RECONECT – Social innovation approach

Deliverable D1.2

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Disclaimer

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Abstract (for dissemination, 100 words)	This document outlines RECONECT's social innovation approach to NBS by presenting methodologies and approaches that guide the reader throughout the stages of co-assessment and planning; co-design; co-implementation, operations and maintenance; co monitoring and evaluation; upscaling; and co-creation.

Keywords	Social innovation, co-creation, nature-based solutions, hydrometeorological risk

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Executive Summary

The document guides the reader through key concepts and methodological approaches in relation to the NBS cycle consisting of: co-assessment and planning; co-design; co-operations and maintenance; co-monitoring and evaluation; upscaling; and co-creation.

Social innovation approaches promote active engagement of stakeholders in generating new and more effective solutions to complex societal and environmental challenges. Despite widespread support for social innovation approaches, their operationalization is not always clear or available beyond the research community. The purpose of this document is therefore to provide more concrete guidance for integrating social innovation in the implementation of NBS for hydro-meteorological hazards. Focus is placed on people -and not only on the biophysical traits- as determining factors for assessing suitability of NBS. Thus, each section begins by relating the NBS stage of the cycle to questions of relevance for how people relate to their surroundings.

The guide is of relevance to researchers and other actors interested in obtaining an overview of how NBS could be implemented in collaboration with stakeholders, and how stakeholders could contribute to facilitating the process throughout the different stages of the NBS cycle.

After going through this guide, the reader should better understand how the NBS-implementation cycle could be conducted through a social innovation approach underpinned by co-creation methodologies. The guide provides detailed guidance for carrying out a stakeholder analysis, which is the starting point for any co-creation activity. Examples of methodologies with different degrees of participation are provided in each of the steps along the cycle.

As the title of the document suggests, the scope of this document is limited to highlighting the steps where a social innovation approach is feasible within the NBS cycle. The document does not capture all the operative details related to the implementation of NBS. Details on each of the steps can be found in other RECONECT deliverables:

- Deliverable D2.4 provides information on RECONECT's Demonstrators' operational costs, such as construction material, maintenance services, and other fees.
- Deliverable 4.1 and 2.1 provide stakeholder analyses for Collaborators and Demonstrators, respectively.
- Deliverable 4.2 provides information on baseline studies for the co-assessment stage in Collaborators.
- Deliverable 4.4 provides information on co-creation, including a demand-supply assessment of knowledge and capacity needs among Collaborators, and a baseline study on perceptions and practices to co-creation.

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Abbreviations

DASA	Demand And Supply Analysis
DRR	Disaster Risk Reduction
KPI	Key Performance Indicators
MCA	Multi-Criteria Assessment
MEA	Millennium Ecosystem Assessment
NBS	Nature Based Solutions
NGO	Non-Governmental Organization
RECONECT	Regenerating ECOsystems with Nature-based solutions for hydrometeorological risk rEduCTion
TEV	Total Economic Value
WP	Work Package

Glossary of Key Terms

Co- Benefits	Added benefits that result from actions taken to address environmental challenges like hydrometeorological hazards or climate change, and which go beyond direct benefits of a more stable climate or reduced risk (Smith 2013).
Co-creation	An approach to collaboratively generate new knowledge, with the aim to increase the social relevance of the knowledge produced for policy and practice applications, and to generate new research questions
Disaster	"A serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts." (UN General Assembly 2016, 13)
Exposure	The number of people, property, or other elements at risk that can be affected by a particular hydro-meteorological hazard
Hydro-meteorological hazard	A potentially damaging hydro-meteorological event that may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation. Examples of hydro-meteorological hazards include floods, storm surges, droughts, and landslides
Nature Based Solution	“actions inspired by, supported by, or copied from nature that aim to help societies address a variety of environmental, social and economic challenges in sustainable ways” (Bourguignon 2017, 2)
Social innovation	“the creation of long-lasting outcomes that aim to address societal needs by fundamentally changing the relationships, positions and rules between the involved stakeholders, through an open process of participation, exchange and collaboration with relevant stakeholders, including end-users, thereby crossing organizational boundaries and jurisdictions” (Voorberg, Bekkers, and Tummers 2015, 1334)
Stakeholder	Persons, groups, and organizations who are, negatively or positively, affecting and/or being affected by current and future hydro-meteorological hazards as well as by the proposed NBS
Vulnerability	The characteristics of the exposed elements in terms of their capacity anticipate, cope with, resist and recover from the impact of a hazard

1 Introduction

Implementation of Nature Based Solutions (NBS) for hydro-meteorological hazards offers the possibility to break away from traditional practices and enable to reconnect our land management practices and developments with nature in order to achieve multiple benefits to services and functions of ecosystems.

Project RECONECT H'2020-C5-08-2017-GA-776866 is an interdisciplinary international project that aims to contribute to European reference framework on NBS by demonstrating, referencing and upscaling large scale NBS and by stimulating a new culture for 'land use planning' that links the reduction of risks with local and regional development objectives in a sustainable way.

In order to contribute effectively to the EU reference framework on NBS, to generate higher impacts across Europe, and enable learning and upscaling internationally, RECONECT (Regenerating ECOsystems with Nature-based solutions for hydrometeorological risk rEduCTion) draws upon a number of Demonstrator[1] and Collaborator[2] cases. These have been carefully selected to cover a range of local criteria including i) climatic and geographic conditions, ii) type of hydro-meteorological hazards (floods, storm surges, droughts, landslides), iii) vulnerability to these hazards, and iv) governance structures and social/cultural settings. Besides these criteria, the potential for collaboration and upscaling has also played a role in the selection process.

This deliverable (D1.2) introduces RECONECT's social innovation approach which will be mainstreamed and contextualized by Collaborators and Demonstrators. The deliverable is part of RECONECT's WP1 Framing science, policy and practice of NBS.

1.1 Purpose

The purpose of this document is therefore to provide more concrete guidance for integrating social innovation in the implementation of NBS for hydro-meteorological hazards. The guide presents examples for operationalizing a social innovation approach throughout the NBS process consisting of: co-assessment and planning; co-design; co-operations and maintenance; co-monitoring and evaluation: upscaling; and co-creation. Focus is placed on people -and not only on the biophysical traits- as determining factors for assessing suitability of NBS.

This is, however, not a guidance for construction works. The guide walks the reader through the considerations that should be made before taking decisions and how these considerations can be embedded in the process of implementing NBS. Lastly the guide recommends adopting an additional step in the NBS process to follow-up and monitor the co-creation process itself.

[1] Divided in two types: Demonstrators Type A – cases where the co-creation (i.e., co-assessment and planning, co-design, co-implementation, operations and maintenance, and co-monitoring and evaluation) of NBS will be carried out during the project, and Demonstrators Type B – cases where such works exist and they will serve as reference cases.

[2] Four European and 13 International Collaborator sites focusing on prefeasibility studies and knowledge sharing activities.

1.2 Who this guide is for

This guide is designed to address two audiences. The first includes researchers (within and beyond RECONECT) who are attempting to work with collaborative approaches to NBS. The second audience are actors, for example at local or regional levels, working with aspects related to water governance, risk management to hydrometeorological hazards, or spatial planning.

1.3 How to read the guide?

The guide is composed of a combination of approaches and methodologies that aim to create a more participatory process for the implementation of NBS. Each section begins by relating the NBS stage of the cycle to questions of relevance for how people relate to their surroundings.

After going through this guide, the reader should better understand how the NBS-implementation cycle could be conducted through a social innovation approach underpinned by co-creation methodologies. The guide provides detailed guidance for carrying out a stakeholder analysis, which is the starting point for any co-creation activity. Examples of methodologies with different degrees of participation are provided in each of the steps along the cycle.

The guide is divided into nine sections:

- Section 2 introduces the concept of social innovation.
- Section 3 introduces a methodology for stakeholder analysis.
- Section 4 introduces guidelines for co-assessment and planning of NBS.
- Section 5 presents co-design alternatives.
- Section 6 discusses aspects related to operations and maintenance.
- Section 7 includes guidelines for co-monitoring and selecting indicators for evaluation.
- Section 8 presents RECONECT's approach to upscaling NBS.
- Section 9 introduces an approach to follow-up the co-creation process.

2 Social Innovation

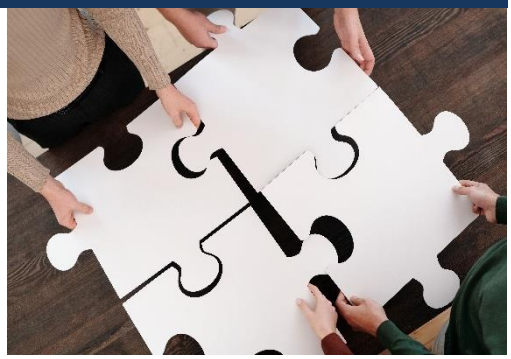
Social innovation is defined as “the creation of long-lasting outcomes that aim to address societal needs by fundamentally changing the relationships, positions and rules between the involved stakeholders, through an open process of participation, exchange and collaboration with relevant stakeholders, including end-users, thereby crossing organizational boundaries and jurisdictions” (Voorberg, Bekkers, and Tummers 2015, 1334).

In other words, social innovation are ways in which people are creating new and more effective answers to the challenges that societies face and embedding these solutions in a way that address societal needs (and not only steered towards economic profit).

What distinguishes social innovation from other types of innovations are the outcomes – strong focus on values attached to products – the networked relationships, and the new forms of cooperation, collaboration, and knowledge sharing that it brings about. As social innovation approaches place social value at the heart of the innovation process (Nicholls and Murdock 2012), participation of citizens and end-users is crucial (Murray et al. 2010).

Participation in RECONECT

Effective stakeholder engagement is an important element in RECONECT. A social innovation approach underpinned by co-creation gives stakeholders a voice, allowing them to present their concerns and be part of the creative process. Our stakeholders are involved in the different stages of the NBS implementation process: from the identification of local problems, to the proposal of feasible solutions.



Co-creation approaches are very well suited for exploring NBS (van Ham and Klimmek 2017; Pelling 2011; Kabisch et al. 2017). Co-creation is the means through which participation of stakeholders takes place in relation to social innovation. The purpose of co-creation is to generate *active* involvement of stakeholders throughout the different stages of a process (Vargo and Lusch 2004).

Local knowledge and expertise are often a valuable tool for understanding local situations and contexts, planning objectives and policy measures, as well as improving and/or designing innovative and alternative strategies (Barquet and Cumiskey 2018). Co-creation approaches not only have the potential to increase support for NBS but have been found to also optimize the potential of attaining co-benefits (Raymond et al. 2017) and contribute to increased legitimacy and stakeholder support of the planning process and the project’s outputs (Barquet et al. 2018). This can result in better managed ecosystems, yield major benefits in terms of ecosystem services and

products, reduce costs of cooperation, and produce a snowball effect of increased cooperation into other sectors (Sadoff and Grey 2005).

The RECONECT co-creation process involves researchers and stakeholders in an iterative process that includes stages of co-assessment and planning; co-design; co-operations and maintenance; continuous co-monitoring (throughout the cycle) and evaluation; upscaling; and an iterative co-creation approach (periodically) (
Figure 1 RECONECT's social innovation approach for NBS. The dashed arrows indicate continuous processes that are undertaken throughout the cycle.
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Figure 1 RECONECT's social innovation approach for NBS. The dashed arrows indicate continuous processes that are undertaken throughout the cycle.

3 Stakeholder analysis

Broadly defined, stakeholders are any group or individual who can affect or is affected by a process, issue or objective (Freeman 2010).

While stakeholder inclusion is a defining element in any co-creation approach, identifying who has something at stake is more challenging than it may first appear. In the absence of a robust methodology, stakeholder identification can easily turn into a subjective selection of easily accessible or well-known actors.

To improve the robustness of stakeholder inclusion in a process, we propose carrying out a stakeholder analysis before engaging in the NBS implementation process.

Stakeholder analyses typically focus on responding questions like: **Who are the relevant stakeholders? What are the stakeholders' interests and beliefs? Who controls critical resources? With whom do stakeholders form coalitions? And what strategies and venues do stakeholders use to achieve their objectives?** (Weible 2006). Stakeholder analysis provides a guide to investigate stakeholders' perceptions on risks, causes of and potential solutions to a problem, the distribution of resources among stakeholder coalitions, and the windows of opportunity for influencing policy for hydro-meteorological DRR. Based on this, strategies and roadmaps for achieving objectives, and find paths to collective agreements can be developed.

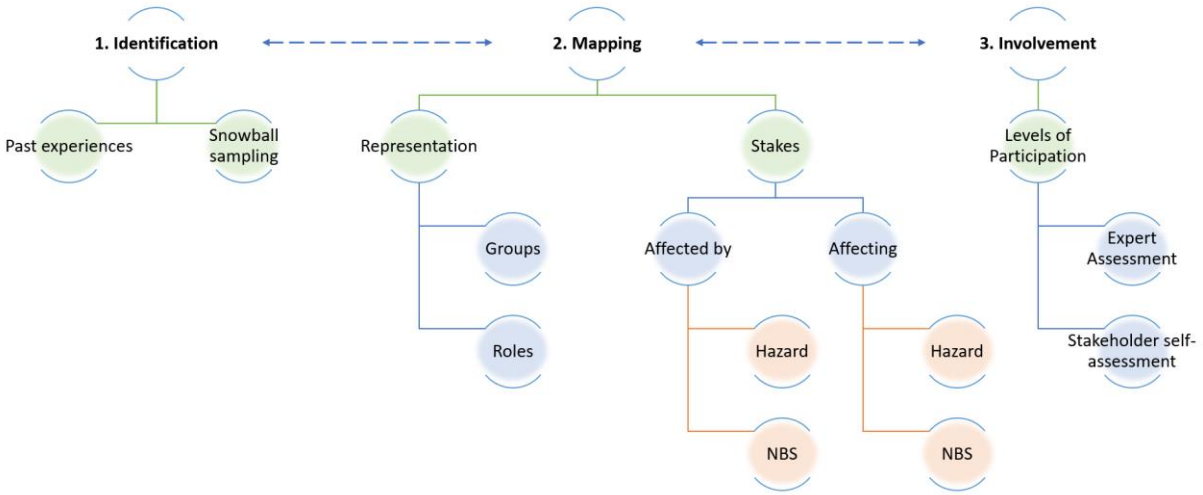

Figure 2 The three steps in stakeholder analysis

We propose a stakeholder analysis methodology based on three steps (Figure 2).

3.1 Step 1: Stakeholder identification

Own networks are often the starting point in a co-creation process. Stakeholders who have established a relationship of trust with the person leading the work are more likely to be responsive and dedicated in the subsequent steps. However, there is a need to go beyond own networks. This can be done through snowball sampling, for instance of experts in the field and according to predefined groups and roles. Groups and roles are defined according to the objectives and area of focus in a project.

3.1.1 Stakeholder groups

Stakeholder groups should represent the main sections of society, which in the case of RECONECT include authorities from governmental agencies, political representatives, civil society, commercial sector, academia, media, and international and transnational organizations. **Error! Reference source not found.** describes each of the groups in the context of RECONECT.

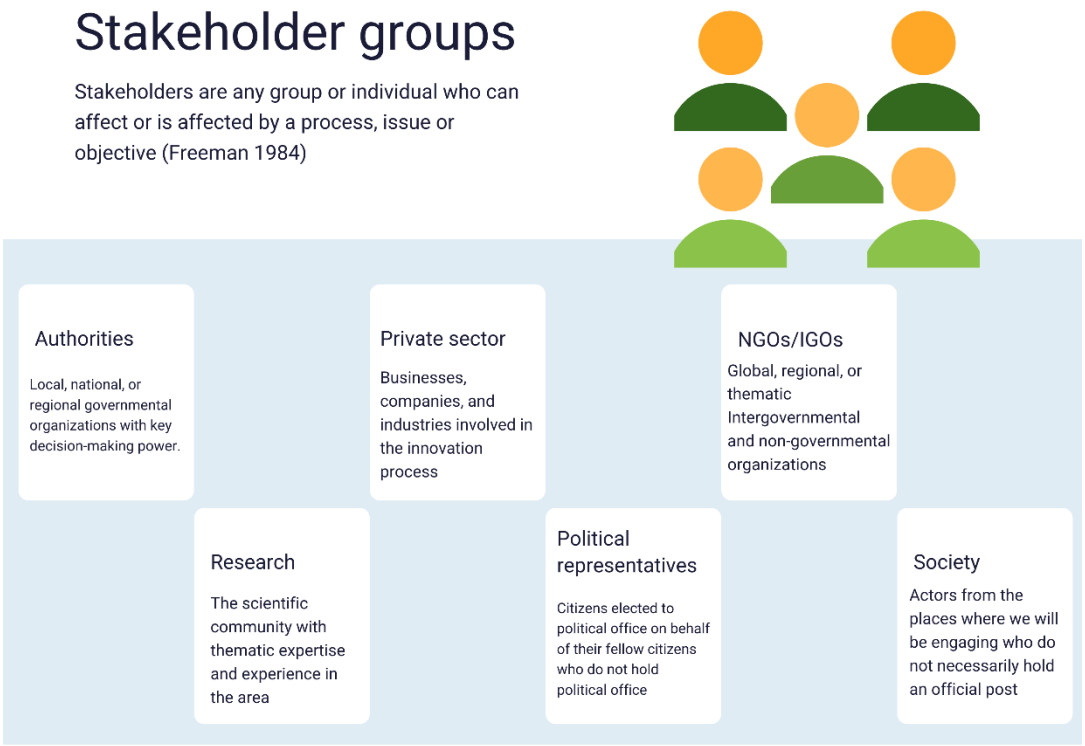

Figure 3 Stakeholder groups identified in RECONECT

Stakeholders should either represent themselves or a group. Group representatives, whether from civil society (such as associations, unions) or government (agencies) should have the support and be trusted by the people they are representing and the knowledge relevant to the issues to be discussed or willing to acquire the necessary information.

3.1.2 Stakeholder roles

While stakeholders can only represent one group, it is possible for them to have several roles. The role of each stakeholder will vary across contexts and is dependent

on the specific issue in question. For instance, it is likely that authorities have different roles or mandates across all cases, particularly when contrasting centralized and decentralized governance systems. **Error! Reference source not found.** includes descriptions of different roles identified in RECONECT and examples of stakeholders that potentially fit the description.

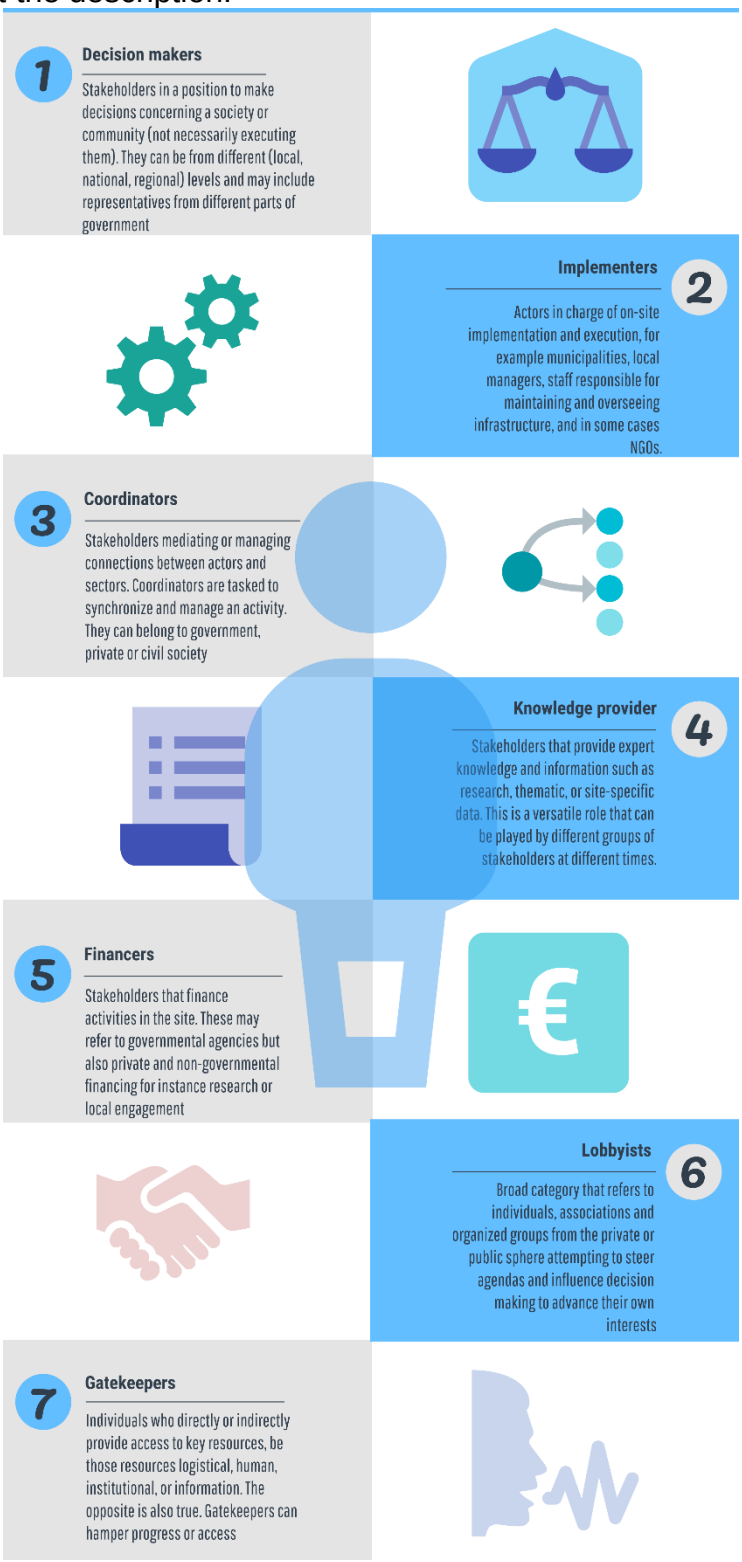

Figure 4 Stakeholder roles identified in RECONECT

3.2 Step 2: Stakeholder mapping

There are different methodologies for mapping stakeholders. Here, we suggest two methodologies to map stakeholders according to representation, and according to influence.

3.2.1 Mapping stakeholders according to representation.

An example is provided in Table 1, using a fictitious example of a case study. Notice how stakeholders only represent one group but may play different roles. As many stakeholders as deemed feasible can be included but a balance between the roles is ideal. If there are too many stakeholders providing expert knowledge and too few able to influence decisions or implement actions, the result might become a knowledge-rich workshop, but with very few possibilities to influence practice. If, on the contrary, there are too many stakeholders with decision making roles and too few stakeholders with expert knowledge (including knowledge on everyday experiences like local knowledge), the process could easily become top-down with potentially little anchorage in everyday practices.

Table 1 Example of stakeholder mapping based on groups and roles

Stakeholder Group	Name, Position and Organization	Role						
		Decision-makers	Implementers	Coordinators	Knowledge Provider	Financer	Lobbyists	Gateeeper
SH1: Authorities	Regional Coordinator, Contingency Agency	☐	X	X	☐	☐	☐	☐
	Municipal Council, Municipality X	X	X	☐	☐	☐	☐	☐
SH2: Political Representatives	Union Representative	☐	☐	☐	☐	☐	X	☐
	Elected Town Council Representative	X	☐	☐	☐	☐	X	☐
SH3: Civil Society	Representative of association for local inhabitants	☐	☐	X	X	☐	X	X
	house owner	☐	☐	☐	X	☐	☐	X
SH4: Private Sector	Insurance company	X	☐	☐	X	☐	X	☐
	Private Company	☐	☐	☐	X	☐	X	☐
SH5: Research	Climate Adaptation Unit, government agency	☐	☐	X	X	☐	☐	☐
	Researcher, University	☐	☐	☐	X	☐	☐	☐
SH6: NGO/IGO	Transboundary Commission	☐	☐	X	X	☐	☐	☐

3.2.2 Mapping stakeholder according to influence

A rainbow diagram (Burgers and Farida 2015) can help analyze the extent to which stakeholders a) influence the hazard(s) and the NBS (e.g. decisions, structures, dynamics), and b) are influenced by the hazard(s) and the NBS (e.g. exposure and vulnerability). Results from this methodology help assess whether the most influential or influenced stakeholders are being included in the stakeholder map.

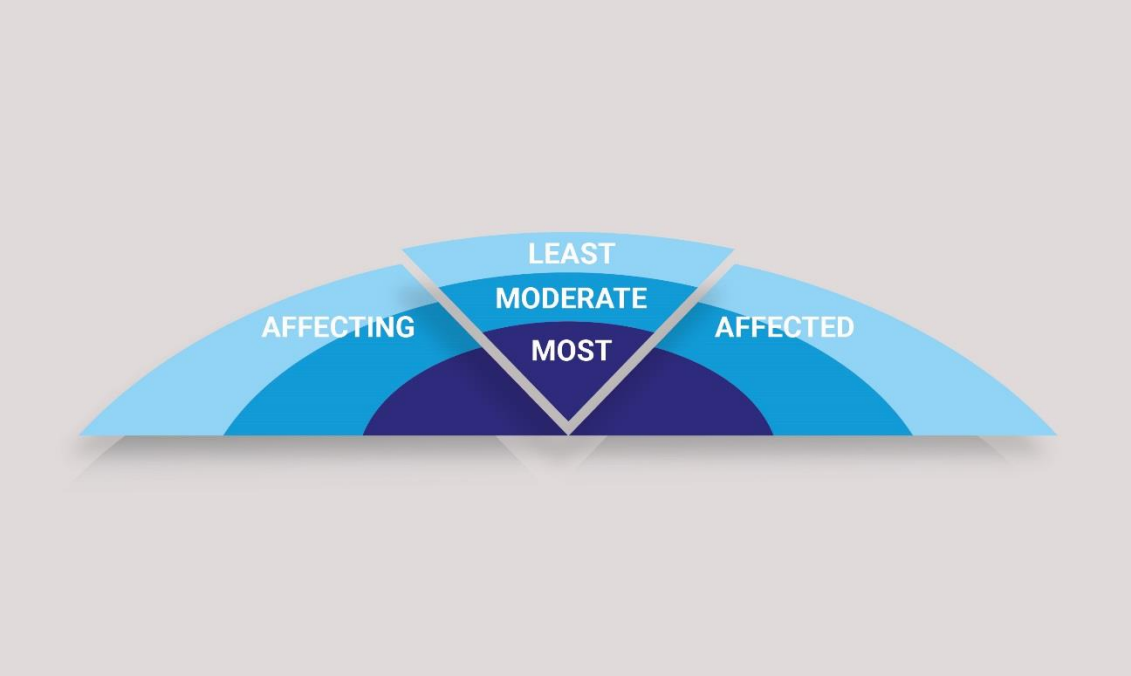

Figure 5 Rainbow Diagram

Furthermore, a stakeholder rainbow diagram can help visualize the stakeholder selection carried out in the first step and flesh out potential imbalances in representation (see Figure 5). For example, it could be the case that after step 1, the group of stakeholders involves more actors in decision-making positions whilst actors potentially affected by the NBS are underrepresented. Alternatively, there may be equal representation in the number of stakeholders, but with very uneven stakes in the process which could lead to the failed problematization of the issue in question.

Separate diagrams are used for 1) stakeholders affecting or being affected by the hazard, and 2) for stakeholders affecting or being affected by the NBS (i.e. two rainbow diagrams per site).

3.3 Step 3: Stakeholder involvement

The third methodology helps to assess the level of involvement or participation required and desired by each stakeholder (**Error! Reference source not found.**). This addresses the questions: how much and in what way do stakeholders want to be involved? And how much should stakeholders be involved and when?

Once stakeholders, their roles, and the extent to which they either affect or are affected has been identified, it will be important to find ways in which each stakeholder can participate effectively. It is important to consider not only which stakeholders are needed at different stages to obtain the necessary inputs, but also the willingness of stakeholders to participate, and the interests they might have at the different stages of the process. Especially the latter needs to be determined in consultation with the stakeholders. Finally, it is necessary to be aware of powerful stakeholders that allow, facilitate and encourage the involvement of other stakeholders or conversely prevent their participation, and ensure that all stakeholders feel free to make their voices heard.

Error! Reference source not found. depicts an adapted version of a typology of participation developed by Arnstein (1969). It includes one level of non-participation (uninvolved), three levels of low participation (awareness, information and consultation) and three levels of high participation (discussion, co-design and co-decision making). As more involvement is needed from stakeholders, the number of individuals interested and available in taking part in the process is likely to decrease.

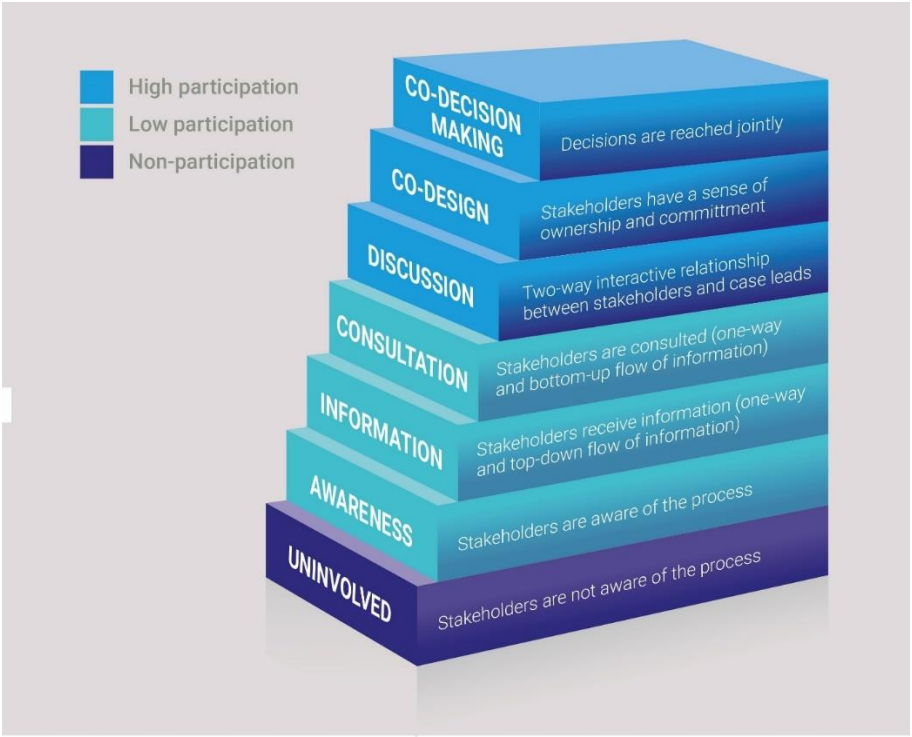

Figure 6 Levels of Participatio (adapted from Basco-Carrera et al. 2017, 100)

Different levels of engagement are required at different stages of the co-creation process. For instance, information meetings and other general type of activities can attract a broader audience. Conversely, tasks related to data provision or co-assessment of risks will rely on that there are a few dedicated and interested stakeholders – referred to as key stakeholders – at the very top of the ladder. Key stakeholders are often willing to dedicate time to the process but will also expect to be part of taking decisions. It is therefore important to manage expectations among stakeholders from the start.

In theory, stakeholders that are most affected and most affecting should be participating at a high level (e.g. co-decision making), and conversely stakeholders which are less affected but also less affecting can afford to be involved to a lower degree. Parties that are more affected by an NBS or by a hazard and that are affecting the NBS or the hazard the least should also be highly involved in the co-creation process. However, in practice participation depends on many other, sometimes pragmatic aspects, ranging from willingness to be involved, to time availability, competing interests, overcommitted actors, etc.

Like with the rainbow diagrams and the matrix for stakeholder mapping and analysis the level of involvement will have to be defined iteratively. In a first step, experts determine the level of involvement they wish to have from stakeholders, based on the stakeholder's group, role and how affected or affecting they are. In a second step, they consult stakeholders regarding their own view on what level of involvement they are willing to have in the project. This iteration might result in some key stakeholders not being willing to participate to the extent wished for (or not at all) despite their importance to the process. In such case, it is important to keep these stakeholders in the map (even if they do not want to be part of the process at all) and to find out the reason why they are not willing to be part of the project. This may change over the course of the project due to their time availability or interest.

4 Co-Assessment and Planning

The stage of co-assessment and planning addresses the questions: **What are suitable NBS? What are the benefits and costs?** This entails an assessment of places and people exposed to hydro-meteorological hazards, their vulnerabilities, preferences, and perceptions, as well as the barriers and enablers for implementation. Based on these assessments, the applicable types of NBS and their feasibility are determined. Appraisal of different types of NBS will be carried out in relation to benefits, co-benefits, and cost-assessments that reflect Key Performance Indicators (KPI)**.**[3]

The first part of this section provides guidelines for how to operationalize the stakeholder mapping exercise during a co-assessment and planning stage. The second part presents 10 steps for assessing and planning NBS. Each section contains a short description of the purpose and outputs of each of the steps, and the potential methodologies for ensuring a co-creation approach.

4.1 Stakeholder identification in co-assessment and planning

In order to understand the potential benefits and co-benefits of NBS for hydro-meteorological DRR, it is important to first establish who are affecting and being affected by a hazard. One way of making sure all groups are represented in the stakeholder analysis for a given hazard is to follow the process through which a disaster and its solution play out.

4.1.1 Who to involve in relation to the hazard?

Determining who is at risk, and therefore who should be qualified as a stakeholder in relation to the hazard, is more complex than determining the hazard and exposure. Who is at risk largely depends on vulnerability, and contrary to hazards and exposure, vulnerability cannot be merely determined by using physical parameters and demographic datasets. Instead, direct as well as indirect impacts of a hazard need to be considered. Indirect impacts can arise out of, for example, cascading effects upon critical infrastructures. The variety of negative outcomes highlights the need to locally anchor our understanding of vulnerability by allowing stakeholders to define the populations and infrastructures they consider to be vulnerable (Schneiderbauer and Ehrlich 2006).

[3] KPIs are defined in a different part of RECONECT (WP3 Co-evaluation and Validation).

Figure 7 Example of questions related to the hazard that can guide the identification of stakeholders during the co-assessment and planning stage

4.1.2 Who to involve in relation to the NBS

Among the stakeholders that should be identified in relation to the NBS are those that are affected by the NBS's area of influence, i.e., stakeholders that are indirectly affected by the flow of water coming from the NBS site. Figure 6(a) shows a hypothetical example of a site with implemented large- and small-scale NBS. Figure 6(b) depicts the same hypothetical case but simplified, including only one of the NBS.

Figure 8 Examples of stakeholders affected by an NBS

Stakeholders that are indirectly affected would include stakeholder B (e.g. the authority responsible for the small watercourse receiving inflow from the NBS site), stakeholder C (e.g. the authority responsible for the main river), and stakeholder D (e.g. the authority responsible for the final water body recipient).

Stakeholders may be self-identified or selected by others. They may represent themselves directly, be represented by a group or organization, or represent their community or particular interest groups (Forrester et al., 2008). The stakeholder mapping focuses on the relevant hazard as well as NBS being considered, both of which vary from site to site.

Many are likely to benefit from the establishment of NBS. However, it cannot be taken for granted that NBS will only bring about positive change. Rather, it is important to also explore whether there are individuals, groups, or organizations that perceive the NBS as disadvantageous and their reasons for doing so, as these stakeholders are likely to voice strong opposition to the NBS and in some cases even block any attempts at implementation. Acknowledging these stakeholders and inviting them to the discussion could have a positive impact upon the dynamics of the decision-making process, flash any potential physical, social, or environmental risks associated to the NBS, and help address and mitigate potential negative impacts from the NBS upon the physical, institutional, and social structures of a place.

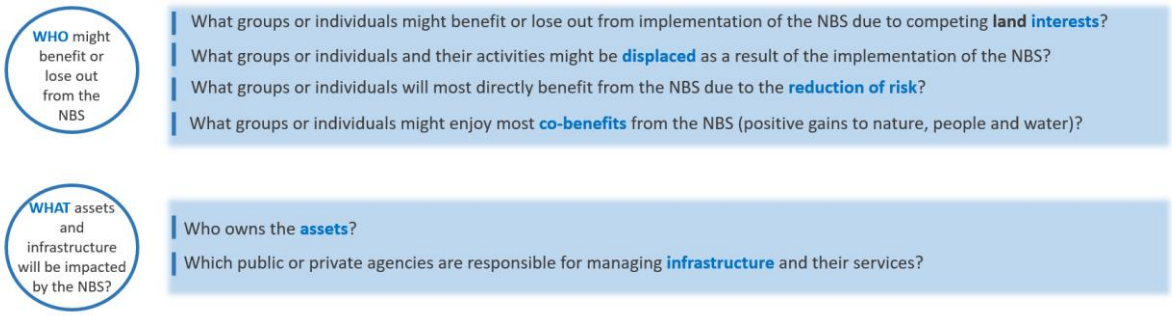

Figure 9 Example of questions related to the implementation of the NBS that can guide the identification of stakeholders during the co-assessment and planning stage

4.2 Ten Steps for co-assessing and planning NBS

The process outlined below is aligned to the more traditional steps followed in the planning stage of NBS. The difference is the inclusion of a social innovation approach in each of the steps as described below (illustrated in figure 8).

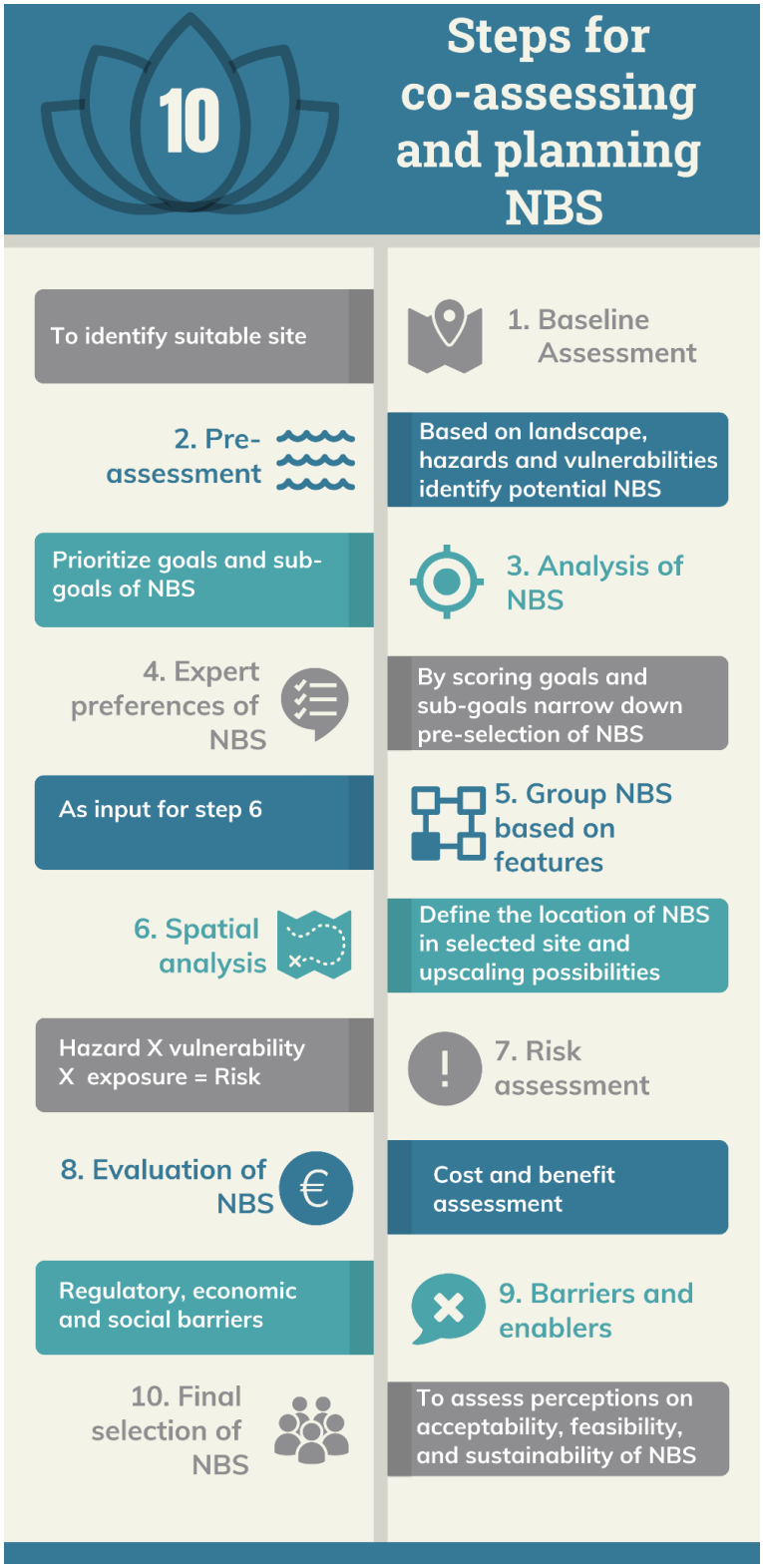

Figure 10 Ten steps for co-assessing and planning NBS

1. **Baseline assessment** is done with the purpose of identifying suitable NBS according to landscape characteristics. The baseline assessment is carried out by using existing data and through key-stakeholder consultations. The baseline assessment will help identify the broader area (i.e., catchment level) based on previous experiences or history of hazards.
2. **Pre-assessment** to narrow down the focus area. Apart from history of hazards, a prefeasibility assessment includes information on the physical landscape: climate, topography, geology, land cover and use, terrain characteristics, groundwater; and socio-economic traits such as vulnerabilities, development plans, and regulatory context. Based on this assessment and using RECONECT's catalogue of measures, an initial list of NBS can be selected
3. **Analysis of NBS** through prioritization of goals and sub-goals. Stakeholders score the goals and sub-goals for of highest importance to them in relation to hydro-meteorological risk, water quality, habitat structure, biodiversity, socio-economic and human well-being.
4. **Expert preference** to narrow down the selection of NBS. The previous steps will result in a list of NBS based on the characteristics of the physical landscape. These NBS have been assigned a scored based on goals and sub-goals. The next step is to narrow down the selection even more to ensure relevance with the ecosystem and societal functions. This can be done through participatory methodologies like workshops with expert stakeholders, retrospective reflections and future planning, or multiple perspectives wheel (Turoff et al. 2013).
5. **Group shortlisted NBS** according to design features (see next section for examples). These will be used as input to the spatial analysis (next step). Node-link diagram methodology is a useful methodology for visualizing connectivity (Keller, Eckert, and Clarkson 2006).
6. **Spatial analysis** to define the potential location of NBS within the selected site and identify upscaling and replication possibilities. Using the shortlist from step 5, participatory mapping or transect walks could be used to ensure stakeholders' experiences are captured in the analysis (Rød et al. 2012).
7. **Risk assessments** accounting for hazard, vulnerability, and exposure as well as results from the participatory mapping previously carried out. Stakeholder workshops can further help to validate results.
8. **Evaluation of shortlisted NBS** through cost and benefit assessments (both monetary and non-monetary). It is recommended to use life cycle cost

Green, Blue, Grey

NBS can be "blue" which are water-based measures; "green" or vegetation-based; and "hybrid" which combines green or blue NBS with constructed structures. (Sahani et al., 2020)

Figure 11 Before (left) and after (right) the implementation of NBS in RECONECT's Thur River Basin, Switzerland

assessments (Figure 12) that account for initial costs (planning, design, construction...); process costs (permits, certifications, monitoring equipment, inspections...) and maintenance costs (repair, transport, excavation, materials...). Benefits can be initially explored by using some of the available online tools like BeST (Benefits of SuDS Tools), or Teeb-staad. Qualitative valuation of benefits and co-benefits, for instance through multi-criteria assessments (MCAs) can be used wherever data is missing.

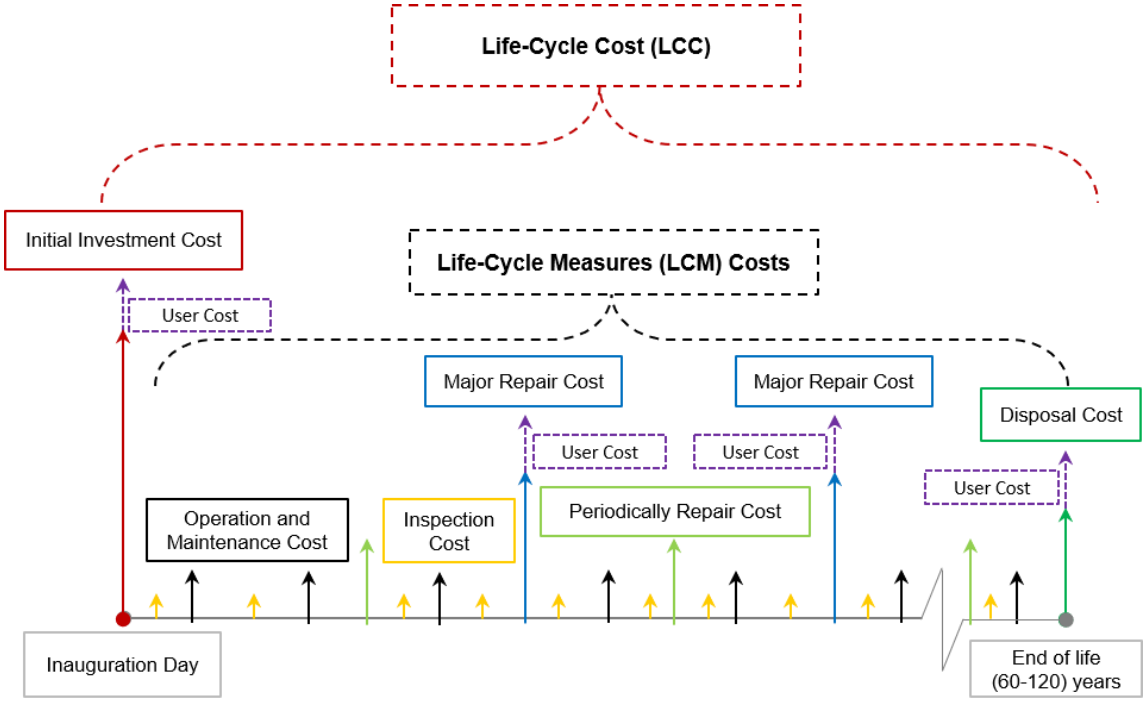

Figure 12 Life-Cycle Cost assessment (Folkbro n.d)

9. **Assessment of regulatory barriers and opportunities** is important to understand the contexts in which NBS will be implemented. This can be done through reviews of literature and documents combined with key stakeholder interviews and participatory workshops.
10. **Final selection of NBS** through participatory MCAs can allow for exploring perceptions on acceptability, feasibility and sustainability of NBS based on a number of scenarios (Barquet and Cumiskey 2018).

5 Co-Design

This stage addresses the questions **Which design configurations meet stakeholders' needs and uses? How can NBS be designed for multiple benefits?**

Addressing this question demands the involvement – through consultation or participation- of stakeholders involved during the co-assessment and planning stage.

This section is divided into four subsections, each of these outlining a) co-design principles, b) design considerations, c) a three-dimensional approach; and d) business case identification.

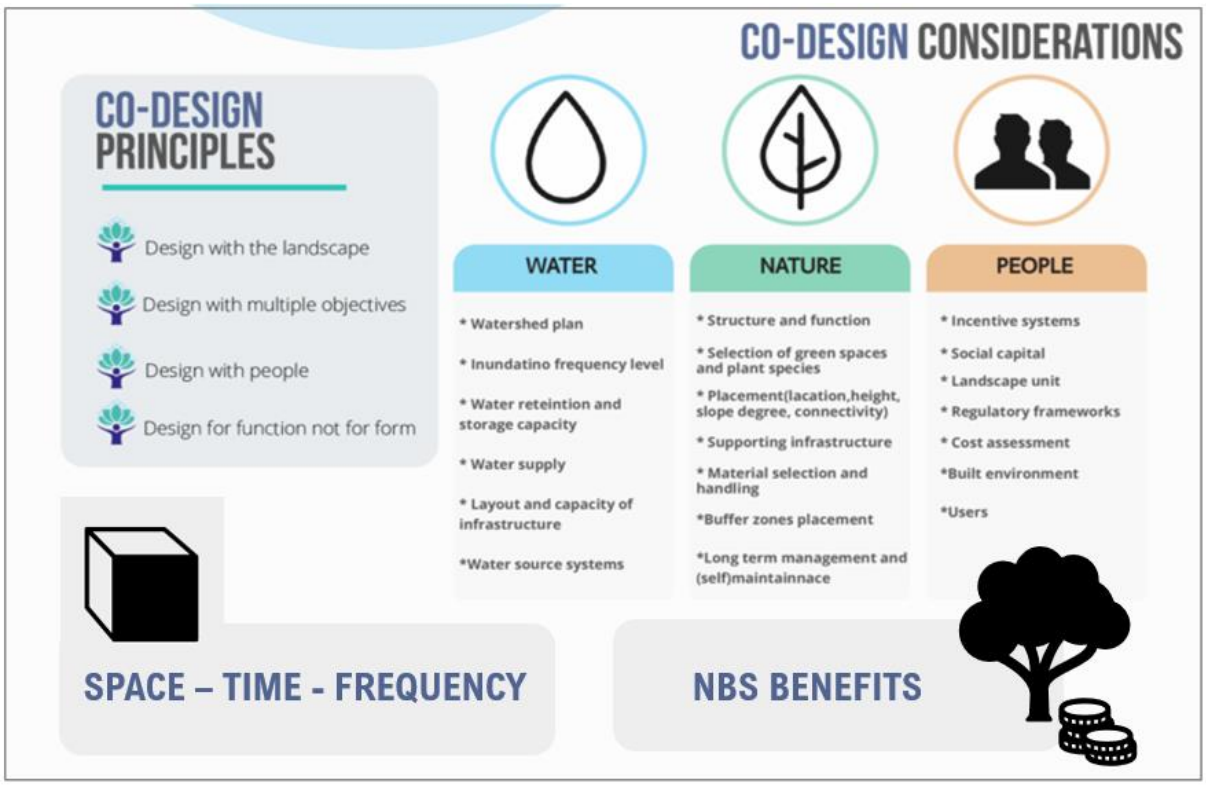

Figure 13 Typology for NBS co-design options

5.1 Co-design principles

NBS require a design based on a **landscape approach**. For example, if working with water, then it is important to work with the whole watershed, not just the part of the waterbody that may be the most degraded site or that might present the highest frequency of floods. Activities upstream can have adverse effects downstream. Particularly, land use like agriculture, could increase runoff volumes, stream downcutting and bank erosion, and pollutant loading. Urbanization and infrastructure development could exert pressure on existing water systems or affect water flows. A localized solution may not be able to change the entire watershed, but it can be designed to better accommodate watershed effects. At the same time, often some

NBS benefits are not generated on site, but spill over into many places inside and outside the area where the NBS is implemented, beyond the administrative limits (European Commission 2015). By considering the entire landscape, planners may be able to design a NBS to address hydrometeorological risk, while also withstanding or even helping to remediate the effects of adjacent land uses (USEPA 2000).

Identification of potential design options of NBS will be based on the potential to achieve multifunctional land use with **multiple objectives** that can combine a variety of benefits and co-benefits. “Multifunctionality” has become a popular term in landscape design and planning, and it has been associated with protective and creative measures promoted through the European Landscape Convention and also with NBS as promoted by the European Environment Agency. Application of such multifunctionality requires to change not only the thinking in terms of traditional practices, which place a greater focus on grey infrastructure, but also the traditional landscape planning practice and much more on integration between the two, resulting in a multifunctional design approach.

Designing with people entails fostering community participation as well as embedding NBS to government regulations and city planning strategies. Community initiatives that include owners and users in the making of communities are important for creating bottom-up processes in city and landscape planning. Participatory planning processes can be enhanced by clear and transparent communication of potential actions to assist in the identification and promotion of community initiatives as a base for NBS. Besides from community initiatives, government policies play a significant role in the maintenance and operations of NBS. Ownership and delegation of responsibilities but also financing are aspects often covered in regulations and which need to be incorporated in the design of the NBS. This is particularly important when designing for the landscape, which is often not congruent with urban administrative boundaries and division of responsibilities between governing agencies. Therefore, bringing on board the right stakeholders from the beginning is crucial for ensuring a sustainable design.

Designing for function requires awareness at the design stage that not all NBS become functional overnight. For example, it might take several years for wetlands to start retaining nutrients or create the optimal conditions for enhancing wildlife. Second, not over-managing the NBS but allowing it time to develop is key for success. Lastly, NBS cannot be over-engineered. For instance, rectangular designs, rigid structures and channels, and regular morphology go against the principle of mimicking natural processes (Mitsch 1992).

5.2 Co-design Considerations for Water – Nature - People

The potential design options of NBS will take into consideration different requirements across the water, nature and people dimensions.

The elements listed under each category – Water, Nature, People – need to be seen in relation to one another. For example, users refer to all types of stakeholders using a resource (e.g., water), or the infrastructure delivering the resource. It can also refer to property owners, associations, or other type of stakeholders that might modify the landscape. This means that when looking into water source systems and supply (under

Water), or buffer zone placements (under Nature), users will need to be connected to the design process because social and economic considerations will ultimately decide whether landscape-level approaches, such as the restoration of wetlands in watersheds, can and will be implemented (van der Valk and Jolly 1992).

5.3 Three-dimensional approach: space, time, frequency

Incorporating a three-dimensional approach of time, space, and frequency is necessary to assess the drivers of risks, and to identify whether the risk is due to the magnitude of the hazard, the vulnerability of the case, or the combined exposure of these. At the same time, NBS serve many purposes beyond hydrological risk reduction, with some benefits being delivered on a daily basis whilst others are only evident during an extreme event. Lastly, the space used for NBS is also important in the discussion on multiple services, as these should justify the land allocated for the NBS. The three dimensions are further discussed below.

Spatial dimension

Relevant NBS solutions to consider depend on whether it is a small local catchment or the downstream part of a large river stretch. This will impact both the modelling complexity as well as potential measures. Different NBS solutions have different requirements for space and hence also the physical limitations in a given context will influence the choice of NBS measures.

Temporal dimension

The spatial and temporal dimensions are closely linked as the hydrological response to large-scale meteorological phenomena is slower than to small-scale local phenomena. Thus, the same considerations as in the Space dimension apply as the critical timeframe of a catchment is closely linked to its size.

Frequency dimension

The three points approach (3PA) can be used to distinguish between three hydrological domains in the frequency dimension: 1) The everyday domain, 2) the design domain, and 3) the extreme domain (Fratini et al. 2012; Sørup et al. 2016). This framework acknowledges that infrastructure, including NBS, provide services at different levels and that it is important for the planning and design to be aware of these differences. If NBS designed to manage extreme hydrological events on rare occasions should provide ecosystem and recreational services on an everyday basis specific analyses under those assumptions needs to be done on top of the analysis of the extremes to make sure it is the case (Andersen et al. 2017). This also highlights the fact that many “additional” or “soft” services delivered by NBS occur on a much more frequent basis than the risk they also manage in the case of extreme weather events.

5.4 Understanding benefits

Capturing NBS value is contingent upon understanding their impacts. ‘Impacts’ refer to the benefits that an NBS produce on Water, Nature or People. In order to quantify these, it is necessary to have data of NBS’ physical impacts upon people and the surroundings. However, currently, the level of knowledge related to the benefits from NBS do not allow for making a detailed assessment of the value chains from ecosystems. On this aspect, using conceptual frameworks can be useful for the

identification of business potential in NBS projects. Two frameworks can be useful for assessing benefits of NBS: ecosystem services and total economic valuation.

5.4.1 Ecosystem services

NBS' impacts could be assessed based on their ecosystem services. The ecosystems approach proposed by the Millennium Ecosystem Assessment is typically classified according to these four types of services:

- **Supporting** services (nutrient cycling, soil formation, etc.)
- **Provisioning** services (food, fresh water, etc.)
- **Regulating** services (climate, flood, etc.)
- **Cultural** services (aesthetic, educational, etc.)

These services have different impacts for human well-being that stakeholders involved in the NBS projects are looking for:

- **Security** (personal safety, secure resource access, etc.)
- **Basic material for good life** (adequate livelihoods, etc.)
- **Health** (strength, feeling well, clean air, clean water, etc.)
- **Good social relation** (social cohesion, etc.)
- **Freedom of choice and action**

Figure 14 Range of ecosystem services provided by nature to humans Source: WWF, 2016 (adapted from Millennium Ecosystem Assessment, 2005)

5.4.2 Total Economic Valuation framework

Ecosystems are real sources of value, but NBS can also provide other values of importance to the economy that the ecosystem service approach does not capture. This is where the Total Economic Value (TEV) framework can be a good complement.

The TEV framework starts from a less anthropocentric perspective but retains a link with the ecosystem service approach. It is relevant for integrated assessments that need to incorporate cost-benefit analyses. The concept encapsulates two values (Gren et al. 1994; Turner et al. 2003; Balmford et al. 2008):

- **The 'output' value** (e.g. benefits and services that ecosystems can provide like provisioning, regulating or cultural).
- **The 'insurance' value** (capacity of ecosystems to maintain a constant flow of benefits as supporting).

For the TEV, biodiversity and ecosystems can generate two types of values. Within this approach, output values are divided into 'use' and 'non-use' value categories as presented in **Error! Reference source not found.**5.

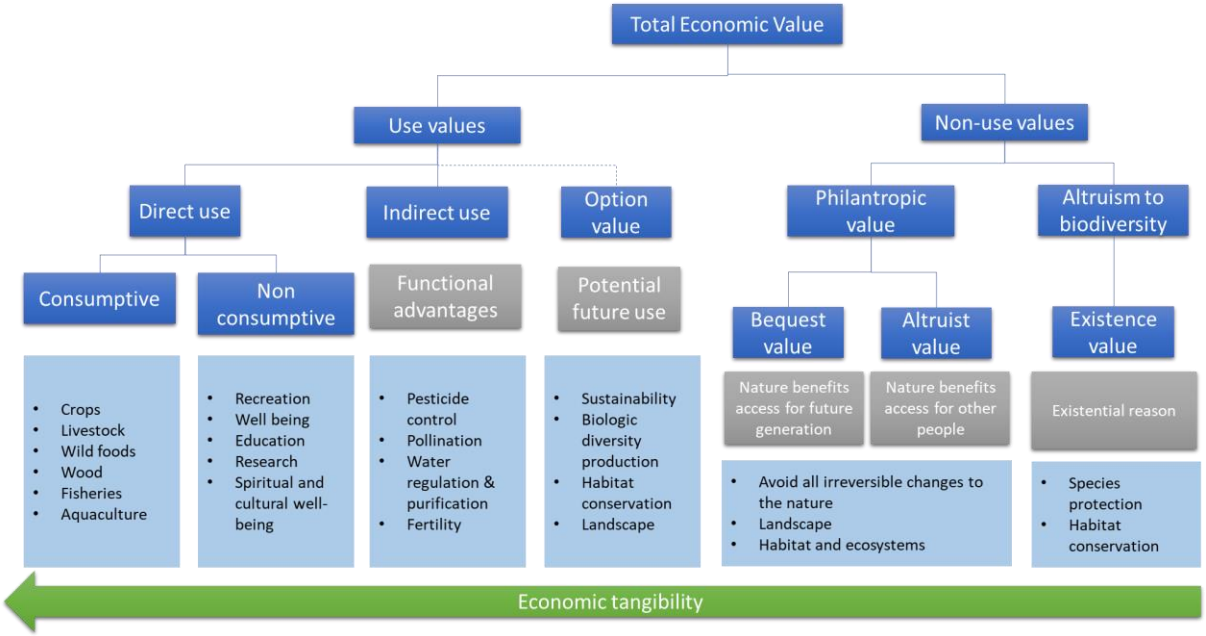

Figure 15 Value types within the TEV framework

adapted from Chevassus (2009) and TEEB (2010)

6 Co-Operation and Maintenance

How to construct, operate, and maintain NBS? How to ensure effectiveness and sustainability of NBS? Operation and maintenance activities are not just a technical issue, but includes social, financial, organizational and environmental aspects as well (Brikké 2000). Operations and maintenance require understanding of regulatory process and the mandates of different actors and organizations.

This section touches upon three aspects of operation and maintenance: 1) Who does what and key steps to consider; 2) construction works; and 3) phases for implementation.

6.1 Who does what?

Operating NBS and subsequently maintaining it is a continuous process that will require the involvement of several actors for different purposes. Figure 15 divides them into 3 types of actors: core governance, technical staff and quality control. Some of these actors are likely to fulfill more than one function. Also, the specific actors are likely to differ from case to case. Actors involved in operations and maintenance of NBS can be mapped already during the stakeholder analysis (section 3 of this guide).

RECONECT's Deliverable 2.4 provides more in-depth information about operations and maintenance of the project's demonstrators.

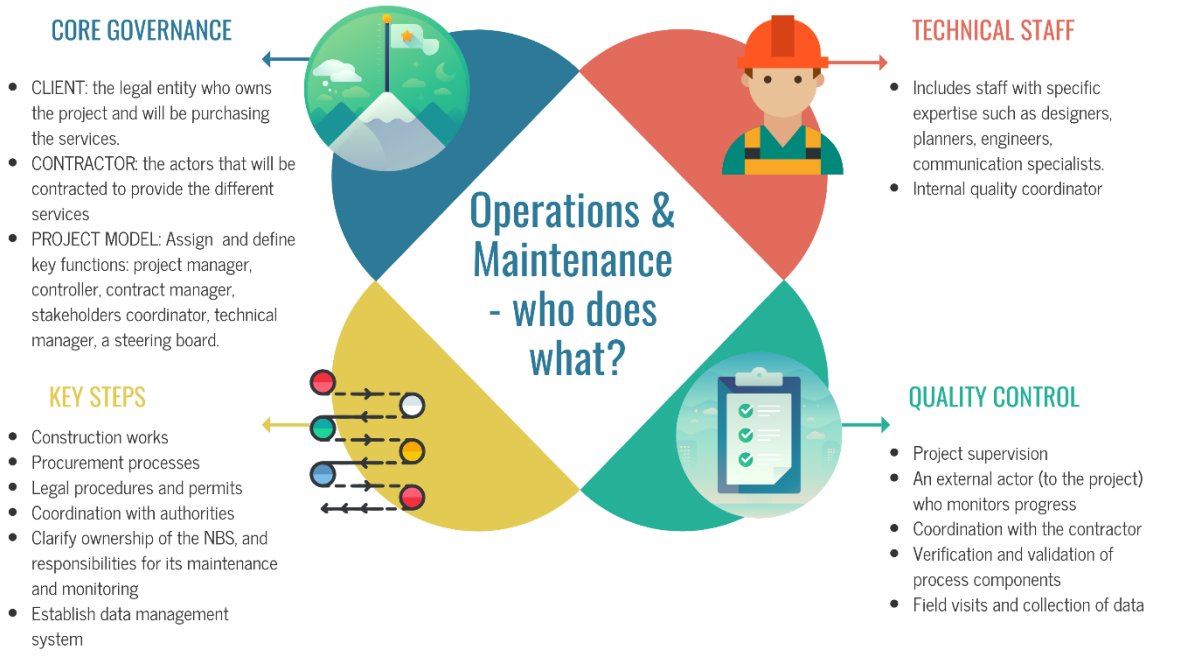

Figure 16 Actors and functions in Operations and Maintenance of NBS

6.2 Phases for implementation

The implementation of NBS can follow a timeline for the different tasks planned for the operation and maintenance of the area. Figure 17 shows the example of RECONECT's Ijssel River Basin in the Netherlands.

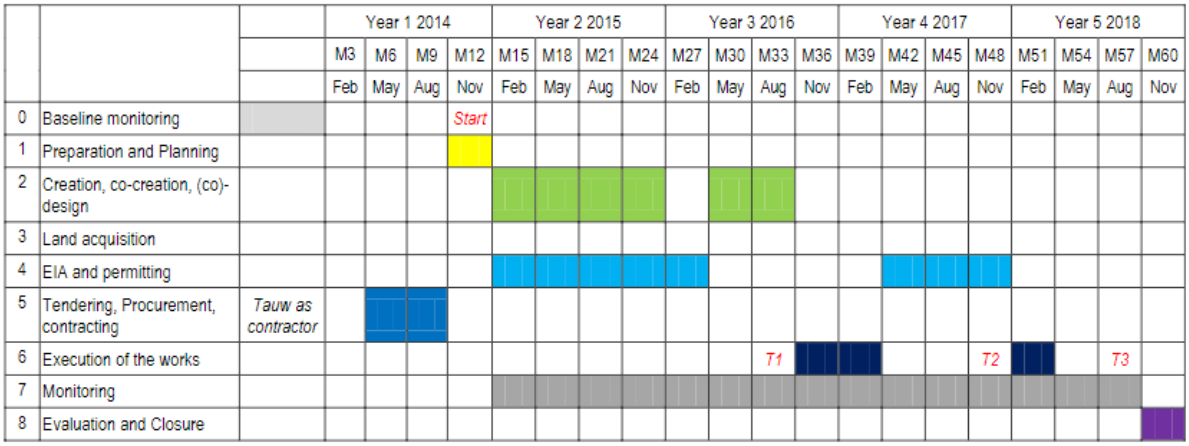

Figure 17 Timeline for implementation in Ijssel River Basin, The Netherlands

The project ran over a 5-year period. During the first three years the construction works were divided three phases:

Phase 1: land parcels where flora and fauna data are known, and with stakeholder agreements, started in 2015 for an estimate of 40% of the area.

Phase 2: land parcels where flora and fauna data are known, but where more effort was needed to reach agreements with stakeholders, started at the end of 2015 for another estimate of 40% of the area.

Phase 3: parcels where the flora and fauna data had to be further explored and risks of appeal procedures in the permit applications existed, started in 2016 for an estimate of 20% of the area.

The subsequent years focused on processing permits, seeing over the execution of the works, monitoring and evaluation.

6.3 Business case identification

NBS can imply many opportunities for new or existing businesses. Practically speaking, the main challenge in creating a business case for NBS is capturing its value. After having assessed NBS benefits (section 5), the values created by NBS can be explored.

Two types of values can be created by NBS: monetized and non-monetized values. Monetized values correspond to activities made by someone who is paid for with money, while non-monetized values are not. For instance, caring for parents is a non-monetized value which could become monetized if a nurse is paid with money to carry

out the related activities. Internalizing non-monetized values into business models is still an emerging topic of research.

In order to identify business cases, inputs are required from stakeholders. During the co-assessment and planning stage, preferences regarding goals and sub-goals, and perceptions on the feasibility of NBS can be used as input for identification business opportunities.

Figure 19 shows four factors that may influence the business potential of NBS (ConnectingNature[4], ThinkNature[5], Naturvation[6]):

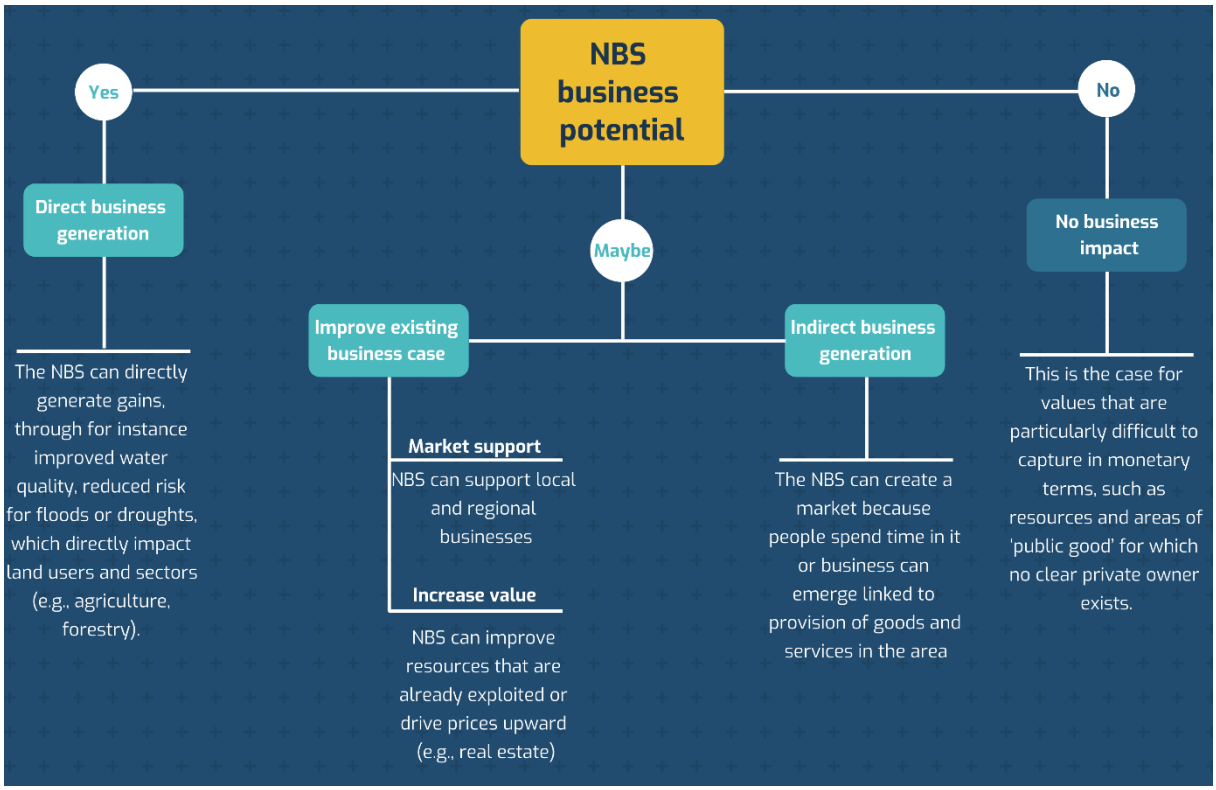

Figure 18 Four factors influencing the business potential of NBS

Once values are identified, several methods exist to quantify them economically. They require a lot of information and a specific approach for each case. These are summarized in Figure 20.

The Market Valuation Approach includes several methods to set a value depending of the context and the case (TEEB 2010).

Revelead Preference Approach can be done through two methods: the travel cost method, and hedonic price modelling (TEEB 2010).

[4] "The Nature-Based Solutions Business Model Canvas & Guidebook V2", by Siobhan McQuaid, Trinity College Dublin & Horizon Nua, for the ConnectingNature European project
[5] Webinars of ThinkNature
[6] https://naturvation.eu/atlas

The Stated Preferences Approach can be done through three methods i) asking people to estimate the price of an ecosystem (Wilson and Carpenter 1999; Martín-López 2007); ii) modelling people's choices (Hanley, Wright, and Adamowicz 1998; Philip and MacMillan 2005); or iii) group Valuation (Wilson and Howarth 2002).

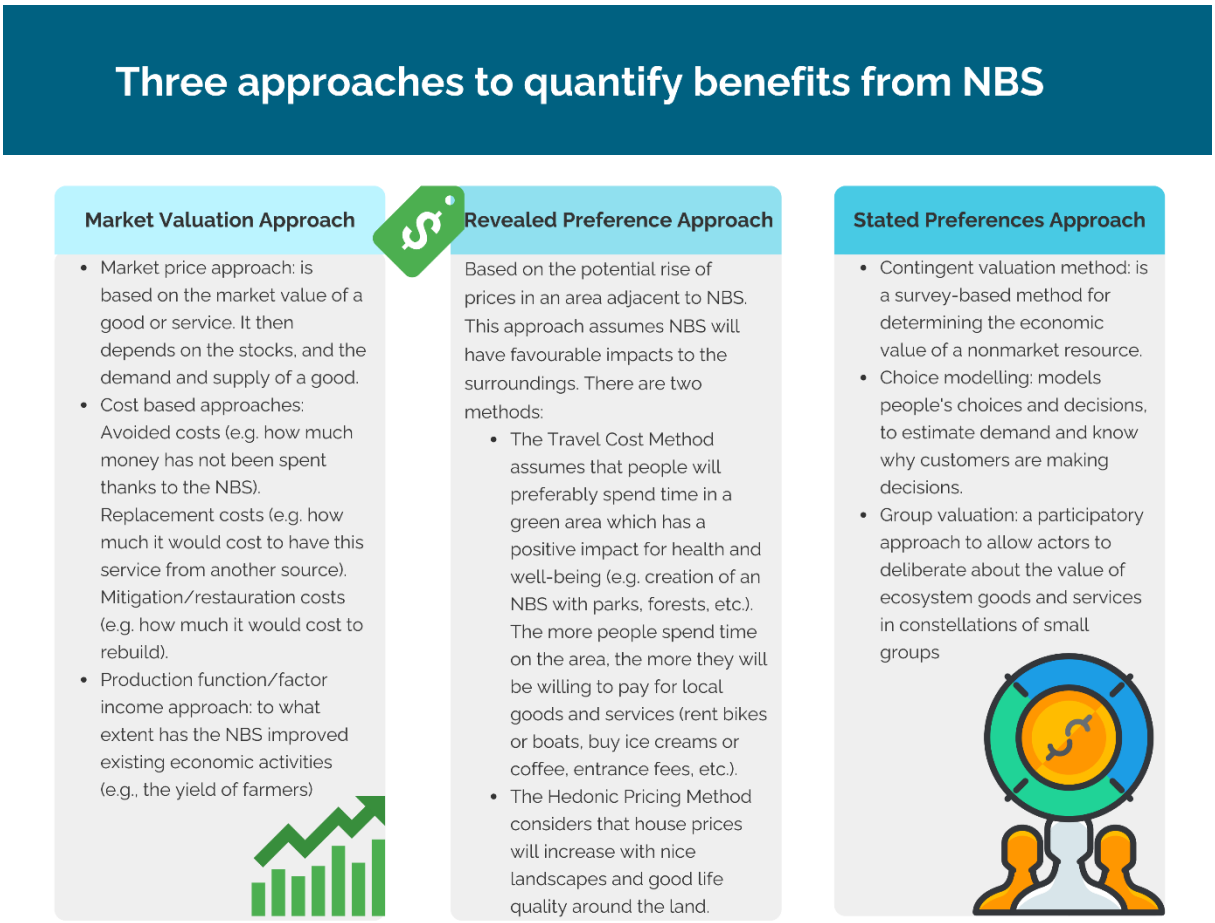

Figure 19 Approaches to quantify benefits from NBS

7 Co-Monitoring and co-evaluation

How effective are co-implemented NBS in achieving desired benefits and co-benefits? What works, what does not work and why? Co-monitoring is important to evaluate NBS performance characteristics, and in RECONECT these activities are carried out in relation to three categories of challenges – Water, Nature, and People. Before beginning monitoring activities, it is important to co-design a comprehensive monitoring plan and have a baseline to which progress can be evaluated iteratively. This plan will be based on clear aims and objectives, and will identify relevant indicators, target values, program duration, and roles and responsibilities of the stakeholders involved.

7.1 Monitoring and evaluating using co-designed indicators

Monitoring and evaluation go hand in hand. In order to evaluate something, there needs to be a previous process of monitoring. Results from this process will provide the basis for comparing progress.

> *"Evaluation is learning what works, recognizing when something isn't working and figuring out a new course of action that gets us where we want to go. Evaluation works best when actions can be compared against a baseline or starting condition and measured with a goal or outcome in mind. Evaluating effectiveness includes assessing the time, resources and effort that go into producing desired outcomes and making progress toward shared goals" (Feurt 2008:15).*

Monitoring the performance of NBS can be carried out using co-designed indicators developed during the co-assessment and planning stage to measure progress on expectations for benefits and co-benefits of NBS (see figure 21 for the framework used in RECONECT).

Before beginning monitoring activities, it is important to co-design a comprehensive monitoring plan. This plan should be based on clear aims and objectives, and outline relevant indicators, target values, program duration, and roles and responsibilities of the stakeholders involved. Monitoring systems are most effective when indicators are linked to objectives (Keiner 2006), when they meet essential decision support needs of planning (Briassoulis 2001), when the needs of decision-makers inform the selection and interpretation of indicators (Hoernig and Seasons 2004), and when indicators cover issues identified as important both from a scientific point of view and based on stakeholder concerns (Falck and Spangenberg 2014). Indicators become an influential

policy tool when their results are used and integrated into regular decision-making processes by a variety of users (Hoernig and Seasons 2004).

Monitoring variables will be derived from an analysis of co-designed indicators. These will aim to reflect short and medium-term changes, which will show the likelihood of a solution's success in both short- and long-term. Baseline monitoring aims to reflect the situation before the implementation of NBS, whereas the post-implementation monitoring aims to evaluate the situation after implementation of NBS. Monitoring activities at a particular location will depend on the chosen group of indicators.

Methods for monitoring and evaluating will require data/information on, amongst others, i) hydro-meteorological conditions, ii) the situation before and after implementation of the NBS, and iii) the potential impact of the NBS in relation to hydro-meteorological DRR and the provision of ecosystem services, and iv) a range of social, economic and environmental co-benefits.

In RECONECT, co-monitoring and evaluation activities are carried out in relation to three categories of challenges – Water, Nature, and People – and across spatial and temporal dimensions as outlined in section **Error! Reference source not found.**. NBS will be evaluated in relation to their potential to achieve benefits and co-benefits. For Water, activities involve, hydrological data collection, modelling of watershed runoff, river and floodplain hydrodynamics, as well as coastal processes. For Nature, the focus is on environmental and ecosystem processes. Aspects related to habitat structure and biodiversity play an essential role in the evaluation of NBS. Hence, monitoring of environmental impacts is a highly relevant phase within the Environmental Impact Assessment process in all Demonstrator cases. For People, the evaluation will include aspects related to human well-being and socio-economic aspects, such as using Social Impact Assessments and Social Vulnerability and Resilience Assessments.

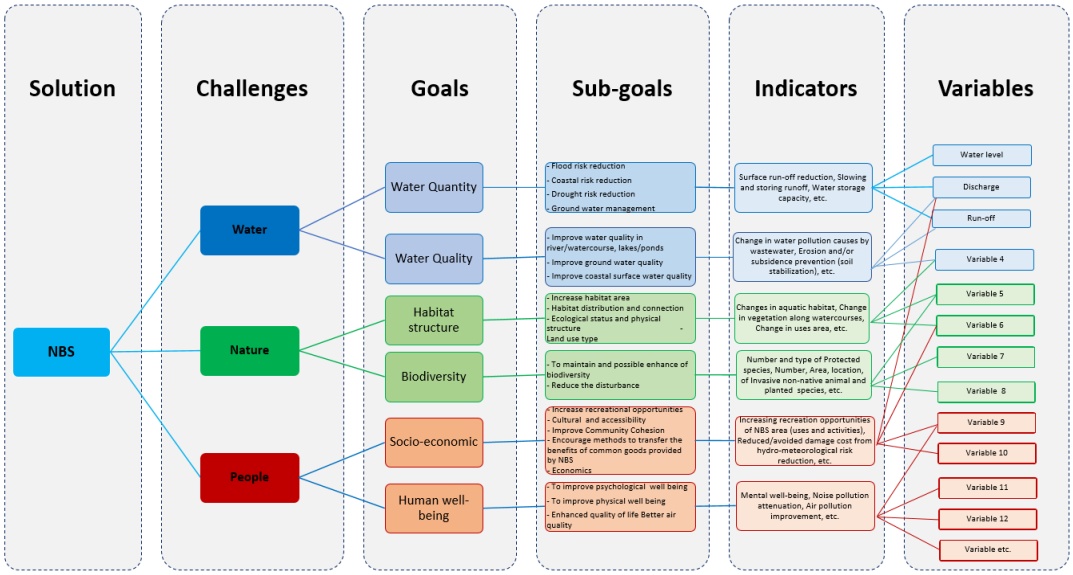

Figure 20 RECONECT framework for development of indicators and variables

Figure 21 provides a generic list of goals, sub-goals, indicators, and variables per challenge. These need to be socialized in the specific case where the NBS interventions is being planned. Co-created indicators imply a process whereby stakeholders have been part of the selection of factors deemed important for the context. A participatory process for co-creating indicators can be carried out through participatory workshops, focus group discussions, or participatory MCAs (Ahlström, Johannesdottir, and Kärrman 2019)

8 Upscaling

How can NBS be more widely adopted? How can social lead to transformative impact of NBS 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 adaption, urban development or land planning – both within but also beyond the RECONECT context?

This section proposes a typology for upscaling NBS. The purpose is that impacts so that of NBS do not only reach stakeholders related to a project (e.g., RECONECT), but rather lead to a wider transformative change. The section sketches out key elements as well as specific actions that are particularly relevant for initiating scaling processes. More details and a more comprehensive strategy are provided in a dedicated report on RECONECT scaling strategy (D4.3).

8.1 A typology for upscaling

In this report, we deliberately use the term **scaling** in order to point to strategies and actions that aim at increasing the impact of the NBS project (e.g., RECONECT). Scaling includes diverse actions and strategies and is used here as an umbrella term that is made operational through **five different scaling strategies**, sketched out in figure 22

Figure 21 Scaling typology (based on Moore and Riddel 2015)

8.1.1 Scaling out

Scaling out' is probably the most common strategy pursued in many sustainability-oriented initiative 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 or by exploit project results, also economically.

However, social innovations are often not just context-specific they also aim at addressing and overcoming some of the deep seated root causes of a problem, which are often a result of specific institutional patterns and regimes as well as established cultural values and worldviews. Such root causes, however, are not systematically addressed by scaling out strategies. Therefore, Moore et al. (2015) propose to also include strategies based on the idea of scaling up and scaling deep.

8.1.2 Scaling up

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, 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).

8.1.3 Scaling deep

Scaling deep is 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. 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, sharking of experience and knowledge as well as partnering.

8.1.4 Scaling down

Scaling down is an additional element of scaling we propose. It takes predominantly a top-down perspective and is 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. Scaling down is thus about how governments set up policies and binding standards (Kern 2018, 134) and by doing so supports or hinders the uptake of NBS. It is important to be aware of such policies and standards as hierarchical governance plays a key role in the development of EU environmental policy and will also have a large impact on the amplification of NSB across Europe and beyond (Wellstead et al. 2016).

8.1.5 Cross-Cutting scaling

Cross-cutting scaling strategy that relies on different elements of scaling (scaling deep, out, up and down). Although, the scaling strategy is presented as a stepwise approach,

which implies chronology, steps can be taken simultaneously, repeatedly and in different order. More important than the chronology is thus the underlying ideas and actions as well as the overarching ambition to make scaling an explicit effort that requires both a strategy visions (accompanied with specific tactical steps) as well as resources and time dedicated to such efforts to implement a scaling strategy effectively.

Demand and Supply Analysis

Scaling of social innovations implies reaching out to people looking for solutions (Westley et al. 2014). A key cornerstone of any scaling activity is thus to understand the needs and demands of a wide set of stakeholders, but to also be specific about the expertise, knowledge or solutions that can be provided. An important element of scaling is therefore a demand and supply analysis (DASA) that allows matching partners with specific demands with partners that are able to supply expertise with respect to this demand.

Which group of stakeholders or people should be involved in the DASA? A first group of stakeholders are those involved within a project, a second group of stakeholders are beyond the project. For example, in the context of RECONECT we aim at assessing the demands of Demonstrators and Collaborators with regards to a more effective uptake of NBS in the management of hydro-meteorological hazards. Demonstrators might for instance want to better understand how to assess different options for mitigating risks related to hydro-meteorological hazards or how to design a specific NBS within a given context. Collaborators might want to learn more from good practices on how to overcome public resistance to NBS to mitigate flood risks.

How to structure a DASA? Any DASA requires a backbone-structure along with the demands and supplies that are being assessed. In the RECONECT project, for instance, the DASA is structured along the NBS cycle (presented in section 2) and the wider governance context. Based on the International Risk Governance Council framework (IRGC 2017), four governance layers shaping the management of NBS can be highlighted (see **Error! Reference source not found.**):

- The organizational capacities of Demonstrators and Collaborators to realize NBS (Kuhlicke and Steinführer 2010). This includes, among others, knowledge about how to realize NBS as well as the motivational and economic capacities to realize NBS as well as the economical capacities to realize them;
- A sound understanding of the stakeholders affecting and being affected by NBS as well as by the hazard (see Section **Error! Reference source not found.**);
- An understanding of how the political and regulatory context (i.e. regional, national as well as European policies and legislations) supports or hinders the realization of NBS through specific guidelines, supportive regularly frameworks, or incentives or subsidy programs (Kern 2019);
- The wider social climate including trust in the responsible organizations as well as the general acceptance of NBS as a way to reduce hydro-meteorological flood risks.

Which methodology is most suitable for conducting a DASA? The answer to this questions, depends on the time and resources available, on the numbers of stakeholders and people addressed as well as on the stage of the scaling processes (e.g. at the beginning of rather at a more progressed stage). In the following we introduce a workshop-based assessment supported by qualitative interviews. Such a workshop based assessment allows intense and in-depth discussion with a rather limited number of people and stakeholders.

Conducting a DASA workshop: The workshop should gather people and stakeholders with a particularly need as well as people and stakeholder who can supply expertise, knowledge and specific solutions. In the context, of RECONECT this included all Demonstrators and Collaborators as well as all project partners. The latter represented a diverse set of competences and expertise.

At the beginning of the workshop the general idea of the activity as well as the expected outcome should be clarified. In the case of RECONECT, the DASA workshop was for instance, an important element of initiating twinning processes within the project. This included also a generic definition, and the potential benefits of twinning activities.

In a next step, the needs assessment should be conducted. All participants should be invited to openly and freely present topics they would like to exchange with others by stating their needs. After participants have stated their needs, participants should be invited to identify topics they could provide expertise to others (i.e. expertise/knowledge, experiences, and practices they might want to share with others). Demands and supplies should be written down on cards and pinned to a white board along the pre-defined structure. In addition, each statement should be connected with a name of an organizational affiliation to be able to track back the statements to single partners.

Through this collective and highly interactive format, an atmosphere of transparency and productivity is created as both demands and supplies are immediately visible to all participants at the white boards. Based upon such a workshop session, one is able to identify needs/supplies of both single stakeholders and people but also develop an overview on topics which are of great relevance for a wider group of stakeholders.

In addition, to the workshop and if time and resources are available, it can be helpful to do additional interviews in order to gain further context knowledge and to develop a more detailed understanding of the root causes shaping the needs to people and stakeholders.

Twinning

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. While the first town twinning dates back to the 1930 – it was the City of Klagenfurt (Austria) that twinned with the City of Wiesbaden (Germany) – the idea gained momentum after the Second World War. During this period, the objective was to install mechanisms ensuring reconciliation and peace among France

and Germany by forming partnerships between cities, towns and municipalities (CESIE 2011). Since then, many different forms of twinning have been implemented.

Generally, twinning activities aim at initiating a substantive exchange of experience, information, expertise, and good practice across cases.

In RECONECT twinning is not just about establishing a partnership between two partners; it is also about partnering a larger group of partners

Twinning 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

9 Co-creation

Has the social innovation led to transformative change? Co-creation is being increasingly promoted and applied; however, co-creation is also a highly resource intensive and challenging approach. More information is needed to evaluate the impact and effectiveness of different elements of co-creation (Durose, Richardson, and Perry 2018). Development and testing of robust indicators are needed to follow-up the co-creation processes, which will highlight areas for improvement and lend greater credibility and valuing of the co-creation process. This will inform the identification of best practices as there are few standardized approaches for co-creation.

RECONECT draws on existing co-creation indicators in the literature (Schuck-Zöller, Cortekar, and Jacob 2017; Bos, Brown, and Farrelly 2013), to identify a number of dimensions that are relevant for assessing the success of co-creation in RECONECT. For example, to establish whether the co-creation process has been effective it is necessary to monitor its contribution to the actions necessary to achieve progress towards the establishment of NBS.

Based on dimensions illustrated in Figure 19, RECONECT has piloted a mechanism for assessing a) whether the designed interventions have achieved their stated goals, for example whether new forms of action to implement NBS have been undertaken as a result of the co-creation process (goals will vary from case to case); b) whether co-creation led to an inclusive process characterized by openness and transparency, and where equal recognition is granted to all contributions; c) whether the project contributed to generating solutions that stakeholders consider relevant; d) whether it improved credibility of solutions; e) whether the co-creation process produced social learning and if so at which scale.

This proposed framework does not only help to evaluate the interventions, but to regularly monitor them as well.[7]

[7] Indicators for each dimension in Figure 19, will be developed together with the cases

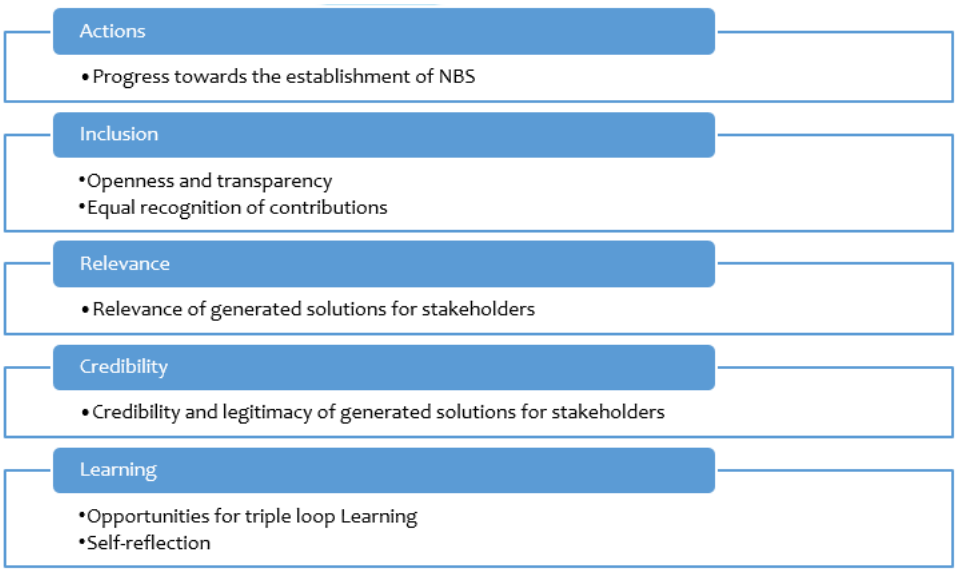

Figure 22 Dimensions for monitoring co-creation processes

Data can be collected using methods such as key informant interviews, surveys and questionnaires to assess co-creation indicators addressing the dimensions. Following a baseline assessment, surveys can be conducted at regular intervals (e.g. annually), using the same set of co-creation indicators in order to ensure comparability over time, as well as including other aspects that are relevant to that phase of the project (e.g. perceptions of co-creation initiation at the start of the project, or perceptions of change at the conclusion of RECONECT).

More information regarding the first co-evaluation activity in RECONECT is provided in D4.4.

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