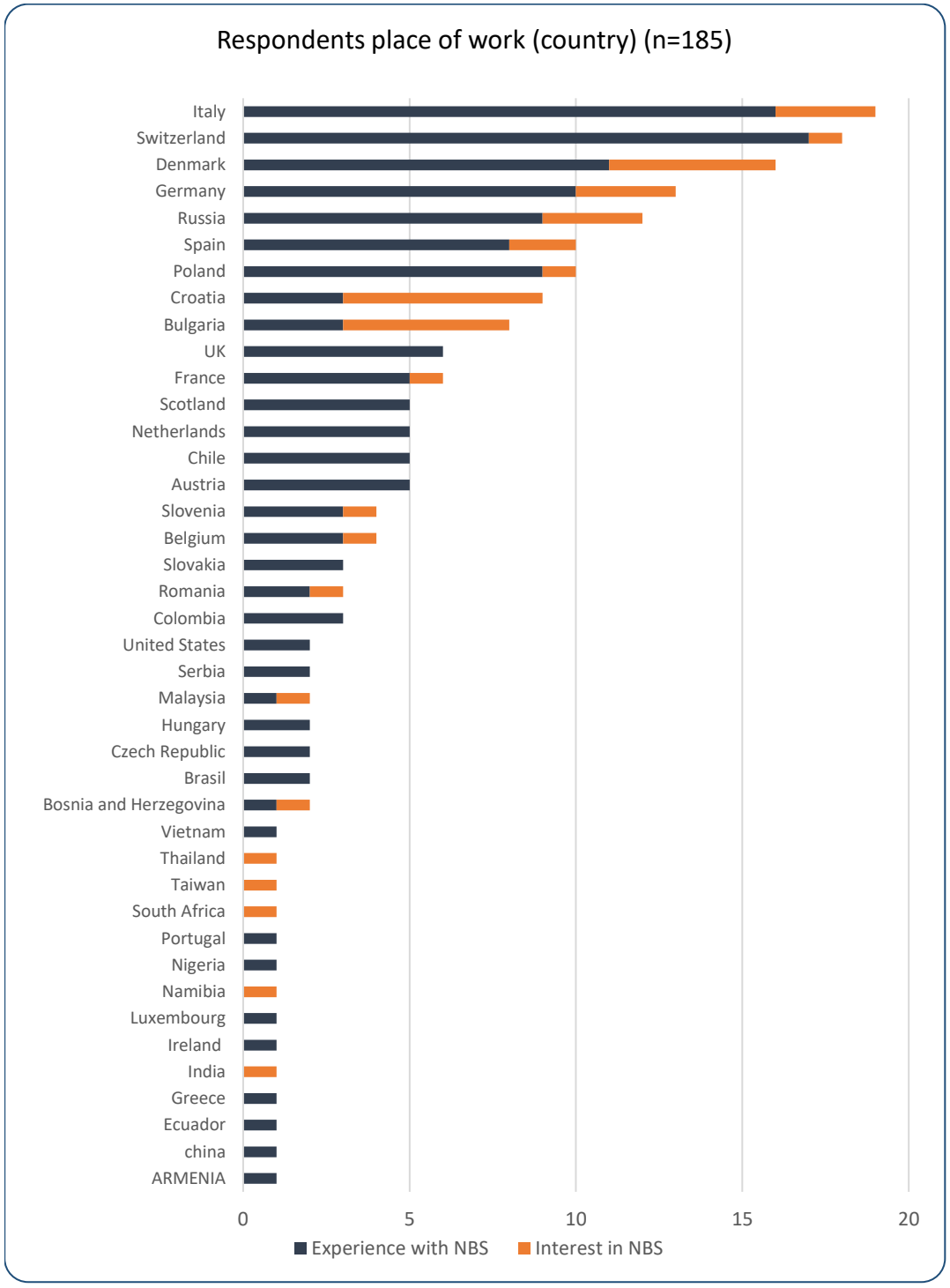

Figure 10 Work place of respondents (by country)

Although the largest group of the respondents is affiliated to an academic environment (university/institution), the majority of respondents is working in a non-academic organisational context. That means either in a public authority, the private sector, a civil society organisation or a sectoral organisation (e.g. Water Company). Again, the sample includes the most relevant groups of actors, including a majority of respondents being involved in the practical aspects of realising NBS, as Figure 11 shows.

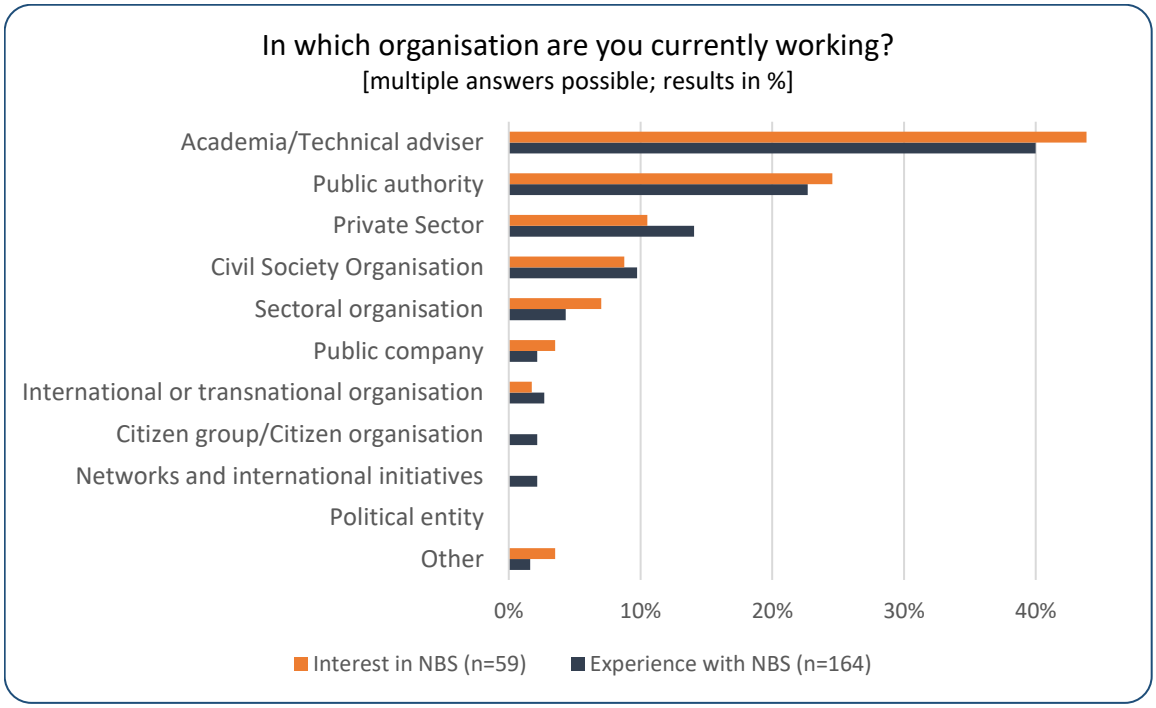

Figure 11 Organisational background of respondents

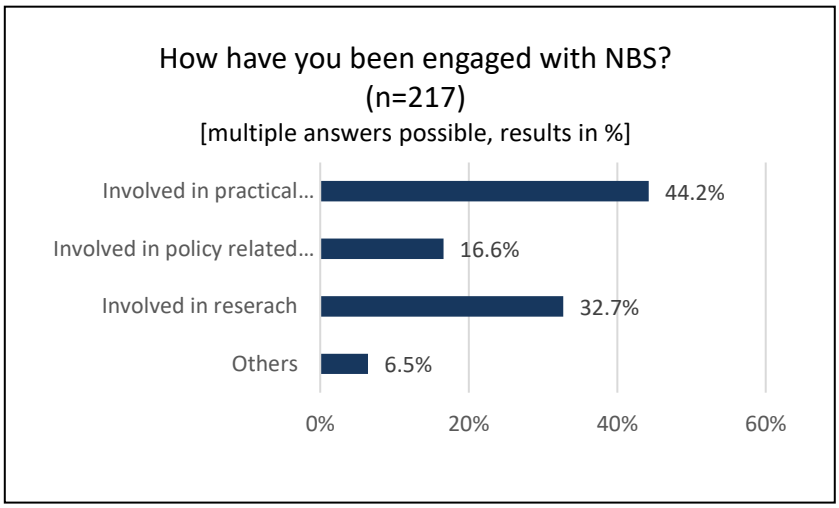

Figure 12 Different forms of how respondents engaged with NBS

Figure 12 shows that among the respondents with experience in realising NBS, the majority (44,2%) was involved in the practical aspects of realising NBS, followed by research (32,7%) and policy-making (16,6%).

Terminology and information about the NBS project

Among the respondents, NBS is the term used most often, interestingly between both groups (experience/interest). However, more established concepts such as green-blue infrastructure, river restoration, ecological restoration and ecosystem-based adaptation/solutions are also often referred to. Yet, as indicated by the high number of multiple answers, the majority of the respondents seemed to use multiple terms in their work, thus indicating a certain degree of terminological openness and flexibility (Figure 13).

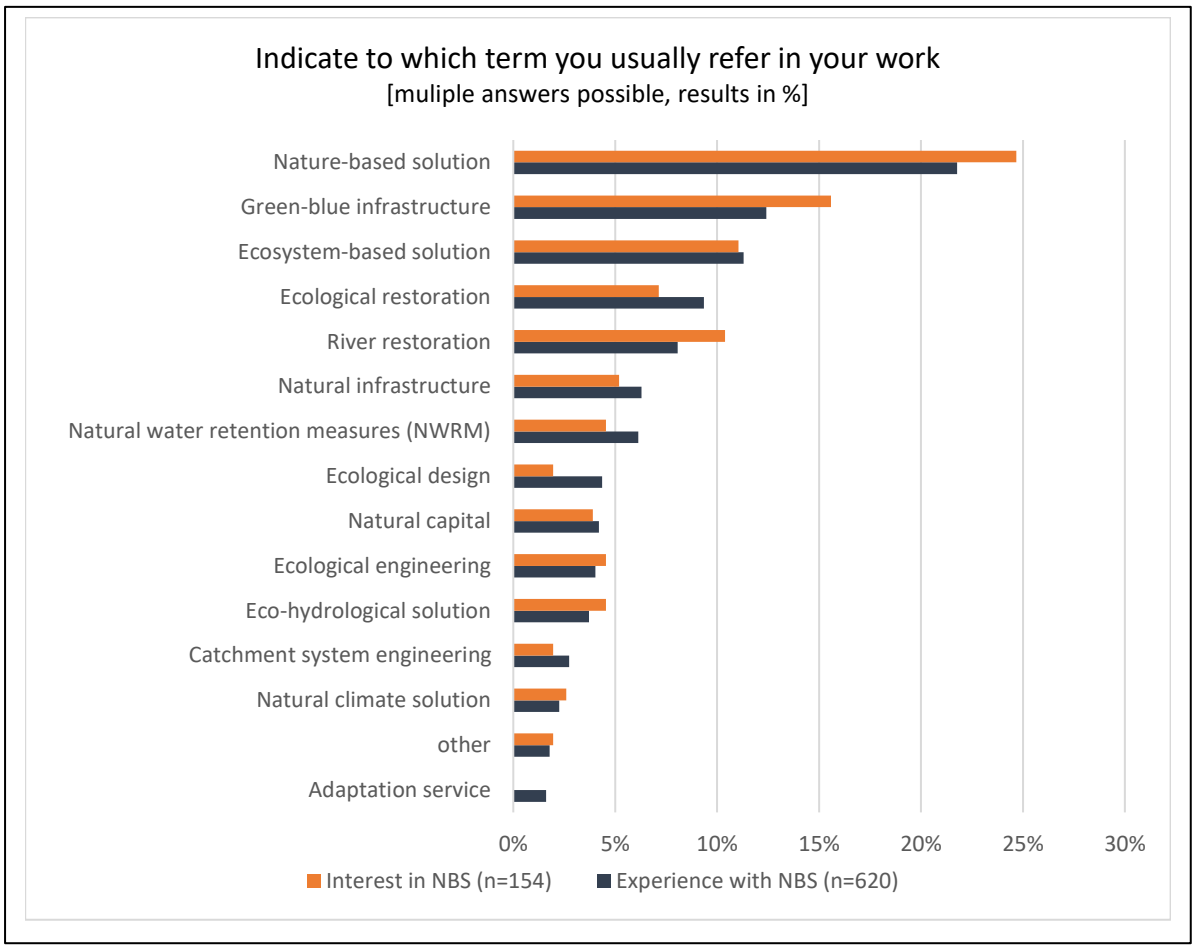

Figure 13 Terminology used in working context

The majority of actual or potential NBS projects are addressing/will address hydro-meteorological risk, underlying again that the survey results are of high relevance to RECONECT, which is also addressing hydro-meteorological risks and the issues of how to reduce them (Figure 14).

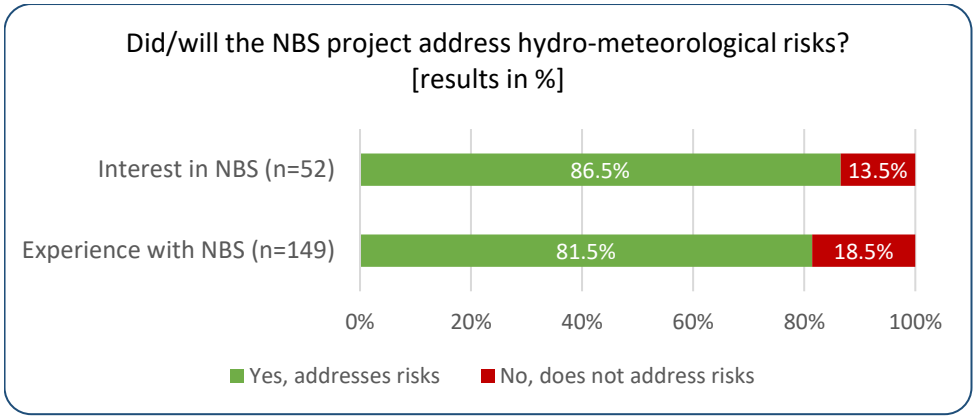

Figure 14 Did/will NBS address hydro-meteorological hazards?

Most of the NBS projects realised and/or to be realised aim at reducing the risk from flooding (pluvial, riverine, flash floods), followed by heats, droughts and fires, landslides and sea-level rise (Figure 15).

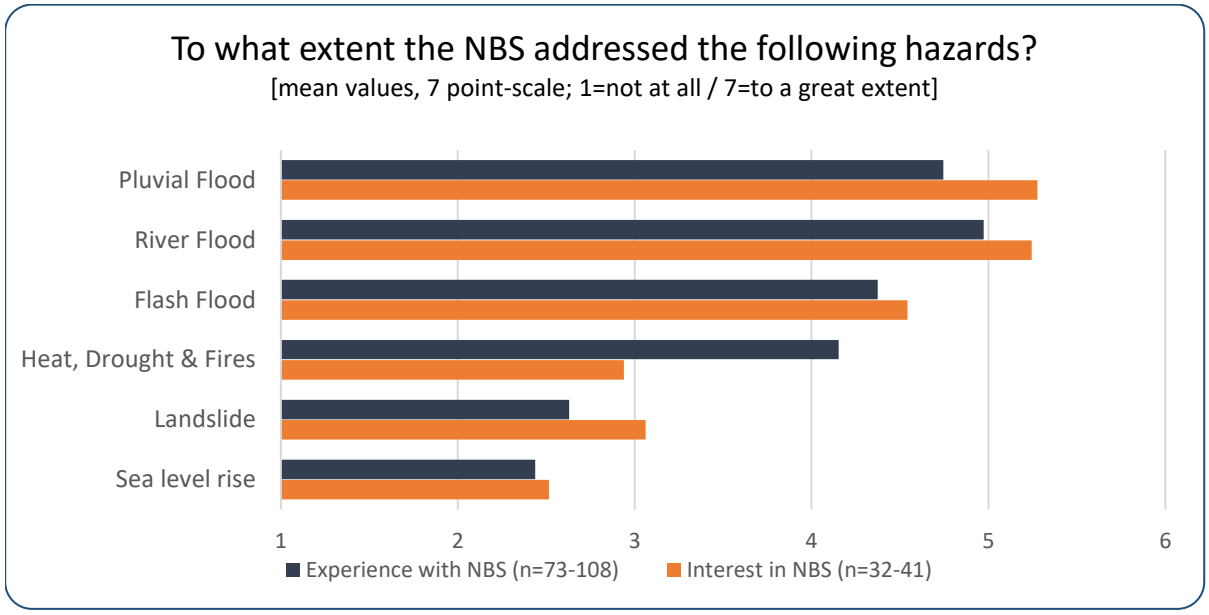

Figure 15 Extent to which different natural hazards are addressed by NBS

Comparing the hazards that the NBS projects aimed to reduce, with the societal challenges the NBS project addressed/will address (Figure 16), a couple of observations are noteworthy.

- First, although sea-level rise is assessed as the least relevant hazard addressed by the NBS projects, it is considered as the most relevant societal challenge (i.e. coastal resilience). To explain this difference is rather challenging. However, one reason might be that coastal resilience is considered as a more comprehensive concept that includes more than the sea level rise;
- Second, although the majority of the projects have a focus on hydro-meteorological risks, disaster risk reduction and climate resilience are not among the most relevant societal challenges addressed. The most relevant societal challenges are above all economic and societal topics (i.e. green opportunities for economic growth, economic development, social justice and cohesion). This finding underlines the high relevance of co-benefits from the point of view of respondents.

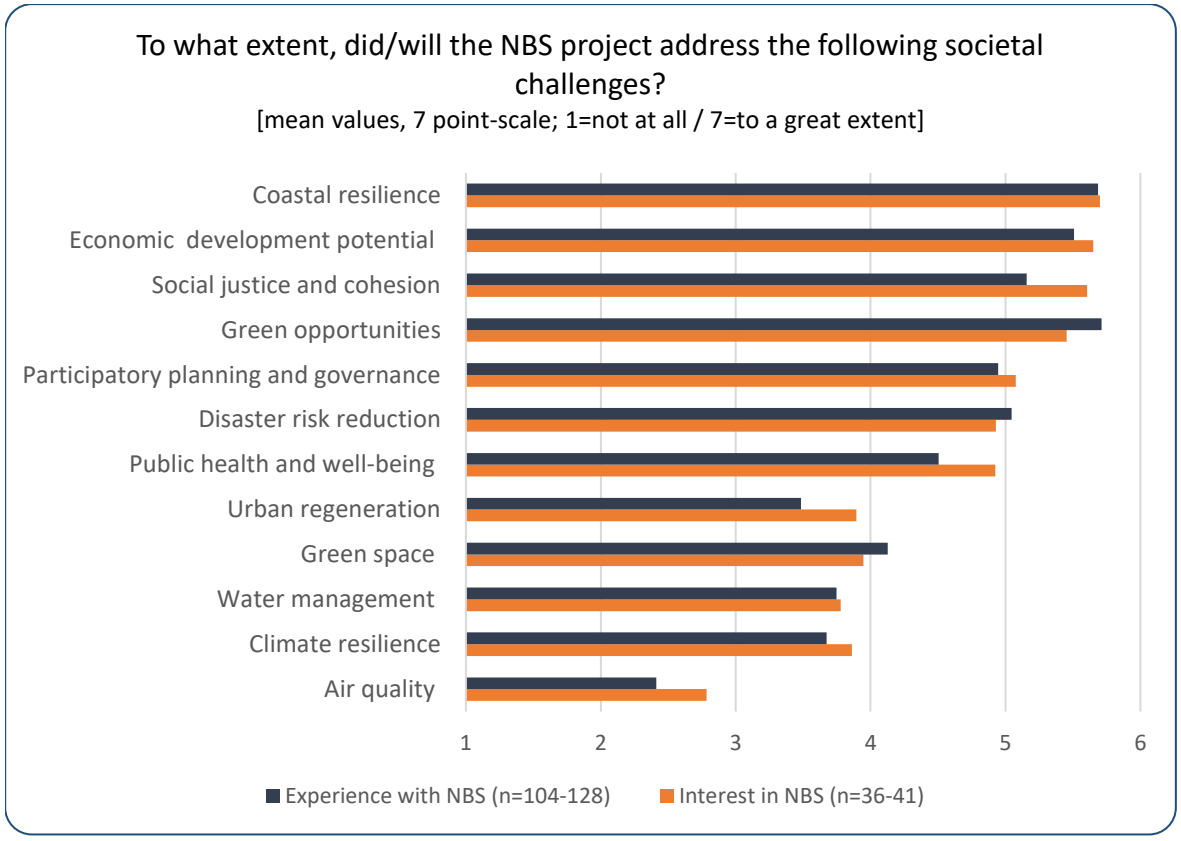

Figure 16 Societal Challenges addressed by NBS

Capacities for realising NBS

As indicated previously, we assumed difference in how two groups (interest/experience) assess their capacities to realise NBS project. The findings of the survey confirm this assumption.

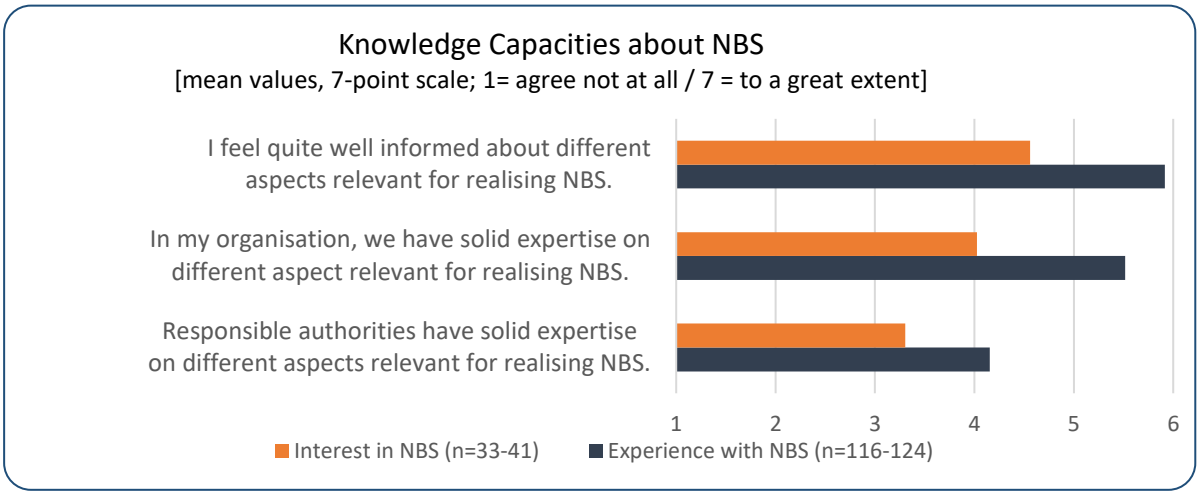

Figure 17 Assessment of knowledge capacities

Generally, respondents with experience in realising NBS assess the knowledge capacities as considerable higher than those with no prior experience but an interest in realising NBS in the future (Figure 17). The difference relates to individual capacities as well as the capacities of the organisation respondents are working for and the responsible authorities supervising the realisation of the NBS project.

Furthermore, respondents in both groups feel better informed about NBS and assess their own expertise as higher in comparison to the organisation they are working in as well as in comparison to public authorities.

Generally, the findings with respect to financial capacities are quite similar to assessment of the knowledge capacities. Again, respondents with experience in realising NBS assess financial capacities for realising NBS as considerable higher than those with no prior experience in realising NBS (Figure 18). The difference between both groups relates to how well responsible organisations are financially equipped, how elected politicians are determined to ensure the financing of NBS as well as to the financial capacities of the respective organisation. With respect to financial capacities, the difference on the organizational level is particularly striking between two groups, as respondents with no experience but an interest, asses the financial capacities of their organisations as considerably lower than respondents with experience in realising NBS.

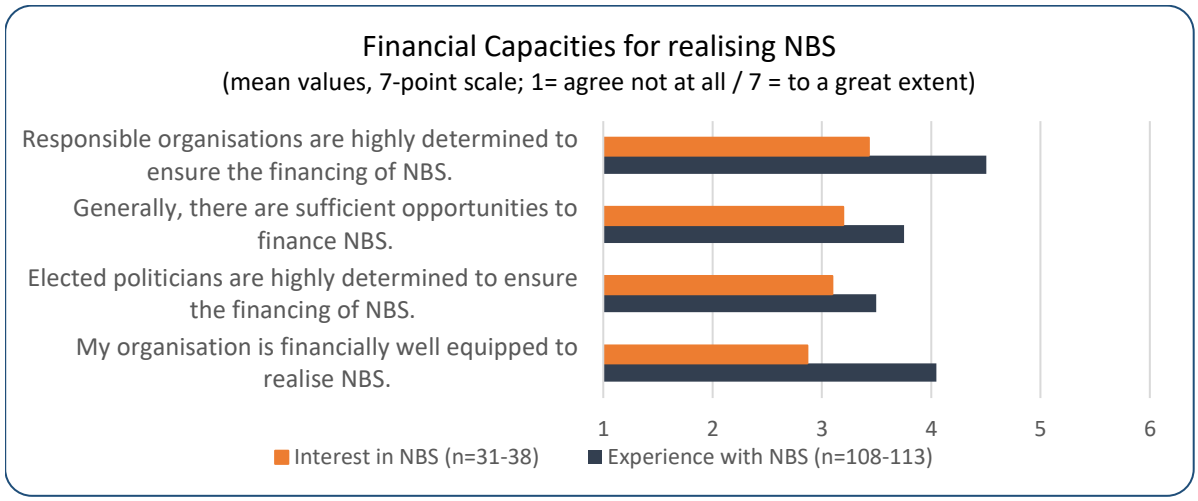

Figure 18 Assessment of financial capacities

Support and barriers for realising NBS

While personal and also organisational support is very high, underpinning the high motivation and support of respondents as well as the organisations they represent with regard to NBS, the support is rather weak with respect to key enablers for the realisation of NBS. Both existing policies as well as elected politicians seem to be of rather moderate support for realising NBS. This assessment is very similar for both groups (experience/interest). Interestingly also, the support by affected citizens is perceived as higher compared to the support of policies and politicians, thus underlining again how relevant it is to transform the institutional-political context for amplifying NBS more effectively (Figure 19).

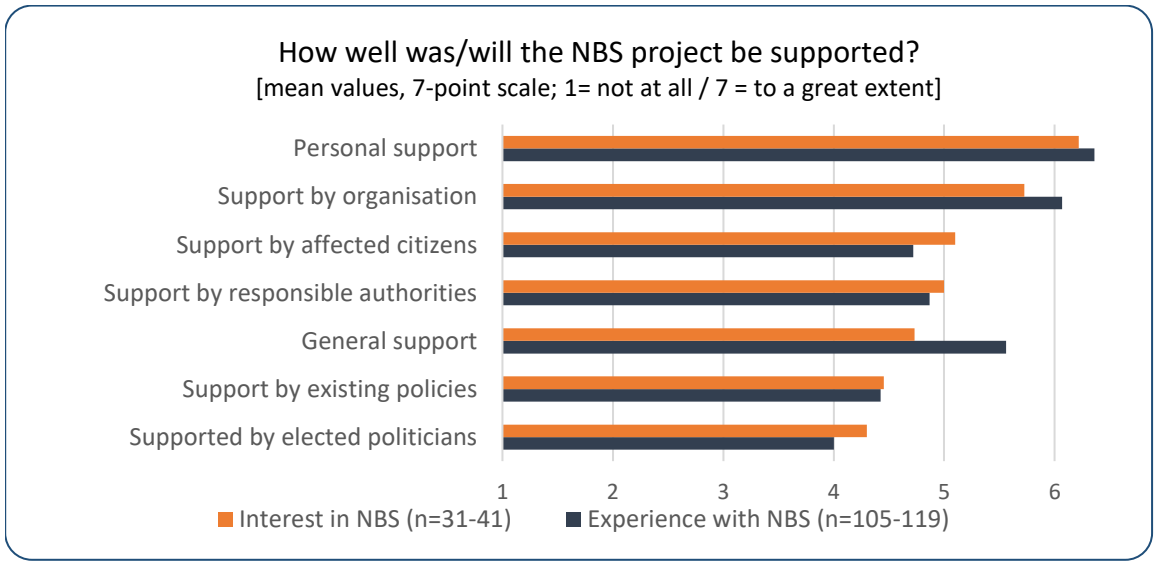

Figure 19 Support for the realisation of NBS

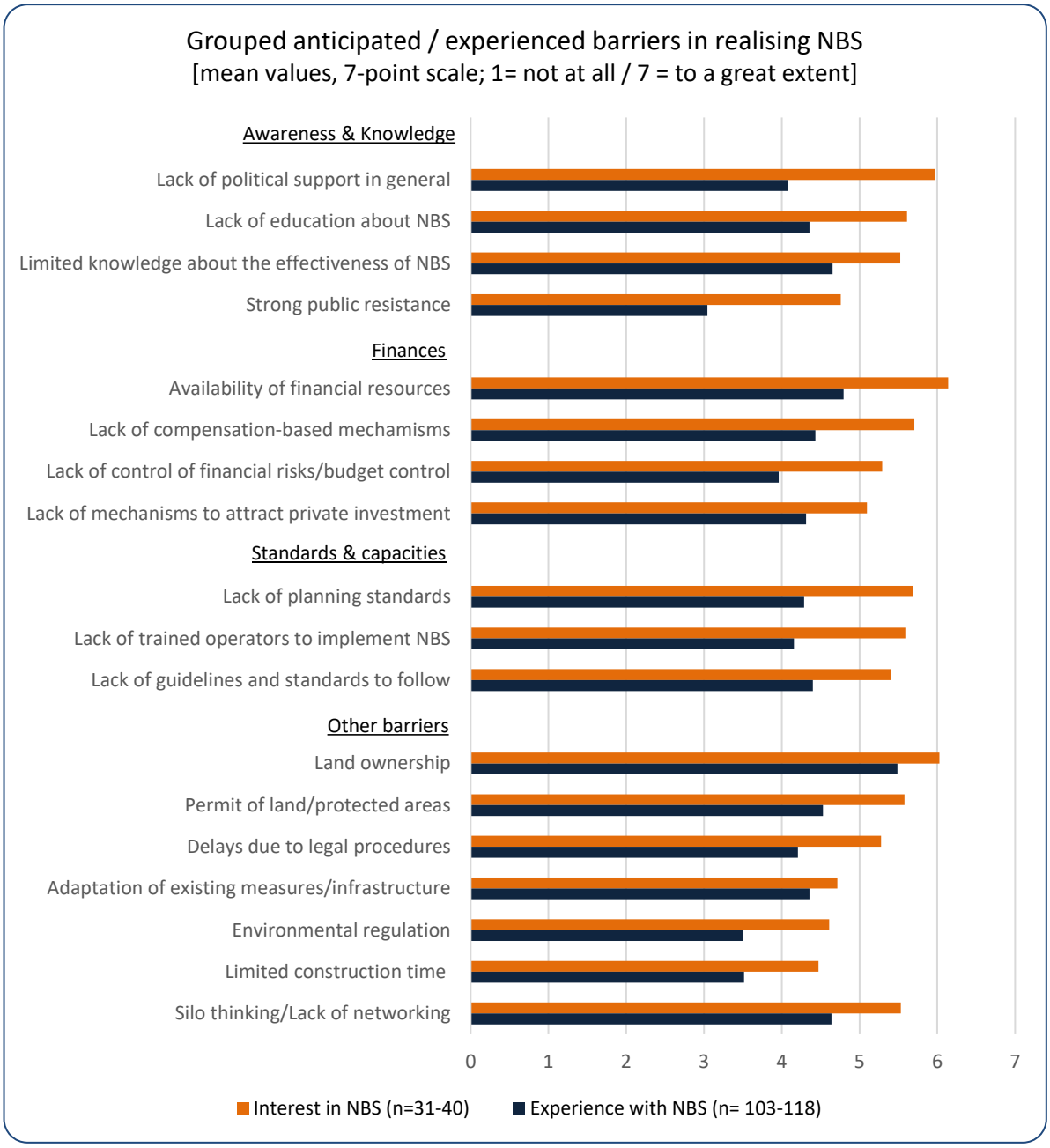

Figure 20 Barriers for the realisation of NBS

All of the assessed barriers are perceived as more relevant by the respondents with an interest in realising NBS compared to those with experience in realizing NBS (Figure 20). This indicates that the actual severity of a barrier is not fixed; it rather seems to change as the realisation process of an NBS project is progressing, this at least is suggested by the findings of the survey. There are various potential reasons for this difference. We would like to point out two potential reasons:

- First, as a NBS project was successfully realised, potential barriers must have been overcome. Therefore they are regarded as less relevant by respondents with experience.
- Second, because barriers are very severe, the respondents with an interest in realising NBS are struggling at the initial stage of the realisation process (e.g.

assessment/planning) and were therefore not yet able to realise an NBS project. The assessment of other barriers is different between both groups.

There are different ways of grouping barriers. The grouping underlying our analysis is based on the upscaling strategy and RECONECT is potentially able to influence the barriers through its outcomes and products. These groups of barriers include a lack of awareness/knowledge about NBS, a lack of standards and capacities, as well as a lack of financial resources and financing mechanisms (Figure 20). Other barriers are more difficult to influence as they are either largely a result of the respective institutional context (e.g. environmental regulation, land ownership) or of very practical nature (construction time).

- *Barriers related to a lack of awareness and/or knowledge*: Similar as the results with regard to the supporting factors (see Figure 19), the public resistance is regarded as the least relevant barrier by both groups of survey respondents. The assessment of other factors differs quite profoundly between both groups. While respondents with no experience tend to assess a lack of political support as the most relevant barrier within this cluster, respondents with experience in realising NBS rather see a lack of knowledge about the effectiveness of NBS as the most relevant factor in hindsight.
- *Barriers related to a lack of financial resources and/or financing mechanisms*: the availability of financial resources is perceived as the most relevant factor within this cluster, whereas the overall assessment is relatively similar among respondents from both groups. At the same time, the availability of financial resources is considered as the most severe barrier among all barriers by respondents with no experience but an interest in realising NBS.
- *Barriers related to a lack standards and capacities*. A lack of planning standards, trained operators as well as guidelines to follow are considered by both groups of the respondents relatively similarly indicating that capacity building as well as the development and agreement on specific standards on how to realise NBS is a decisive step forward in order to amplify NBS.
- *Other barriers*: Land ownership and issues located around this topic are considered as one of the most relevant barriers in both groups of respondents, followed by other topics such as permit of protected land, legal procedures etc.

In order to consider the large number of the survey participants from academia, the perceived barriers were also analysed with the categorization of academic and non-academic participants. To explore more if there is any significant difference in distribution across the groups, we performed Wilcox Rank Sum Test. The significance is shown as a star in Figures 21 and 22.

Figure 21 shows the result for the group of people that have experience in NBS implementation. In general, the barriers were perceived similarly regardless of academic groups, but limited knowledge about the effectiveness of NBS, lack of control of financial risks and budget control, and lack of guidelines and standards to follow were perceived more severely by the academic participants than the non-academic participants. Figure 22 illustrates the analysis performed for those who have an interest in NBS. Likewise, there was no big difference between the groups. The availability of financial resources and environmental regulation were perceived more severely by the non-academic participants than academic participants. One of the likely causes of this discrepancy is that participants'

backgrounds have distinct interests in relation to the activities they are involved in NBS projects.

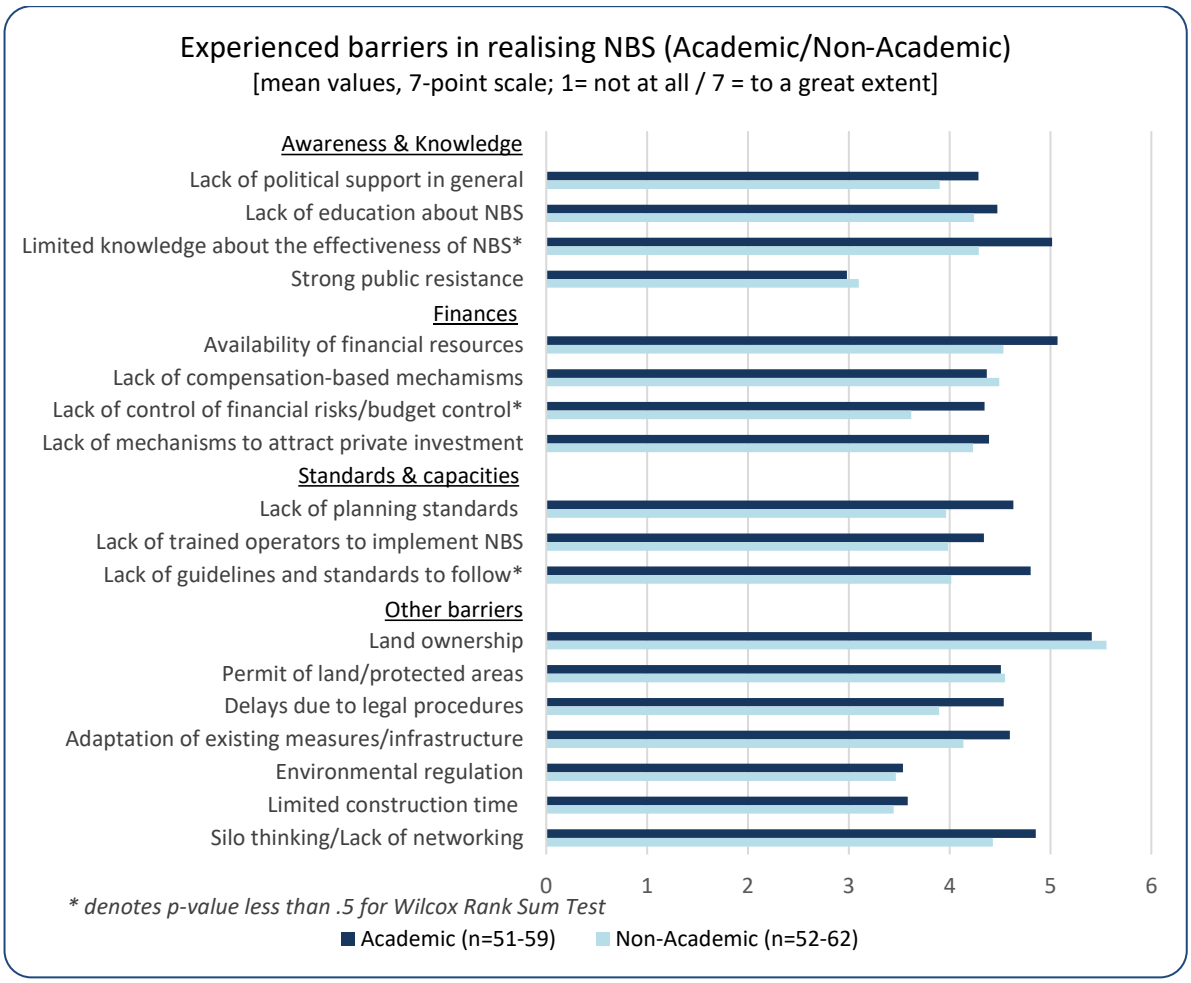

Figure 21 Experienced barriers in realisation of NBS

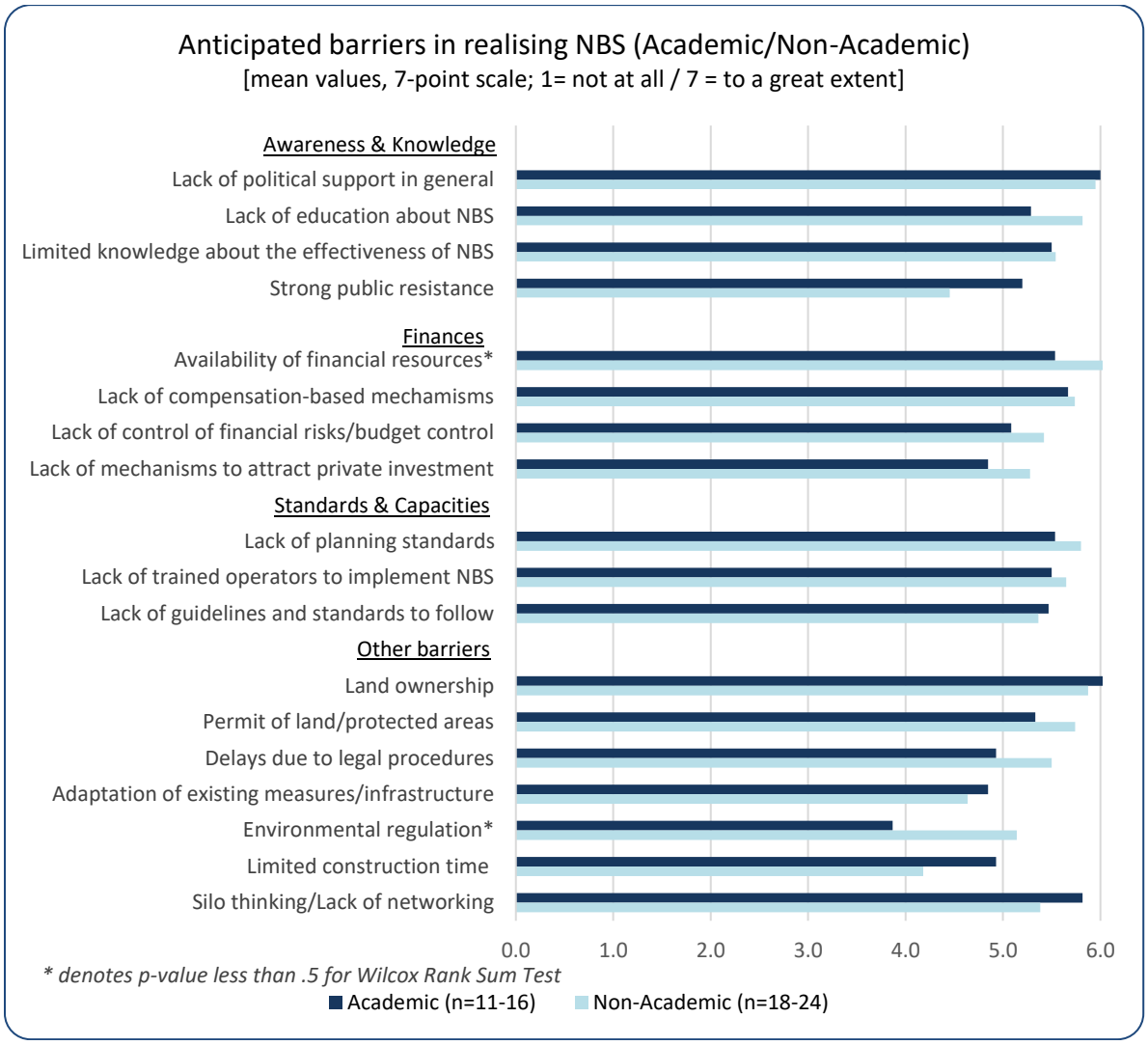

Figure 22 Anticipated barriers in realisation of NBS

Innovation and upscaling activities for NBS

In this section, the focus is exclusively on respondents with experience in realising NBS projects.

In the first step, we were interested in the aspects that respondents considered as most innovative when realising a NBS project. The second step was related to how they up-scaled their insights and experience to make these knowledge available to other stakeholders, but to also promote NBS more systematically. Instead of asking directly on upscaling activities, we rather asked for assessing the relevance of different activities for promoting NBS. As we revealed from the survey review and pretest, the term "upscaling" seemed too technical and difficult to understand without providing additional context on its actual meaning.

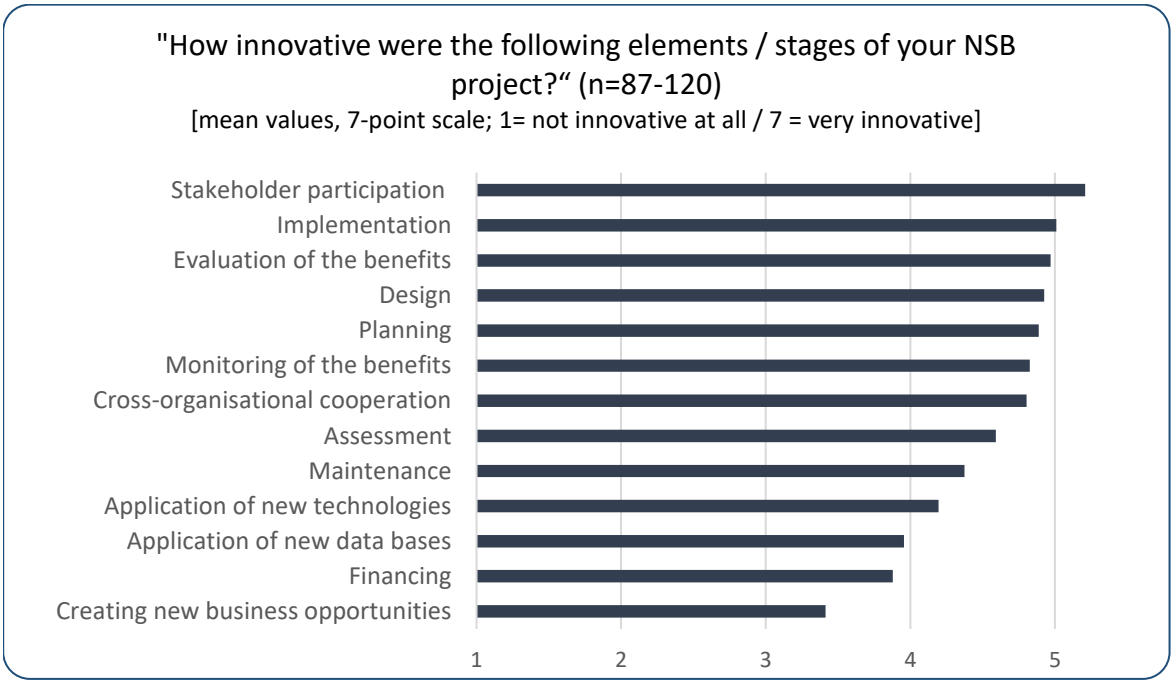

Figure 24 Innovative elements of NBS projects realised

Most NBS projects did engage quite systematically in upscaling activities (mean: 4.74 on a 7-point scale). As Figure 23 shows, stakeholder participation is considered as the most innovative aspect according to the respondents with experience in realising NBS projects. This not only underlines that the practice of realising NBS seems to go hand in hand with an increased relevance of stakeholder participation and the co-creation approach; it also underlines that respondents themselves consider this as an aspect they consider as innovative, either because they were organisationally or individually not familiar with participation or it is really a new practice for many of the respondents and therefore considered as particularly innovative. Also implementation strategies (e.g. innovative models such as policentric vs. monocentric governance, new public versus traditional management, public-private partnership, etc.) and evaluation of the benefits provided by the NBS (e.g. innovative assessment frameworks and approaches), were mentioned as innovative elements in the realizing of NBS projects.

The most relevant activities to promote and upscale NBS are based on personal conversation or direct interaction (Figure 24). This includes as the most relevant means personal conversation with colleagues, workshops and seminars, on-site field trips, partnering with other organization. Such partnership and collaboration are examples of inspiring, replicable solutions across a range of conservation and sustainable development topics, enabling cross-sectoral learning and inspiration. Only thereafter more traditional ways of promoting NBS are ranked, including publications, websites etc.

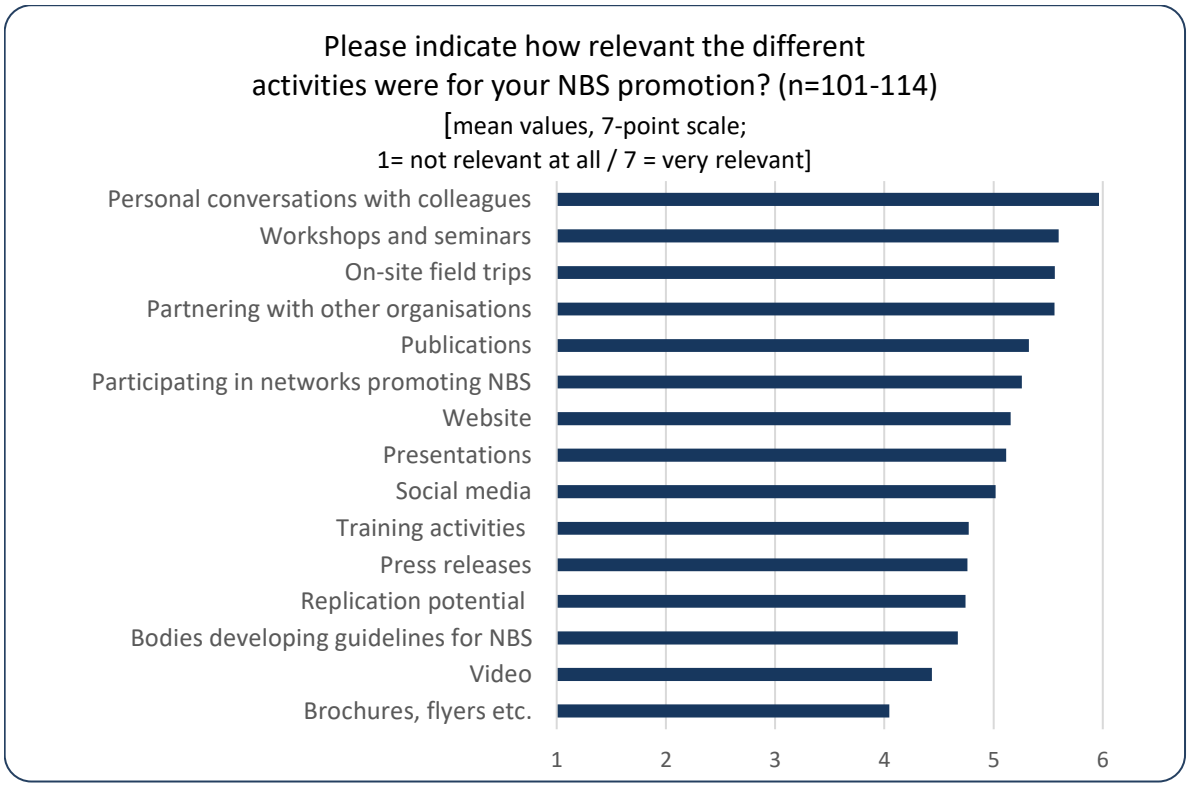

Figure 25 Relevant activities for upscaling NBS

Knowledge needs and preferred means of learning more about NBS

In this section, the focus is exclusively on respondents with an interest but no experience in realising NBS projects.

In the first step, we asked about the topics that the respondents were most interested to learn more about (Figure 25). In the second step, we were interested in the means with which they would like to learn more about NBS (Figure 26). The variables were the same as in the survey focusing on the respondents with NBS experience.

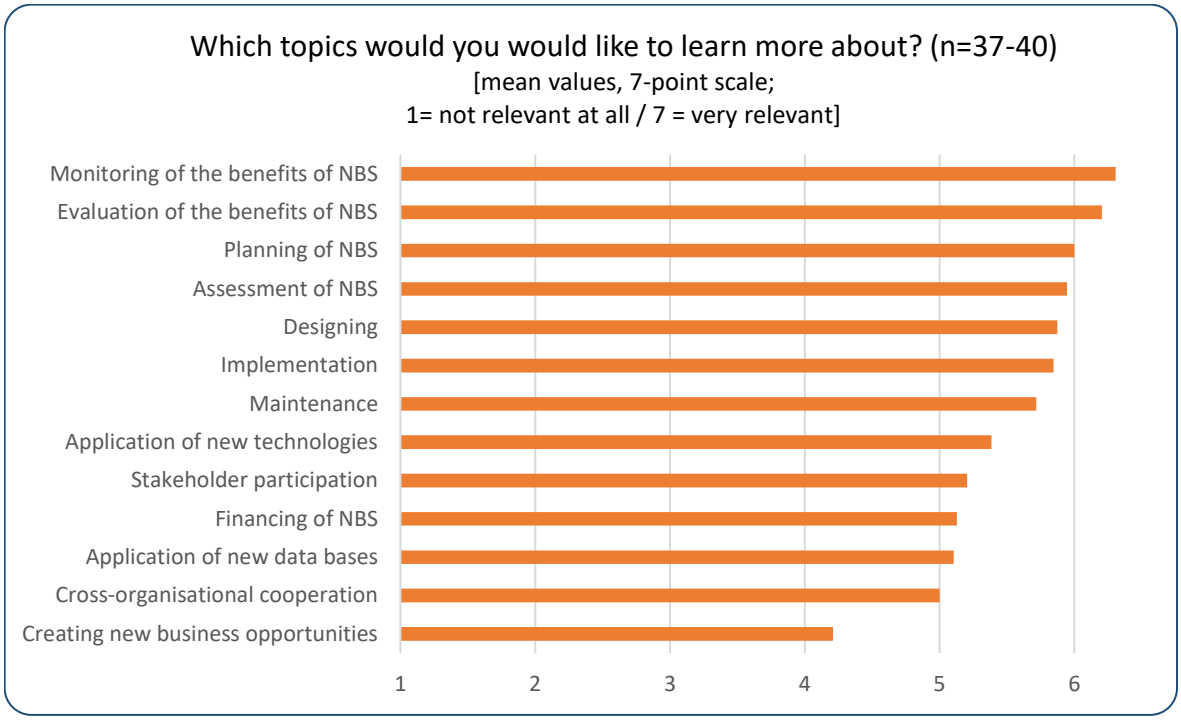

Figure 26 Topics respondents would like to learn more about NBS

As Figure 25 shows, both monitoring and evaluating the benefits of NBS is considered as most relevant topic respondents would like to learn more about. Taking into account the lack of political support and/or the relevance of knowledge/awareness related barriers, this result appears plausible. Only if respondents with an interest in realising NBS are able to demonstrate the added values or co-benefits of realising an NBS project, they will receive the support that is needed particularly during the initial stage of the project realisation.

The following topics are rather expectable as they are of highest relevance during the initial stages of the realisation process and include the assessment of NBS, their planning and design as well as implementation.

In contrast to the respondents with experience, this group of respondents considers stakeholder participation as less relevant. The more technical topics are considered as more relevant.

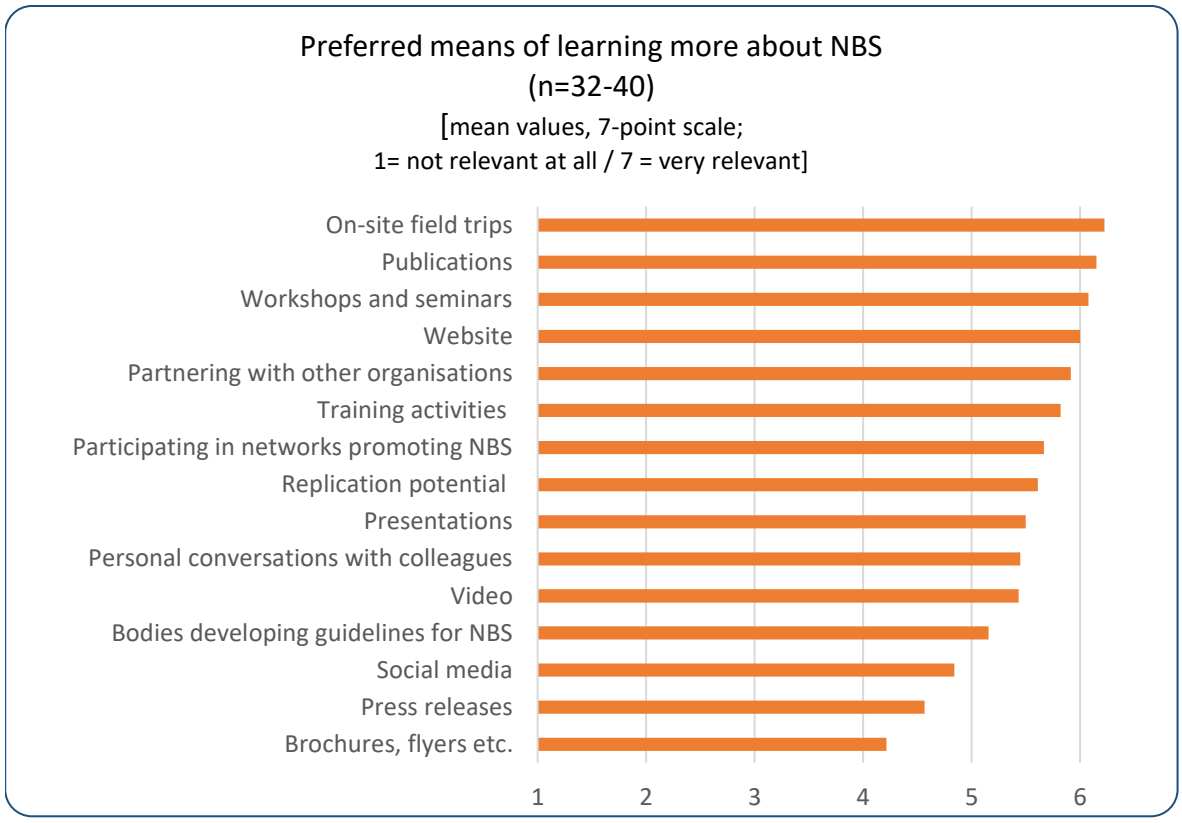

Figure 27 Means of how respondents would like to learn more about NBS

The means with which the respondents would like to learn more about NBS are quite mixed. They include again rather interactive forms and particularly on-site field trips are considered as very relevant as well as workshops, seminars and partnering with other organisations and training activities. However, they also include the means that allow people to inform themselves (e.g. publications and websites).

4.4 Summary and implications for RECONECT's upscaling strategy

This section provides for the first time a systematic study with a focus on upscaling (at least to our knowledge), which is at the same time a robust evidence base for further specifying RECONECT's upscaling strategy. The insights are based both on a group of respondents who have experience in realising NBS as well as on the knowledge needs of a group of respondents who has an interest but no prior experience in realising NBS.

Summary

- *Risks and Societal Challenges*: Despite strong focus on hydro-meteorological risks, disaster risk reduction and climate resilience are not considered as the most relevant societal challenges addressed by NBS. According to respondents, rather wider societal and economic challenges are/will be addressed by NBS (e.g. green opportunities for economic growth, social justice and cohesion, etc.)

- *Capacities*: Respondents with an interest in realising NBS but no prior experience, assess their knowledge and financial capacities as lower than respondents with experience in realising NBS. Possible reasons are, among others, that knowledge and financial capacities are increasing with the realization, or NBS cannot/are more difficult to be realized because of a lack of capacities.
- *Support and Barriers (scaling-down)*: All barriers are assessed as more relevant by respondents with no prior experience compared to respondents with experience. Possible reasons are, among others, that the barriers appear smaller in hindsight once they are overcome; as barriers are very severe and difficult to overcome, NBS have not yet been realized.
- *Innovation and Knowledge Needs*: Stakeholder participation is considered as the most relevant innovation among those with experience underlining the relevance of social innovation/co-creation (scaling deep). Knowledge needs among respondents with an interest but nor prior experience, relate particularly to topics relevant at the initial stage of realizing NBS (e.g. added value, co-benefits, assessment, planning).
- *Means of upscaling*: Interactive formats (e.g. workshops, seminars and partnering with other organisations, side field trips, training activities) are considered as the most relevant for promoting/learning more about NBS.

Implications of the survey results for the upscaling strategy

Although hydro-meteorological risks are addressed, a wider perspective on co-benefits is needed: The results of the survey underline the relevance of taking a broad perspective that goes beyond the immediate field of disaster risk reduction (e.g. avoided damage). The relevance of NBS is grounded in the fact that it allows to address a wider set of societal challenges. As an implication this means also that it is vital for RECONECT to make sure that wider societal and economic co-benefits are monitored and evaluated to demonstrate the added value of NBS. More specifically, the added value for society, monitored and evaluated in RECONECT by means of the so-called people indicators and applying the co-creation/participatory approach, are of particular relevance according to the results of the upscaling survey.

Products and outcomes developed by RECONECT should address specific barriers and help stakeholders with an interest in realising NBS to overcome them: The results of the survey suggest that the perceived relevance of barriers is changing during the process of realising NBS. While barriers might appear initially as very severe and difficult to overcome, they seem to become less relevant and problematic with the realisation process. This has implications for the RECONECT upscaling strategy, as the products and outcomes of RECONECT should be addressed towards specific barriers and help stakeholders to overcome them (scaling down). This can be done through developing products that enhance stakeholders' capacities (e.g. training modules, establishing new and supporting existing partnership, networking), through raising awareness and providing robust knowledge about NBS (e.g. on the co-benefits). But at least equally important are products that contribute to defining standards in realising NBS, on new and innovative financing mechanisms, governance models/strategies and designing policies which are effective in amplifying NBS (cross cutting scaling).

Demonstrating the benefits of co-creating NBS as a social innovation: Realizing NBS is not just a new way of managing risks, it can also lead to social innovation, this at least is suggested by the results of the upscaling survey. Participatory processes are considered by respondents as the most innovative aspects of their NBS project. As RECONECT has a strong emphasis on participatory processes, it needs to ensure that a robust methodology is developed that allows the project to generate a strong evidence based on the added value of co-creating NBS (scaling deep).

Upscaling activities should be built around interactive formats: The results of the survey suggest that interactive formats are preferred way of how stakeholders involved in NBS projects promote and upscale their insights and how interested stakeholders would like to learn more about NBS. This includes, among others, personal conversation with colleagues, workshops and seminars, on-site field trips, partnering with other organization (scaling out, scaling up).

5 RECONECT's upscaling strategy

The key concern of RECONECT's upscaling strategy is: how can the various activities and products of the project contribute to the amplification of NBS across Europe and beyond? More specifically, which kind of long term impacts does the project aim to generate and through which performance indicators shall these impacts be measured and traced?

Therefore, this section turns its attention first to the objectives and expected impacts as outlined in the Description of Action (i.e. the proposal). We understand both the objectives and expected impacts as relevant to further specify RECONECT's upscaling strategy as they allow us to specify what outcomes the project aims to achieve (Kern 2019, p. 178) and the wider impacts it aims to support after the end of the project.

In addition, to the objectives and expected impacts, which were defined during the project proposal stage, we will also consider potential barriers that stakeholders might face and will design our products in a way that they not just address specific barriers, but also support stakeholders in their attempt to overcome them.

5.1 Three pillars underpinning RECONECT's upscaling strategy

Generally, the aim of RECONECT is to rapidly enhance the European reference framework on NBS for hydro-meteorological risk reduction by demonstrating, referencing, upscaling and exploiting large-scale NBS in rural and natural areas. Underlying this effort, there are five generic objectives that allow to build first relations to different types of activities within the RECONECT's upscaling framework.

Table 8 RECONECT's objectives and relations to different types of scaling

Objectives	Relation to different types of scaling
O1: Develop a **holistic ecosystem-based framework** which enables cross-sectoral and transdisciplinary analyses and evaluation to advance the knowledge of NBS in the context of hydro-meteorological risk reduction focusing on floods, storm surges, landslides and droughts (evaluation framework).	O1 is the basis for all kinds of upscaling activities as it aims at ensuring a robust framework that allows to **generate a robust evidence base** on the benefits and co-benefits of NBS in the context of hydro-meteorological risk reduction.
O2: Form the basis for the **proof-of-concept** regarding large scale NBS demonstrations by **co-creating** new cases and **connecting** to existing implemented reference cases and **sharing experiences** with European and international Collaborators.	O2 provides the basis for activities related to **scaling deep**. In RECONECT, this includes twinning activities, which ensure sharing of experience between Demonstrators and Collaborators, as well as co-creation processes aiming at a strong emphasise of the promotion of active stakeholders engagement and use of participatory process in practice in all sites of Demonstrators and Collaborators.
O3: Identify and assess barriers related to social and cultural acceptance of NBS and	O3 provides the basis for activities related to **scaling down** and focuses on identifying and analysing barriers that hamper the uptake of

policy regulatory frameworks and propose ways to overcome them.	NBS as well as outlines the possible solutions to overcome them.
O4: Promote and pursue **innovation in relation to design, operation, maintenance and decommissioning of NBS** (i.e., standardisation) and also in relation to their **co-creation through social innovation** and active participation of stakeholders.	O4 provides the basis for activities related to **scaling out** by offering a reference framework for replication and standardisation, as well as for **scaling deep** by promoting a strong participatory process with different groups of stakeholders in the sites of Demonstrators and Collaborators.
O5: Enable **replication and up-scaling** of NBS in different contexts within the RECONECT network of cases taking into account market dynamics, knowledge co-creation, institutional entrepreneurship and brokerage utilising the partners' networks.	O5 provides the basis for activities related to **scaling out** by focusing on dissemination, replication and exploitation, as well as to **scaling deep** by focusing on strategy partnering and advocacy.

As Table 8 indicates, all objectives have strong linkages to different types of upscaling and thus not just support the comprehensive framework proposed in this document, but also provide first hints on more specific actions that need to be taken to ensure that the objectives are actually pursued effectively.

If one summarizes the key objectives and connects them more closely to the RECONECT upscaling framework as well as the key insights derived from the results of the upscaling survey, the following key strategic aims supporting the amplification of NBS can be identified:

- RECONECT upscaling strategy has a strong focus on replicating and co-creating NBS and by doing so demonstrating the co-benefits of NBS and changing relationships with stakeholders through co-creating NBS (Scaling Deep; Objectives 1, 2, 4);
- RECONECT upscaling strategy has a strong focus on barriers (i.e. institutional, financial, technical, cultural, etc.). It analyses barriers, how they slow-down or even hinder the uptake of NBS. In addition, RECONECT also puts a strong emphasis on assessing the replication potential of NBS and provides outcomes that help organisations to overcome barriers (e.g. by increasing their capacities) (Scaling Down; Objective 3);
- RECONECT reaches effectively out to large number of stakeholders and supports the uptake of NBS through dissemination, training, exploitation and replication (Scaling Out; Objective 4). By doing so, it aims not just at raising stakeholders' awareness, but also at enhancing their capacities;
- RECONECT aims at changing regulations, policies and standards, thus supporting a more effective uptake of NBS on the European and national level (Scaling Up; Objective 4).

Based upon these aims, three foundational pillars of RECONECT upscaling strategy can be specified (see also Figure 27).

Pillar 1 – Replicating and co-creating NBS on the ground with Demonstrators and Collaborators: At the end of the project, there will be more physical NBS sites implemented as before the project since Demonstrators will realise their NBS projects during the project

duration. In addition, decisive step will be taken to prepare future implementation of NBS, as Collaborators will draft pre-feasibility studies for their future NBS projects to be implemented after the project terminates. This includes a thorough replication analysis and the co-creation process that includes the analysis of current barriers, the engagement of stakeholders through all stages of the realisation process and through a strong emphasis on co-monitoring and co-evaluating the co-benefits of NBS for hydro-meteorological risk reduction (including benefits for nature, water and society).

Pillar 2 - Enhancing the capacities of practitioners and policy-makers for realising NBS: The second pillar addresses the capacities of stakeholders and organisations with an interest in realising NBS. Organisations and stakeholders, however, can also be rather experienced and therefore would like to learn more about specific aspects (e.g. how to co-monitor and evaluate societal benefits). Therefore, RECONECT will produce specific outputs that are directed towards enhancing capacities. This includes activities based on dissemination and information provision, but also interactive formats such as training modules and workshops as well as developing shared standards, for instance, with respect to training curriculum, design standards, etc. Equally important is the establishment of mechanisms that help to more strongly involved the private sector and develop new financing schemes. Raising awareness and enhancing capacities of stakeholders could also contribute indirectly to overcoming some of the barriers to the implementation and uptake of NBS. In particular, certain level of information and knowledge received by the stakeholders might empower them to address the technical challenges after related training, or even political/governance barriers if there is a critical mass of “educated” stakeholders that lobby for NBS).

Pillar 3 – Transformation on the policy level for a more effective uptake of NBS

In RECONECT, upscaling is done through strategic partnering and advocacy for the topic of NBS. RECONECT has established connection to various EU activities. These activities need to be seen in the context of the wider EU Research and Innovation policy agenda on Nature-Based Solutions and Re-Naturing Cities, which aims to position the EU as leader in 'Innovating with nature' for more sustainable and resilient societies.

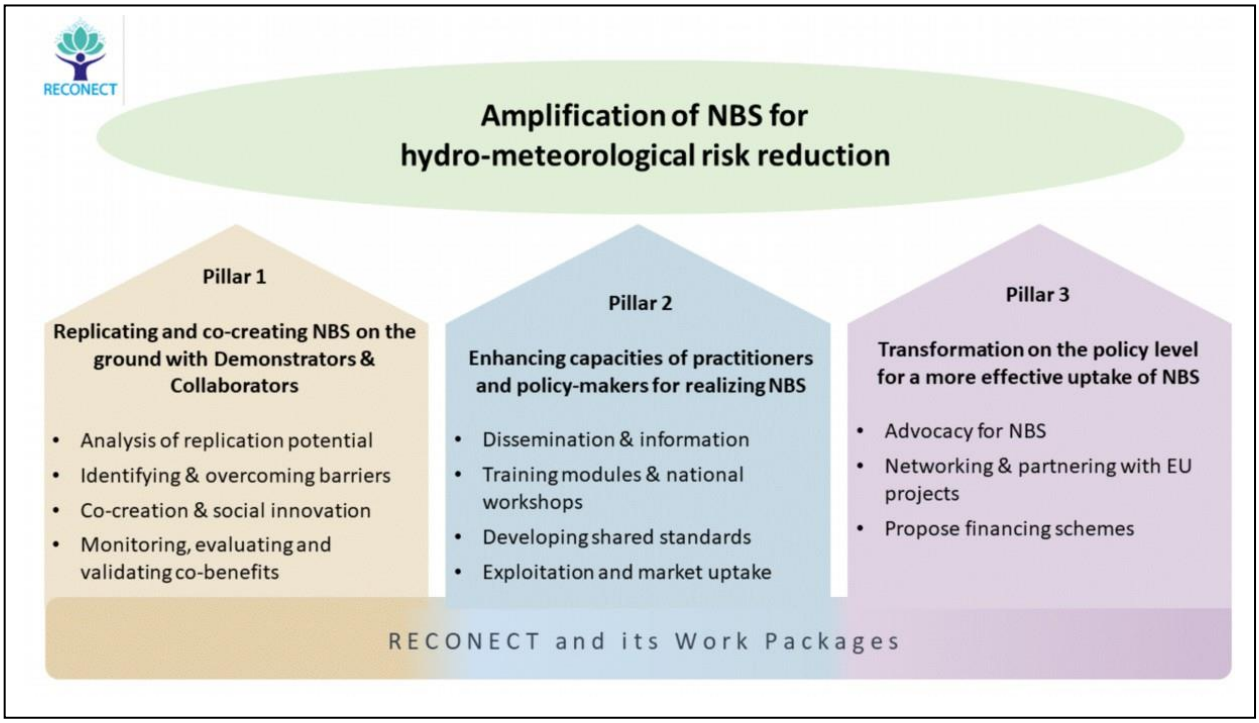

Figure 28 RECONECT central pillars underlying its upscaling strategy

The different pillars support RECONECT strategic approach to achieve the impacts as specified in the DoA (Table 9).

Table 9 Expected impacts and relations to different types of scaling

Expected Impacts (EI)	Key performance indicators (KPIs)	Relation of the three upscaling pillars
EI#1: The EU being recognised as a leader in NBS for hydro-meteorological risk reduction and climate change adaptation.	**KPI#1:** Number of demonstrator cases where the benefits and replicability of NBS will be validated during the project lifetime. Target: ≥4.	**EI#1: High relevance** as an overarching strategic mission for all **three pillars;** **KPI#1: High relevance for pillar 1** (co-creation), evaluation and validation of co-benefits.
EI#2: The mainstreaming of NBS in land use planning, landscaping and territorial policies due to the provision of appropriate tools and best practice.	**KPI#2:** Number of demonstrator cases, in which specific innovations/beyond the state-of-the-art Ambitions (A) are to be applied successfully. Targets: For A1, A2, A3≥ 3. For A4 ≥ 5 (i.e., to be used by the relevant stakeholders in at least 5 RECONECT cases).	EI#2: **High relevance for pillar 2** (capacities), increasing capacities for mainstreaming; **high relevance for pillar 3** (policies), suggestion of more effective policies; **KPI #2: High relevance for pillar 1** (co-creation), demonstrations beyond state of the art.
EI#3: Development of an integrated EU-wide evidence base and a European reference framework on NBS.	**KPI#3**: Number of regions with RECONECT cases having promoted the new culture of land use planning in their regional SDOs, based on the evidence base with the project cases being available via online platform. Target ≥ 2.	**EI#3: High relevance for pillar 1** (co-creation), providing an evidence base through co-creating NBS; **KPI#3: High relevance for pillar 1** (co-creation), i.e. new culture of land use planning and specification of relevant stakeholders to be addressed through scaling activities.
EI#4: Enhanced market demand for NBS for hydro-meteorological risk reduction and climate change adaptation.	**KPI #4**: Number of Industrial partners who have adopted the prepared draft protocols and standards (P&S) for their own business. Target ≥ 3.	**EI#4: High relevance for pillar 2** (capacities) increasing market demand; **KPI#4: High relevance for pillar 2 and 3 (capacities and policies),** standardisation and specification of relevant stakeholders to be addressed through scaling activities.
	KPI#5: Number of National associations having officially promoted (P&S) among its members. Target ≥1.	**KPI#5: High relevance for pillar 2 and 3** (capacities and policies), dissemination and specification of relevant stakeholders to be addressed through scaling activities
EI#5: Improved disaster risk management, due to enhanced capacity for	**KPI#6:** Number of Demonstrator cases with capacity in quantitative assessment of NBS enhanced. Target ≥ 3 cases.	**EI#5: High relevance for pillar 2** (capacities);

Expected Impacts (EI)	Key performance indicators (KPIs)	Relation of the three upscaling pillars
providing quantitative assessments of NBS for disaster risk reduction and climate change adaptation.		**KPI#6: High relevance for pillar 1 and 2** (co-creation and capacities).
EI#6: Reduced human and financial costs due to better and more flexible disaster risk management with NBS.		**EI#6: High relevance** as an overarching strategic mission for all **three pillars;** **KPI#6: High relevance for pillar a 1 and 2** (co-creation and capacities).
EI#7: Enhanced implementation of EU policies for disaster risk prevention and reduction.	**KPI#7:** Number of RECONECT cases adopting relevant EU policies in planning, design and deployment of NBS. Target ≥ 5 cases.	**E#7: High relevance** for pillar 3 (policies); **KPi#7: High relevance** for pillar 1 and 3 (co-creation and policies).
EI#8: Contribution to the priorities of the EIP Water.	**KPI#8:** Number of EIP Water events, in which RECONECT will participate. Target ≥3.	**EI#8: Medium relevance for pillar 2** (capacities); **KPI#8: Medium relevance for pillar 2** (capacities).
	KPI#9: Number of relevant EIP Water Action Groups (e.g. and ESE) that RECONECT will participate. Target ≥1.	**KPI#9: Medium relevance for pillar 2** (capacities).
EI#9: Implementing the Sustainable Development Goals (SDGs), in particular SDG 15 and SDG 13.	**KPI#10:** Number of RECONECT cases adopting sustainable use of ecosystems to adapt to climate change, and in particular to reduce the risk to hydro-meteorological events. Target ≥ 3 cases.	**EI#9: High relevance** as an overarching strategic mission for all **three pillars;** **KPI#10: High relevance for pillar 1** (co-creation).

Based on the information provided in Table 9, different scaling activities can be linked to more specific outcomes that the RECONECT aims to achieve.

Figure 28 provides a synthetic overview on some the activities underpinning the different types of scaling (i.e. scaling deep, out, up and down), more concrete outcomes they are aiming at (e.g. scaling deep aims to promote a cultural change in land-use planning and enhance the capacity of relevant actors trough twinning and co-creation), as well as the more generic outcomes that the project is aiming to contribute to through its cross-cutting scaling approach (e.g. mainstreaming NBS). The sections below provide more in-depth details to the different pillars underlying RECONECT's upscaling strategy.

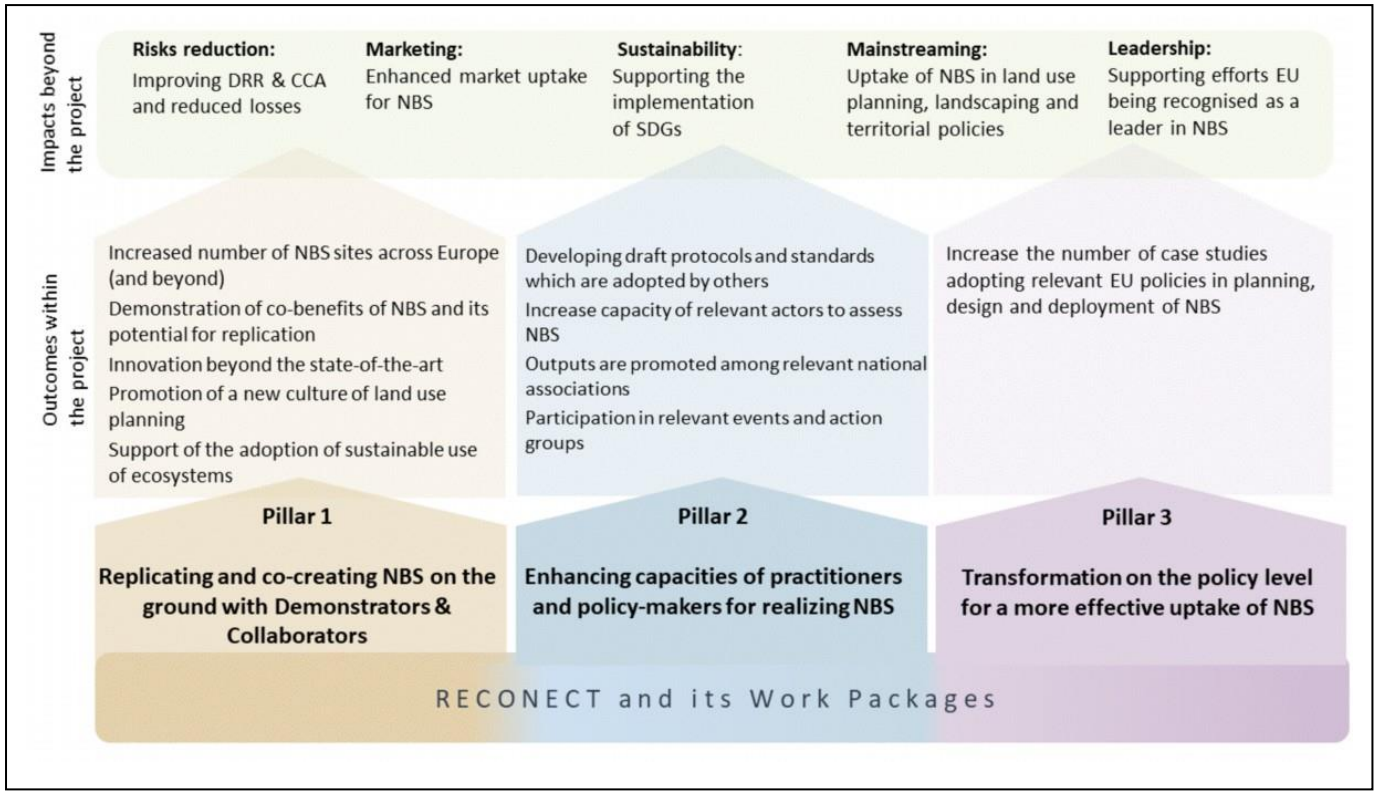

Figure 29 RECONECT's scaling means and outcomes

5.2 Pillar 1 Replicating and co-creating NBS

The first pillar is concerned with the analysis of the replication potential as well as with co-creating NBS. By doing so, this pillar is not just related to the physical setting of potential NBS sites but also to actually co-creating NBS in different settings across Europe. In this sense, replication and co-creating NBS is thus about a deeper transformative process addressing social interactions and forms of participation and recognizes that culture plays a powerful role in shifting problem domains, and change must be deeply rooted in people, relationships, communities and cultures. This form of scaling takes place on a voluntary basis and is based on intensive interactions and collaborations. The exchange usually includes various forms of networking, sharhing of experience and knowledge as well as partnering. Such activities are supported by different means.

Twining of partners within the project. Twinning activities aim at initiating a substantive exchange of experience, information, expertise, and good practice across cases. In RECONECT, a broad perspective is pursued. Restricting twinning to single partners would result in exchange processes that might be too limited and too specific considering the thematic width of the project. Therefore, in RECONECT twinning is not just about establishing a partnership between two partners; it is also about partnering a larger group of partners. This can include the substantive exchange among a small group of partners, but it can also include a rather loose exchange among a larger number of project partners. The ambition of twinning activities is to produce knowledge and expertise and to enhance the relevant capacities of people and stakeholders. Outcomes of twinning can take many different forms, including mutual visits and exchange among stakeholders involved, joint workshops dedicated to specific topics, webinar series dedicated to a number of topics, and capacity building and training activities, but also short written reports on specific topics. In RECONECT we organized forms of **collective twinning** centring on topics of high relevance for a larger group of partners as well as **bilateral twining** that are organized around Demonstrators and Collaborators that share similar characteristics and demands and that face similar challenges. Again, the different twinning activities can result in different means for how to make them operational. While activities centring on Demonstrators might rely on mutual field visits and two-day workshops, collective twinning can be based on webinars, workshops, and training activities.

Analysis of replication potential as well as potential barriers: Figure 29 outlines the single steps relevant for the replication potential analysis and for overcoming barriers. The Serbian Collaborator case was a test case in which this methodology was tested for the first time. The framework outlined in Figure 29 is first approximation or guidance to evaluate the barriers for potential implementation of large-scale NBS for flood risk reduction in early stages of the project.

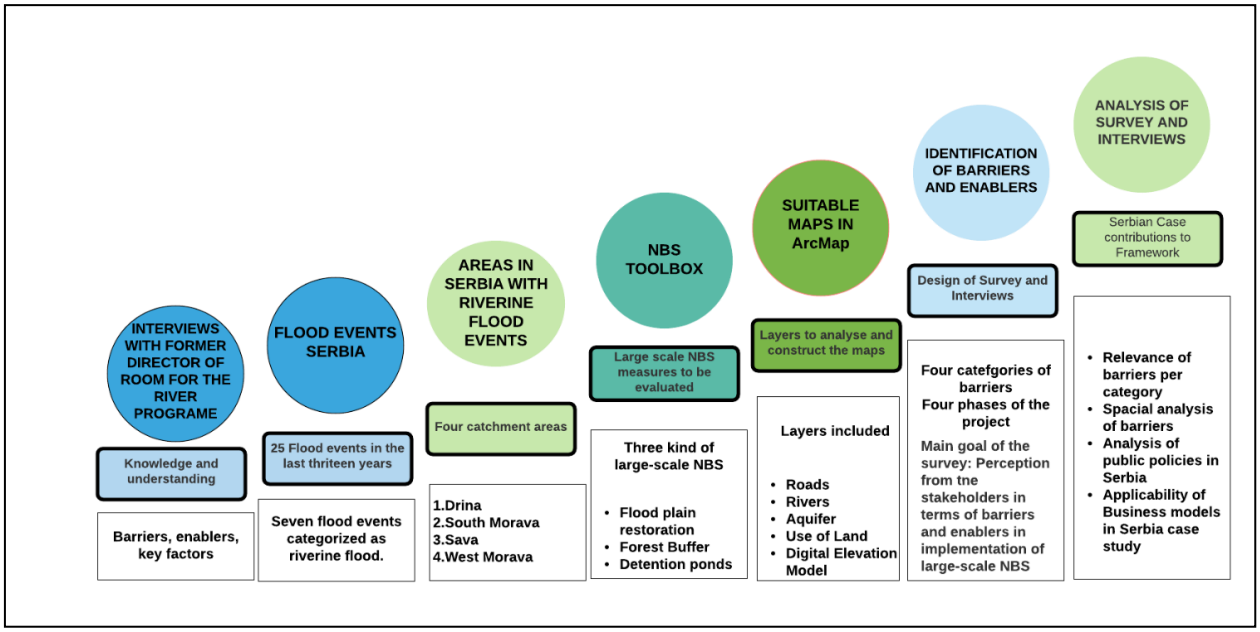

Figure 30 Single steps for replication and analysing barriers

Source: Hernandez (2021).

Co-Creating NBS: RECONECT co-creation strategy consists of seven steps helping to achieve different – intermediate – process goals. Therefore, a multi-criteria decision-making matrix for co-creating NBS provides the step-by-step guide which will help to select the most appropriate co-creation strategy and tools related to the particular stage of NBS process. However, it is important to consider that co-creation is an open process which in most cases will require the need to change and adapt. The steps in a co-creation process connect together activities that need to happen to achieve the goals of the whole process. They can vary in order and are iterative. It is important to identify the concrete co-creation steps with a timeline of the project activities when these are going to happen. It is also important to identify and – as early as possible – reach out to the actors who need to be involved in each co-creation step. In Figure 30, we highlight seven steps to take in a co-creation process.

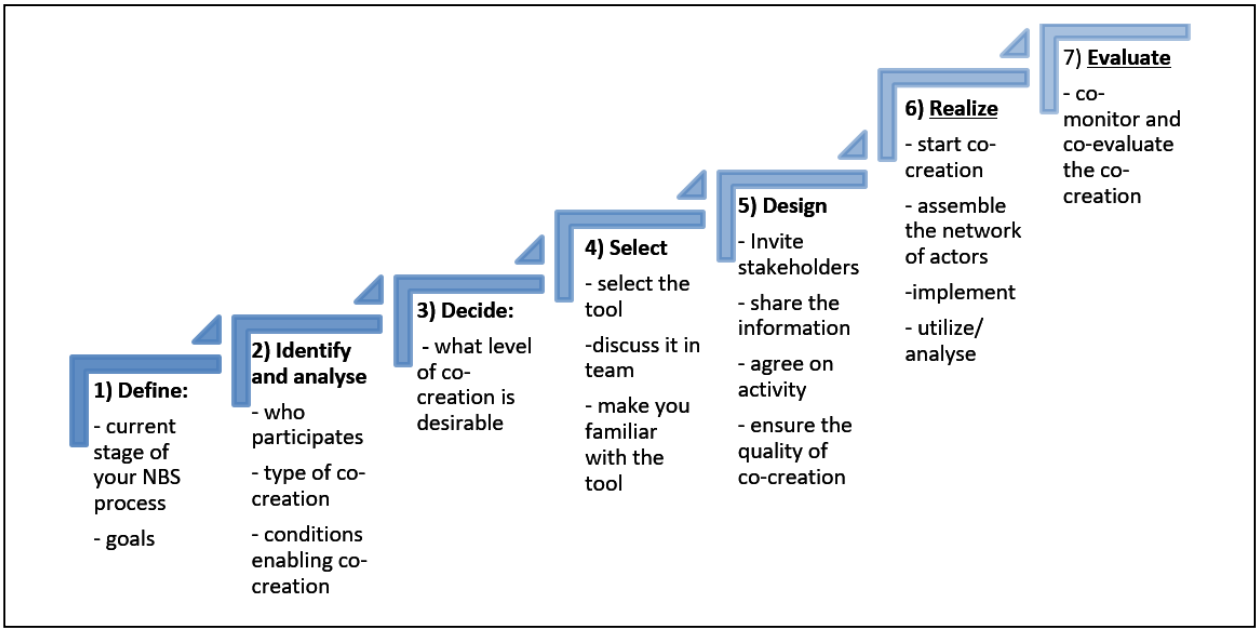

Figure 30 Main steps of RECONECT co-creation pathway

5.3 Pillar 2 Increasing capacities of stakeholders and organisations

Activities that support the second pillar and reflect the idea of "Scaling out" of the upscaling strategy aim not just at influencing a great number of people and stakeholder and make them aware of the RECONECT project activities, but also aim at enhancing stakeholders and organisations capacities to realise NBS. In the following, some of the key elements are outlined:

- **RECONECT Training Framework:** RECONECT Training Framework is based on two training-oriented project outputs. (1) An online-based training module designed to address the exploitation of project outcomes to selected categories of target audience. (2) RECONECT MOOC addressed to a wide range of stakeholders and based on serious games and innovative information and communication technologies. Topics that will be addressed include a general introduction to NBS and how they help to reduce hydro-meteorological risks and contribute to a set of wider co-benefits; co-designing and co-planning NBS; co-monitoring and co-evaluating the co-benefits of NBS.
- **A series of national workshops:** According to RECONECT Communication & Dissemination Strategy and Plan, a series of national workshops will be organized during the project in Demonstrators and EU Collaborators, with the aim to enforce the stakeholder's engagement at regional/national level and to increase their awareness on NBS potential and applicability. In this regard, the co-creation tools and methods suggested in the Manual for practitioners (D3.5) can help. A specific task under WP6 (Task 6.6) is dedicated to manage the organization of these workshops, supporting partners with guidelines and instructions to ensure that scope, target audience and follow up activities are properly achieved. National RECONECT workshops, in fact, are not to be considered just as a "RECONECT information corner", but they want to represent a robust contribution to upscaling and exploitation

strategy. Based on sound scientific data and demos from each Demonstrator and Collaborator, the RECONET national workshops aims to drive the target audience towards increasing their capacities and contribute to changing their mindset and to build a new culture of land planning and risk mitigation. A final round table is organized at the end of each workshop in order to discuss about NBS perception of target audience, to identify drivers and barriers for the NBS implementation helping, in such a way, to better address future strategy and activities of RECONECT. Two national workshops by each Demonstrator and one national workshop by each EU Collaborator are expected to be organized.

- **Non-commercial and commercial exploitation:** Non-commercial exploitation relates to the uptake of large-scale NBS by non-commercial entities, such as governments, municipalities, NGOs, or civil society. Non-commercial exploitation will be supported by developing guidelines and standards for NBS implementation (D5.4 and D2.8). These guidelines and/or standards will focus on addressing a wide variety of contexts and hydro-meteorological risks. They will provide a strong ground for unifying NBS practices across Europe, and will have to be supplemented by recommendations for adopting innovative financing and creating new governance models that support NBS as a planning paradigm in the pathway to climate resilience.

  Commercial exploitation, on the other hand, relates to the overall private sector uptake. This relates to the business case of NBS, linked to the creation of RECONECT concepts for spinoffs. A key success criterion for RECONECT is to upscale large-scale NBS to achieve a broader market access. Thus, the exploitation strategy should aim at maximizing impacts in the form of innovative business solutions that can have the potential to be absorbed by the private sector. The commercial exploitation strategy will work as a value chain, starting from evidence-base and lessons learnt from RECONECT cases (Demonstrators, Collaborators), to the development of business cases for commercial NBS. These business cases will draw upon market analyses and needs assessments at EU scale. Business cases are an efficient tool to involve commercial stakeholders (private companies, consultants etc.) for which efficiency, quality and financial viability are essential drivers.

  Both non-commercial and commercial exploitation will draw upon the RECONECT evidence base. This base will include a catalogue of regions with comparable needs and features as the RECONECT cases. This spatial approach to exploitation will provide a first screening of areas that would benefit from implementation of large-scale NBS for hydro-meteorological risk reduction. Additionally, the potential for upscaling RECONECT NBS throughout Europe will be assessed by implementing an upscaling methodology to the five EU Collaborators. This methodology will combine spatial considerations but also an assessment of non-spatial barriers and enablers (i.e. related to governance, culture, economy, etc.).

5.4 Pillar 3 Changing policies and enforcing the amplification of NBS

This pillar is aiming to support changes on the policy level to enforce the amplification of NBS. It reflects the activities summarized under the term “Scaling up”. In the following, some of the key elements are outlined:

- **Strategic partnering and advocacy:** RECONECT has established connection to various EU activities. More specifically RECONECT is building up networks and contributing to the advocacy of NBS in three tasks forces that aim at establishing a common framework for NBS through (1) Taskforce on Data Management and EU NBS knowledge repository, (2) Taskforce on NBS Impact Evaluation Framework and a Taskforce on Governance, Business Models and Financial Mechanisms. Furthermore, RECONECT participates in building a NBS & Innovative community of practice with the help of the NBS stakeholder platform, such as THINK NATURE (https://www.think-nature.eu/) and/or OPPLA.

Conclusions

The presented report provides RECONECT's upscaling strategy by reflecting on the following aspects:

- how can social innovations become more widely adopted and lead to a transformative impact beyond the immediate context they have been developed,
- what general strategic steps and specific actions need to be taken to support the amplification of NBS in the context of hydro-meteorological risk management, climate change adaptation and land use planning;
- how can a social innovation amplify its impacts so that it not only results in local changes, but also can reach wider groups of stakeholders potentially interested in the experiences made.

The report highlights upscaling as a core element of the RECONECT project underlining that effective upscaling requires more than simply disseminating information about the outcomes of the RECONECT project or exploiting results (although both activities are relevant for scaling activities). In this report, we describe how RECONECT aims at scaling its (social) innovations to support the amplification of NBS. The scaling strategy is based on the literature review provided in the second chapter as well as results and conclusions from RECONECT co-creation and upscaling survey conducted in 2021.

We revealed, that generally, the research on scaling processes is still an emerging field of research and there is no guidance or a mature body of knowledge exists on how to set-up effective scaling processes. Having this in mind, this report provides guidance for such systematic strategy development highlighting the leading role of strategic thinking throughout the whole NBS co-creation process, requiring ongoing attention to the different factors and actors that affect scaling up, as well as adjustments to the strategy whenever necessary. However, the presented scaling-up strategy is a subject to changes and thus should be locally adapted and critically assessed towards the current needs and capacities. Nevertheless, the initial plan presented in the report can provide the base for the necessary adjustments that have to be made as the scaling up proceeds.

Based on a comprehensive literature review, the report outlines RECONECT upscaling framework which provides an analytical lens that helps to organise key ideas underpinning the project's efforts to upscale its lessons learned and by doing so contribute to the amplification of NBS across Europe and beyond. As already mentioned, this framework is a rather conceptual representation of RECONECT's view on upscaling.

Therefore, we advanced and deepen the discussion on upscaling by providing an overview of the results of a RECONECT standardized survey we conducted between April and June 2021 among more than 220 stakeholder from across Europe and beyond. The survey was addressed two different groups of actors: (1) Actors with an interest in realising NBS but no first-hand experience, knowledge and expertise. In the survey we predominantly focus on their current capacities and needs, as well as their perception of potential barriers for realising NBS; (2) Actors with experience in realising NBS. In the survey, we mainly set out to understand their capacities, the upscaling activities, as well as their perception of potential barriers. Through a comparison of both groups we draw first conclusions on not just how both groups are different with respect to their capacities and/or how they perceive the

relevance of different barriers; thereon-based we were also able to fine-tune RECONECT's upscaling strategy to the needs of those stakeholders with an interest in realising NBS in the future. Generally, we assumed that having experience/no experience influences the attitudes, capacities and perception of respondents. The results of the survey underline that stakeholders with no experience in realising NBS have lower financial and knowledge capacities compared to stakeholders that were already involved in the realisation of an NBS project. Furthermore, all barriers are assessed as more relevant by respondents with an interest but no previous experience compared to respondents with experience. Stakeholder participation is considered as the most relevant innovation among those with experience underlining the relevance of social innovation/co-creation (scaling deep). Interactive formats are considered as the most relevant for promoting/learning more about NBS.

Based on the framework and survey results, the project's upscaling strategy was developed and presented (last chapter). The strategy links the conceptual basis more specifically to the objectives and expected impacts as outlined in the Description of Action (i.e. the proposal). We understand both the objectives and expected impacts as relevant to further specify RECONECT's upscaling strategy as they allow to define what outcomes the project aims to achieve and the wider impacts it aims to support after the end of the project. In addition to the objectives and expected impacts, the presented report will help to address the potential barriers stakeholders might face and will support in products' design in a way that they not just address specific barriers, but also support stakeholders in their attempt to overcome them.

The report also underlines that upscaling is a cross-cutting activity of the project that is linked to D1.2 (Social innovation approach of RECONECT), D2.2 and D4.4 (Demand and Supply – Demonstrators and Collaborators), D5.3 (Potential for implementation of large-scale NBS in Europe), D5.7 (Business models and sustainability plans) and D6.9 (Updated Exploitation Dissemination and Communication Plan for Outreach). Altogether they provide a base to inform and support the upscaling strategy.

We are aware of the fact that the ideas presented in this report provide a first conceptual consideration which therefore need to be critically reflected upon, evaluated and, if necessary, locally adapted and further contextualized.

We conclude, that scaling up activities require systematic planning of how pilot-tested innovations can be implemented on a larger scale and achieve broad impact. Success with scaling up needs to balance between desired outcomes and practical realities and barriers. In this regard, we consider upscaling as a cross-cutting activity that relies on the exchange and strategic cooperation of different WPs. This is also reflected in this report which provides a systematic structure that supports a comprehensive view on the project's upscaling approach to support the amplification of NBS for hydro-meteorological risk reduction.

As part of the report, we outline some recommendations / actions for upscaling. First, the results of the survey underline the relevance of taking a broad perspective when it comes to co-evaluating NBS. Such a perspective needs to go beyond the immediate field of disaster risk reduction (e.g. avoided damage). The relevance of NBS is grounded on in the fact that it allows to address a wider set of societal challenges. As an implication this means also that it is vital for RECONECT to make sure that wider societal and economic co-benefits are monitored and evaluated to demonstrate the added value of NBS. Second, products and outcomes developed by RECONECT should address specific barriers and help stakeholders with an interest in realising NBS to overcome them. The results of the survey suggest that

the perceived relevance of barriers is changing during the process of realising NBS. While barriers might appear initially as very severe and difficult to overcome, they seem to become less relevant and problematic with the realisation process. Products and outcomes of RECONECT should therefore be addressed towards specific barriers and help stakeholders to overcome them (scaling down). Third, demonstrating the benefits of co-creating NBS as a social innovation is of great reliance. The results of the survey underline that realizing NBS is not just a new way of managing risks, it can also lead to social innovation; this at least is suggested by the results of the upscaling survey. Participatory processes are considered by respondents as the most innovative aspects of their NBS project. As RECONECT has a strong emphasis on participatory processes, it needs to ensure that a robust methodology is developed that allows the project to generate a strong evidence based on the added value of co-creating NBS (scaling deep). Fourth, upscaling activities should be built around interactive formats. The results of the survey suggest that interactive formats are preferred way of how stakeholders involved in NBS projects promote and upscale their insights and how interested stakeholders would like to learn more about NBS. This includes, among others, personal conversation with colleagues, workshops and seminars, on-site field trips, partnering with other organization.

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