



nature-based urban innovation

NATURVATION

project

NATURE-BASED SOLUTIONS IN EUROPEAN AND NATIONAL POLICY FRAMEWORKS

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Led by Durham University, NATURVATION involves 14 institutions across Europe working in fields as diverse as urban development, innovation studies, geography, ecology, environmental assessment and economics. Our partnership includes city governments, non-governmental organisations and business. We will assess what nature-based solutions can achieve in cities, examine how innovation is taking place, and work with communities and stakeholders to develop the knowledge and tools required to realise the potential of nature-based solutions for meeting urban sustainability goals.

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EXECUTIVE SUMMARY

A growing recognition of the value of ecosystem services and the wider socio-economic and socio-cultural benefits provided by natural systems has spurred a shift in urban policy and planning discourse, aiming to integrate these considerations into decision-making processes. At the European level, the term 'nature-based solution' (NBS) has been coined to refer to the variety of ways in which nature and natural systems can be used to address sustainability challenges. This report examines whether and how EU and Member State (MS) policy frameworks address NBS and related concepts, and how these are taken up in current policy frameworks on the European Union and MS levels.

The report, which has been carried out with the H2020-funded NATURVATION project, utilised desk research and expert interviews to identify relevant EU and MS policy instruments across a range of sectors and gather impressions about the national policy discourse and upcoming developments. In the context of this report, 'policy instruments' refers to different directives, strategies, programmes and financing instruments at EU and MS level. A targeted analysis then explored how NBS are addressed in each instrument. The EU review included 23 strategies, directives and dedicated funding instruments, while the MS review included a range of German, Spanish, Dutch, Swedish, Hungarian and English instruments.

The analysis revealed that while multiple MS and EU policy instruments explicitly acknowledge NBS-related concepts, they rarely contain quantitative and measurable targets relating to NBS deployment and quality. Furthermore, relevant policies often require no or only voluntary action in this regard. The reviewed policy frameworks also largely neglect urban areas when considering NBS and - when included - focus heavily on maintaining and restoring existing green and blue areas as opposed to deploying NBS to create new green and blue spaces.

Several processes are in place at the EU and MS levels which hold promise regarding increased future support for NBS deployment across Europe. However, room remains for increased cross-sectoral integration of NBS-related concepts and increased provisioning of funds as a means to generate concrete implementation action, increase the knowledge and evidence base, and foster wider support and awareness of NBS as a multifunctional approach to addressing multiple societal challenges.

Taking these findings into account, it can be concluded that that the degree of ambition as well as the extent and type of support vary greatly across MS and between the MS and EU levels. While the current policy mix provides a starting point for supporting/promoting NBS, there is significant potential on both an EU and MS level to strengthen the level of ambition and degree of support across sectoral policy instruments in order to create new and optimise existing (urban) NBS interventions.

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1. INTRODUCTION

A growing recognition of the value of ecosystem services and the wider socio-economic and socio-cultural benefits provided by natural systems has spurred a shift in urban planning discourse, aiming to integrate these considerations into decision-making processes. Discussions increasingly recognise the current challenges facing urban areas and their populations, such as a reduced availability of physical space, threats to human health arising from climate change and increased densification, and decreasing connection with nature. Consequently, urban planning processes increasingly consider implementing multi-purpose measures that utilise natural systems to foster the delivery of ecosystem services and wider societal benefits. Such 'green' measures have the potential to provide solutions to urban development and human well-being challenges simultaneously, while also benefiting biodiversity (IUCN, 2016).

The term 'nature-based solution' (NBS) has been coined to capture these approaches. NBS is an umbrella term for the family of related ideas that capture the distinct contributions that natural systems provide for human well-being, amongst other co-benefits. More specifically, NBS are deliberate, innovative interventions that seek to use the properties of nature to address a set of urban challenges as an alternative to conventional methods of urban planning and development, which mainly deploy purely technological and "grey infrastructure" based solutions. As such, NBS are capable of creating multiple ecological, economic, social and urban planning benefits in parallel.

NBS was first introduced as a term in the late 2000s in the context of addressing climate change impacts (IUCN, 2009; MacKinnon et al., 2008; Mittermeier et al., 2008) given the increasing interest in generating win-win solutions and optimising environment and economic agendas at that time. Since then, the term NBS has been broadened to cover and address multiple societal challenges while also delivering economic and environmental benefits. The concept and term have also been adopted and reinforced by the European Commission (DG Research and Innovation), which is now pushing for NBS as innovative means to support economic growth as part of the green economy (EC, 2015) and invests €120 million in research projects under the H2020 programme in 2016-2017 (EC, 2017). However, as there is not yet a legal initiative or policy coordination on an EU level requiring Member States (MS) to invest in NBS and given the relative newness of the term, there is currently only uncoordinated legislative and financial support for NBS scattered throughout various policy documents and sectors.

The current uptake and support for NBS across European and MS policy frameworks is the focus of this review, as this has significant potential to either foster or impede the concept's implementation and operationalisation. Factors such as the degree of bindingness, policy obligations and impacts on multi-level governance (Schleyer et al., 2015) as well as the types of interventions targeted, type of support, etc. are diverse and of crucial importance in this context.



2. AIM AND SCOPE

This report, as part of the NATure based Urban innovATION (NATURVATION¹) project aims to examine if and how EU and Member State policy frameworks address the concept of NBS and derive conclusions about the extent to which the examined frameworks have sought to enhance the use of NBS. Furthermore, the report aims to determine *how* the concept is taken up within the explored documents and countries. In understanding the coverage and sectoral support of NBS as well as what types of NBS are most supported, both the EU and MS levels can better target their efforts to operationalise NBS and maximise their potential to address societal challenges and provide multiple benefits.

The review examined a set of key EU and national policy instruments for (1) their *explicit* inclusion of NBS or directly related terminology as well as their (2) *implicit* reference to the use of nature as a potential solution for addressing a set of identified societal challenges. Desk research and expert interviews served to identify relevant EU and MS instruments, followed by a targeted analysis to explore how NBS are addressed in each. The MS review focused on the countries of the NATURVATION case study cities (i.e. Germany, Spain, Netherlands, Sweden, Hungary and England).

Given these aims, the structure of the report is as follows. We first concentrate on a review of the EU policy framework in Section 3. This section outlines the methodological approach followed, including the selection process for determining the EU instruments to review, and conclusions emerging from the analysis. Section 4 concentrates on the MS level review, outlining the methodological approach that was applied and results of the analysis. Section 5 provides a comparative analysis between the EU and MS levels and highlights overarching findings in this regard. Finally, Section 6 provides concluding remarks and perspectives for NBS deployment across MS and Europe. In the Annexes, supplementary information can be found on the methodological approaches as well as a list of the EU and national MS policy instruments that were reviewed.

¹ <http://naturvation.eu/>



3. REVIEW OF EU POLICY FRAMEWORK

3.1. SELECTING KEY POLICY INSTRUMENTS

A desk-based review was conducted to identify the EU policy instruments of highest relevance for enhancing the use of NBS. In the context of this report, ‘policy instruments’ refers to different directives, strategies, programmes and financing instruments at EU and MS level. Consulted sources included peer-reviewed articles focusing on ‘nature-based solutions’ and related concepts which have been published since 2010, dedicated European Commission (EC) and European Environment Agency (EEA) webpages and publications, and the outputs of pertinent European projects (e.g. OpenNESS², EKLIPE³, Supporting the Implementation of Green Infrastructure⁴, Natural Water Retention Measures Platform⁵, etc.). An extensive list of potentially relevant policy instruments were initially identified, encompassing those which are known to explicitly target the deployment or financing of NBS (or related concepts) and/or which are perceived as having the potential to impact the support for or uptake of NBS. Subsequently, expert judgment was used to refine the list and highlight only the most pertinent items within the identified priority fields (i.e. biodiversity, water, the marine environment, agriculture and regional policy, forestry, climate change adaptation, research, cohesion and growth and environmental assessment). The final selection was validated by the project’s expert task force, resulting in the list below (see Table 1).

In total, 23 EU strategies, directives and dedicated funding instruments have been reviewed (see section 3.3). The approach followed and the outcomes of the analysis are presented in the subsequent sections.

3.2. DEVELOPING AND APPLYING A FRAMEWORK TO ASSESS SUPPORT FOR NBS

Developing a framework for assessing support for NBS across the identified policy instruments is necessary to ensure consistency and enable comparability between the reviewed documents. This requires clarifying how support is defined

² <http://www.openness-project.eu/>

³ <http://www.eclipse-mechanism.eu/>

⁴ http://ec.europa.eu/environment/nature/ecosystems/docs/green_infrastructures/GI%20Final%20Report.pdf

⁵ <http://nwrn.eu/>



TABLE 1. SELECTED POLICY INSTRUMENTS TO BE INCLUDED IN EU LEVEL REVIEW

POLICY FIELD	EU POLICY INSTRUMENT
Biodiversity	<ul style="list-style-type: none"> • Habitats Directive (1992) • Birds Directive (1979/2009) • Biodiversity Strategy to 2020 (2011) • Green Infrastructure Strategy (2013) • LIFE+ (the EU's financial instrument supporting environmental, nature conservation and climate action projects)
Water	<ul style="list-style-type: none"> • Water Framework Directive (WFD) (2000) • Floods Directive (2006)
Marine environment	<ul style="list-style-type: none"> • Marine Strategy Framework Directive (MSFD) (2008) • Blue Growth Strategy (& Guidance) (2012) • European Maritime and Fisheries Fund (EMFF) (2014)
Forestry	<ul style="list-style-type: none"> • Forest Strategy (2013)
Agriculture and regional policy	<ul style="list-style-type: none"> • Common Agricultural Policy (CAP) (2013), including the European Agricultural Fund for Rural Development (EAFRD) • Urban Agenda for the EU (i.e. Pact of Amsterdam, 2016)
Adaptation	<ul style="list-style-type: none"> • Climate Change Adaptation Strategy (2013)
Research	<ul style="list-style-type: none"> • 7th & Horizon (H2020) Framework Programmes for Research and Innovation
Cohesion and growth	<ul style="list-style-type: none"> • Europe 2020 Strategy (2010) • Circular Economy Action Plan (2015) • Cohesion Fund • European Social Fund (ESF) • European Regional Development Fund (ERDF)
Environmental assessment	<ul style="list-style-type: none"> • Environmental Impact Assessment Directive (EIA) (1985) • Strategic Environmental Assessment Directive (SEA) (2001) • Protocol on Strategic Environmental Assessment (2008)

and what qualifies as a NBS. Accordingly, support is defined as the extent to which the regulatory framework addresses NBS and/or related concepts and fosters their deployment across the European Union. This can come in various forms, including e.g. providing information or knowledge, developing capacities (through training, providing access to resources, etc.), legislative or regulatory support, or financial support.

Regarding a classification of NBS, the framework developed within the NATURVATION project has been used (outlined in more detail below and in Annex A) to maintain consistency within the project and respective activities therein. This



TABLE 2. CONCEPTS RELATING TO NBS AND SOCIETAL CHALLENGES ADDRESSED

CONCEPTS AND TERMINOLOGY RELATING TO NBS	SOCIETAL CHALLENGES POTENTIALLY ADDRESSED BY NBS (ADAPTED FROM THE SDGS AND RAYMOND ET AL. 2017 FOR USE IN NATURVATION)
<ul style="list-style-type: none"> • Climate action for adaptation, resilience and mitigation • Water management • Coastal resilience and marine protection • Green space, habitats and biodiversity • Environmental quality, including air quality and waste management • Regeneration, land use and urban development • Inclusive and effective governance • Social justice, inequality and social cohesion • Health and well-being • Economic development and decent employment • Cultural heritage and cultural diversity • Sustainable consumption and production 	<ul style="list-style-type: none"> • Climate action for adaptation, resilience and mitigation • Water management • Coastal resilience and marine protection • Green space, habitats and biodiversity • Environmental quality, including air quality and waste management • Regeneration, land use and urban development • Inclusive and effective governance • Social justice, inequality and social cohesion • Health and well-being • Economic development and decent employment • Cultural heritage and cultural diversity • Sustainable consumption and production

understanding follows the European Commission definition of NBS, defined as those solutions that use nature as a means to address one or more societal challenges (outlined in Table 2). However, given the relative newness of the term NBS and predicted infrequency with which it will be explicitly mentioned in policy instruments, a range of related concepts were also included in the analytical framework and review process. To this end, a brief literature review was conducted to identify the main concepts and terms closely relating to NBS, which also aim to improve human well-being through the appropriate management of ecosystem services and natural capital (Potschin et al., 2016). The identified concepts and terms are outlined in Table 2.

Applying this understanding of NBS and related concepts, a template was developed to structure the review process (see Annex A). Utilising these template, each document first underwent a **review to identify basic information**, including:

- Date of entry into force
- Update/reforms, if applicable
- Type of policy instrument (strategy, framework, directive, etc.)
- Aims, objectives and targets relating to NBS deployment (including quantitative and qualitative goals)
- Geographic coverage
- Funds/programmes used to finance the regulatory framework

For financing instruments specifically, a further basic category asked to specify the amount of funds available, timeframe for distribution, conditionality, and other relevant details.

As a second step, each document was screened for the **explicit or implicit mentioning of NBS or related terms**. Explicit mentions were identified using a text search function, while implicit mentions were identified by scanning the text for any elements highlighting the potential of nature, ecosystems, or NBS-related physical interventions to address one or more of the societal challenges outlined in Table 2. For each identified text block, further details were entered regarding the type of *societal challenge addressed, the type of ecological NBS intervention, elements of NBS mentioned and the nature of the instrument*. More specifically, the types of NBS interventions included:

- 1) the creation of new green and blue spaces,
- 2) the maintenance and/or management of existing green and blue spaces, or
- 3) the restoration of ecosystems and their functionality to deliver a wider range of ecosystem services and benefits.

This categorisation as well as the elements of NBS mentioned (outlined in Annex A) follow the NATURVATION framework. The *nature of the instrument* could either be mandatory (including mandatory requirements or standards), voluntary (encouraging voluntary action), or a statement (relating to NBS thematically, but which does not encourage nor require action).

On the basis of the aforementioned findings, a final section of the template aimed to provide a **summary of the relevance of the document** at hand. This included a short summary of the extent and type of support for NBS, an identification of the NBS and related terms which were explicitly mentioned and an identification of which was most commonly used. Finally, the extent to which a policy instrument supports the deployment of NBS was assessed using expert judgement and only the basis of the review. Four levels of support were identified, as outlined in Table 3.

The full template and explanations of each included category as well as examples for all explored aspects are available in Annex A.



TABLE 3. LEVEL OF SUPPORT FOR NBS IN RESPECTIVE POLICY INSTRUMENTS

LEVEL OF SUPPORT	DESCRIPTION
Strong explicit support	NBS or related terms are explicitly mentioned and strongly embedded throughout the framework, including in objectives, policy measure design and/or supported actions.
Strong implicit support	Strong framing of nature as a means to address (select) societal challenges, with multiple references to/support for elements of NBS or NBS intervention types; no explicit mentioning of NBS or related terms.
Medium support	NBS and related concepts are not a prominent feature, but deployment is supported through references to/support for individual NBS elements and interventions.
Low support	NBS are neither a prominent feature nor relevant for/mirrored in policy measure design and supported actions.

3.3. EU ANALYSIS AND FINDINGS

This section presents an analysis of the reviewed EU policy instruments and funding streams. More specifically, the prevalence of NBS-related terms, types of societal challenges addressed, types of NBS solution (i.e. creation of new spaces, maintenance or management of spaces, and restoration of ecosystems) and examples of NBS, as well as the degree and nature of support for NBS are outlined. The analysis reviews the EU policy framework overall in addition to assessing NBS support within individual policy instruments and fields, as listed in Table 1. The analysis makes a distinction between EU policies and financing instruments (including LIFE+, EMFF, CAP, FP7/H2020, Cohesion Fund, Social Fund and ERDF), treating them separately for the analysis and grouping the respective results below.

This analysis builds on the information gathered from the reviewed policy and funding instruments. The relevant passages and aspects of each instrument relating to NBS were grouped, where possible, and synthesised to provide a concise review of each policy and instrument's support of NBS and related concepts. For example, the review highlighted NBS-related terms as they were identified in the documents, but did not count the number of times these terms were mentioned in each instrument. As such, the statistics and graphic depictions in the following sections should be viewed not as definitive interpretations of policy and funding instrument text, but rather an indicative analysis of the thematic groupings in comparison to one another across policies and funding instruments.

ANALYSIS OF EU POLICIES

Explicit mention of the eight NBS-related terms varied across the reviewed policy instruments. The term 'green (and blue) infrastructure' was included in five of the reviewed instruments, followed by 'ecosystem-based management/approach' (included in four instruments) and 'nature-based solution'/'sustainable management' (each included in three instruments). Green (and blue) infrastructure appears, not surprisingly, in the EU Biodiversity Strategy (2011) and Green Infrastructure Strategy (2013), but also in the EU Forestry Strategy (2013), Adaptation Strategy (2013), and Urban Agenda (2016). Other terms only appeared in single instruments, i.e. 'working with nature' only appeared in the Green Infrastructure Strategy and 'natural water retention measures' were only included in the MSFD. The terms 'ecological engineering' and 'nature-based infrastructure' did not appear in any of the reviewed policies. Furthermore, environmental assessment policies as well as cohesion and growth policies failed to explicitly mention any of the NBS-related terms which were searched for.

The term 'sustainable management' pre-dates all other NBS-related terms that were included in the review (see Figure 1),

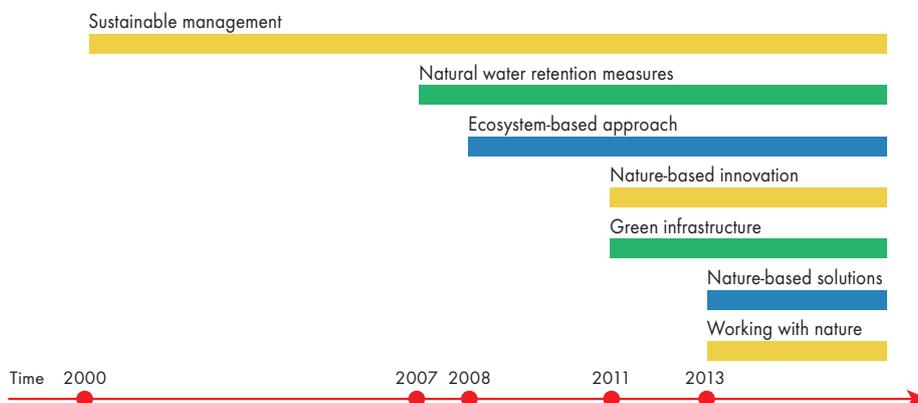


Figure 1: Introduction of NBS-related terms in analysed EU policies

with its first appearance in 2000 within the WFD. In the policy fields of water and forestry, variations of this term were the most frequently used (i.e. ‘sustainable water management’ and ‘sustainable forestry management’). Of note, the Europe 2020 Strategy lacks any mention of NBS-related terms despite its adoption in 2010 and the already established prevalence of several of the concepts relating to NBS at that time. Following the introduction of the EU Biodiversity Strategy and its Target 2⁶ in 2011 as well as the subsequent EU Green Infrastructure Strategy in 2013, the frequency of inclusion of the term ‘green (and blue) infrastructure’ increased significantly. While ‘nature-based solutions’ appear in the EU Biodiversity and Green Infrastructure Strategies, the concept of ‘working with nature’ only appears in the later.

The **societal challenges addressed** focused predominantly on challenges related to *green space, habitats and biodiversity*; followed closely by *climate action for adaptation, resilience and mitigation* as well as *environmental quality, including air quality and waste management* (see Figure 2). This is perhaps not unexpected, as most of the policies reviewed focus on environmental topics and the efforts needed to ensure environmental quality of EU ecosystems and habitats, which are often linked to societal benefits of addressing climate change and improving environmental quality of natural areas. Other societal challenges that were often mentioned include *economic development and decent employment* and *water management*. This assessment summed the total number of extracted text blocks which implicitly or explicitly refer to NBS that also link to societal challenges.

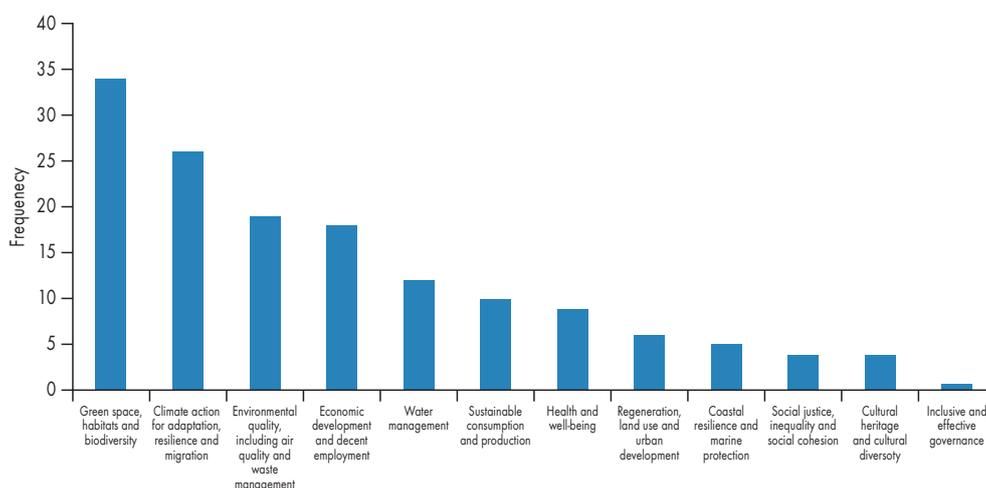


Figure 2: Societal challenges addressed in analysed EU policies

Regarding individual policy fields, instruments in the biodiversity sector refer to the widest range of societal challenges, mostly *green space, habitats and biodiversity*. Instruments in other policy fields tend to focus on societal challenges most related to their specific topic, e.g. water-related instruments mention *water management* and the EU Climate Change Adaptation Strategy mentions *climate action for adaptation*. Other fields that peripherally address societal challenges include the marine environment and the EU Forestry Strategy, which focus on *environmental quality, including air quality and waste management* and *green space, habitats and biodiversity*, respectively. Cohesion and growth policy was the only field whose instruments addressed limited societal challenges, with only brief mentions of *economic development and decent employment*, *climate action for adaptation, resilience and mitigation*, and *sustainable consumption and production*. Lastly, instruments in the policy field of environmental assessment lack any mention of societal challenges related to NBS, mainly because these instruments focus on preventing unnecessary deterioration and damage to the environment (see Box 1).

Most of the policy instruments, however, do not focus strongly on urban societal challenges, with only the EU Urban Agenda to 2020 explicitly focusing on urban settings with respect to implementing or encouraging the adoption of NBS. Other policies,

⁶ Target 2, Action 6 aims to set priorities to restore and promote the use of green infrastructure, including the development of an EU-wide Green Infrastructure Strategy to promote the deployment of green infrastructure (which came into force in 2013).

such as the WFD, EU Green Infrastructure Strategy, EU Biodiversity Strategy and (implicitly) EU Adaptation Strategy mention urban areas to varying degrees. Of these, the Green Infrastructure and Biodiversity Strategies both explicitly encourage NBS within urban areas, while the WFD and Adaptation Strategy outline minimal support for urban areas. This, however, is not unexpected as most policies are broad in scope and focus on addressing a topic or a particular type of natural ecosystem (e.g. forests, oceans, freshwater, etc.). The majority (68%) of the analysed policies failed to make any urban-rural distinction.

Specific types of NBS actions, i.e. creating new spaces, maintaining or managing existing spaces, or restoring ecosystems and their functions, are not specified in 40% of all entries in the respective policy reviews. While the majority of policies reviewed acknowledge the benefits of nature and often of NBS-related concepts, they often do not state how or in what way action should or can be taken (see Figure 3). When mentioned, however, NBS types fall heavily towards those that encourage the maintenance and/or management of existing green and blue spaces (35%) and, to a lesser extent, the restoration of ecosystems and their functions (18%). Maintenance and management are often jointly mentioned with restoration in EU policies, highlighting how these types of measures are not seen as mutually exclusive but rather as complementary within European political discourse. Furthermore, these results underscore the current focus of EU policies to manage/maintain and restore existing ecosystems, rather than emphasising the creation of new spaces. By percentage, the creation of new green and blue spaces were most frequent in the EU Urban Agenda (mentioned in 25% of this instrument's entries).

EU GREEN INFRASTRUCTURE STRATEGY, PG4



Working with nature and using green infrastructure in an urban environment, for example by incorporating biodiversity-rich parks, green spaces and fresh air corridors, can help mitigate the urban heat island effect.

Specific **elements of NBS** were also rarely mentioned in the analysed EU policies (see Figure 4), which correlates with the infrequent mentioning of NBS types. This holds true for e.g. the Europe to 2020, Circular Economy, EIA and SEA Directives, and SEA Protocol. Some policies that mentioned types of NBS failed to provide examples of such actions, such as the Urban Agenda for the EU, the EU Adaptation Strategy, and the Habitats Directive. Perhaps unsurprisingly, the Green Infrastructure



Box Nr: 1

NATURE-BASED SOLUTIONS IN ENVIRONMENTAL ASSESSMENTS

The European Environmental Impact Assessment Directive, the Strategic Environmental Assessment Directive and the Protocol on Strategic Environmental Assessments are the critical pieces of legislation that determine how a project or plan (generally in line with economic development) will potentially negatively impact the environment. Most of the criteria to approve of such plans and projects are inherently geared towards more environmentally friendly solutions, though not all nature-based. For example, these policies all have some form of the following requirement:

"A description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment" (EIA Directive, Article 5.d, pg 9).

The requirement for developers to - at the very least - acknowledge alternatives to their plan or project provides a means to for NBS to become competitive against traditional/grey infrastructure. More specifically, applicants are required to review 'reasonable alternatives', which have the potential to encourage environmentally-friendly solutions to economic/social development needs. Within this context, contractors and planners are encouraged to maximise so-called 'win-win' solutions, which not only meet their development needs, but also maintain or benefit the quality of affected ecosystems and habitats. In practice, however, the extent to which NBS are considered or adopted as an alternative to the originally proposed grey-dominant plans is unknown.

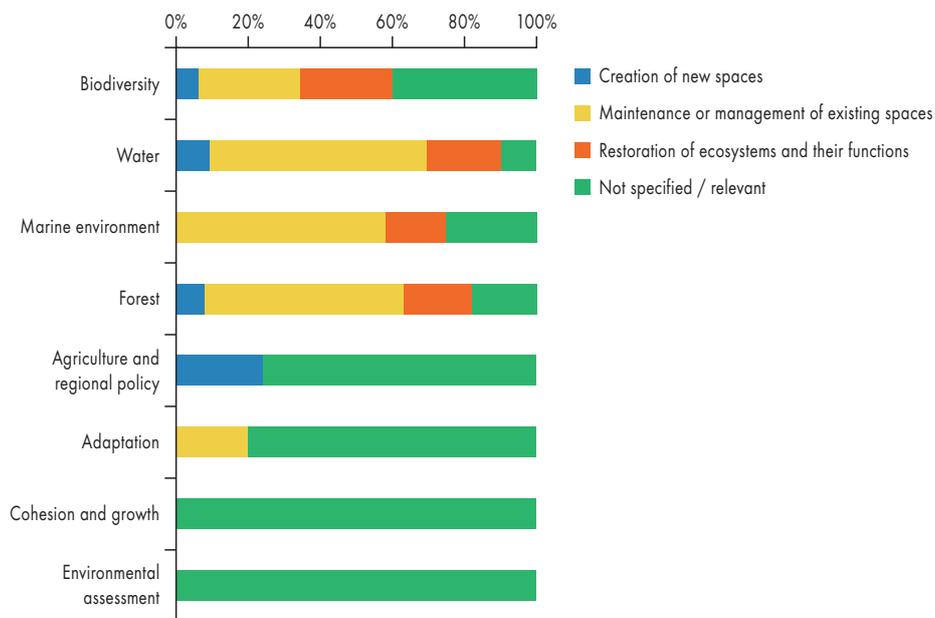


Figure 3: Types of NBS interventions by sector in analysed EU policies

Strategy mentioned the most elements of NBS, followed by the MSFD (focusing on blue areas). The policy field of biodiversity included the most elements of NBS (e.g. blue areas, rural and Natura 2000 sites, and parks and (semi)natural green areas), followed by water (green indoor areas and retention areas), forestry (mostly rural areas and parks and (semi)natural urban green areas) and marine (blue spaces). The instruments in the policy fields of adaptation, agriculture and regional policy, cohesion and growth and environmental assessment did not mention any elements of NBS.

Concerning the **nature of the NBS instruments** in the analysed EU policies, they are most commonly statements that do not require actions (44%) or instruments that encourage voluntary actions (43%). Statements either provide information on the benefits of NBS or encourage MS to adopt NBS or practices that encouraged NBS. Mandatory instruments (13%) are few and far between, mostly occurring in the Habitats Directive in relation to the creation and maintenance of Natura 2000 sites (see Figure 5). Other mandatory instruments are mentioned in the WFD for flood risk management plans and the inclusion of natural retention areas, though this varies between being mandatory or encouraging voluntary action. The EU Biodiversity Strategy also references mandatory instruments, but only with regards to establishing strategic frameworks to set priorities for ecosystem restoration. When grouped by policy field, it is clear that instruments in certain fields only encourage or make

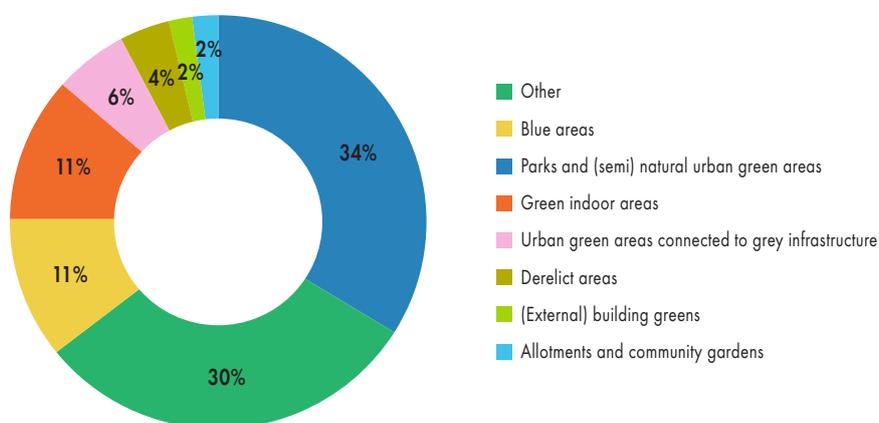


Figure 4: Elements of NBS addressed in analysed EU policies.

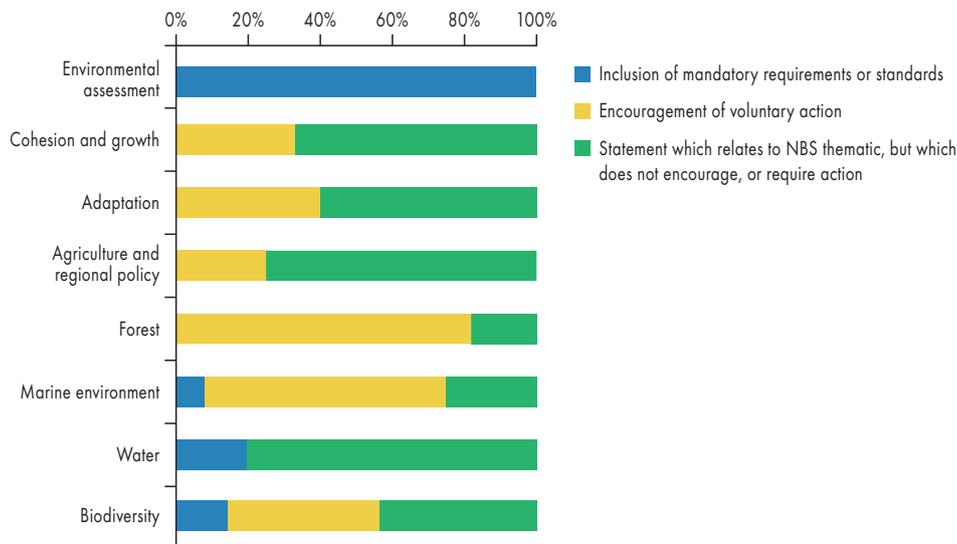


Figure 5: Nature of NBS instruments in analysed EU policies

informative statements, including the fields of forestry, agriculture and regional policy, adaptation and cohesion and growth. Biodiversity instruments, again, include all natures, though they predominantly encourage voluntary actions. Instruments in the field of environmental assessment are entirely mandatory due to the requirements for developers to review ‘reasonable alternatives’ when undergoing an environmental impact assessment.

The **degree of support for NBS** was largely characterised as ‘medium support’, covering 44% of the reviewed policy instruments (see Figure 6), e.g. the water policies and environmental assessment policies. ‘Strong explicit support’ for NBS was present in 31% of reviewed policies, e.g. the EU Biodiversity Strategy, Green Infrastructure Strategy, MSFD, Forestry Strategy and Adaptation Strategy. ‘Strong implicit support’ was found in the Blue Growth Strategy and the EU Urban Agenda. Low support was only found in the cohesion and growth policies of the Europe 2020 Strategy and the EU Circular Economy Action Plan.

The Urban Agenda for the EU, for example, makes explicit reference to NBS and to green infrastructure; however, MS can choose which priority themes to focus on and are only encouraged to voluntarily involve themselves in partnerships to research and implement devised Action Plans. As such, while the level of support for NBS can be considered as strong due to the explicit mentioning of NBS-related terms, the potential impacts of this policy instrument are unknown as NBS support is only encouraged and not required. Within other fields, many of the reviewed EU policies explicitly state the benefits of nature, allude to the societal challenges that can be addressed by NBS, and encourage action to adopt or promote such measures. However, these policies do not go further than encouragement and fail to set standards or mandate supportive action. In particular, the instruments within the field of cohesion and growth as well as agriculture and regional policy field (i.e. the Urban Agenda) do not make NBS a priority for EU MS outside of the environmental agenda.

EU FORESTRY STRATEGY, PG9



Protection efforts should aim to maintain, enhance and restore forest ecosystems’ resilience and multi-functionality as a core part of the EU’s green infrastructure, providing key environmental services as well as raw materials.

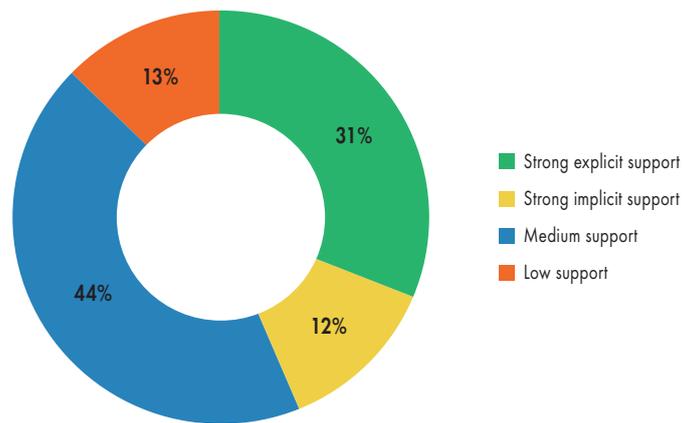


Figure 6: Degree of support for NBS interventions in analysed EU policies

ANALYSIS OF EU FINANCING INSTRUMENTS

NBS and related terms that are explicitly mentioned in the financing instruments include NBS, Green Infrastructure (GI) and ecosystem-based management. The terms ‘ecological engineering’, ‘working with nature’ and ‘nature-based infrastructure’ were not mentioned in the reviewed funding instruments. Though most of the funding instruments analysed dated from 2013 to the present, it is interesting to see which terms are prevalent across which areas. As seen in Figure 7 below, most NBS-related terms were included in the research sector, within both Horizon 2020 research programmes as well as the 7th Framework Programme for research. While much of the interest around NBS and the funding to support NBS is focused within academia on the concept’s development and on information gathering, the most recent Horizon 2020 calls for research proposals have also included an increased focus on supporting the application of NBS solutions in different cities across Europe and encouraged monitoring and assessment of these interventions to improve the evidence base.

While the financing instruments do not explicitly state how much funding is available to NBS-related endeavours, it is possible in some cases to deduce indicative figures. For example, the most recent (2016-2017) EU research funding programme Horizon 2020, funded by the European Commission’s Directorate-General of Research and Innovation, dedicated €71 million to explicitly NBS-centred research projects (see Box 3). Previous calls in the 2014-2015 Horizon 2020 work programme and the 7th Framework Programme dedicated an amount of €73.6 million and €10 million, respectively. Several

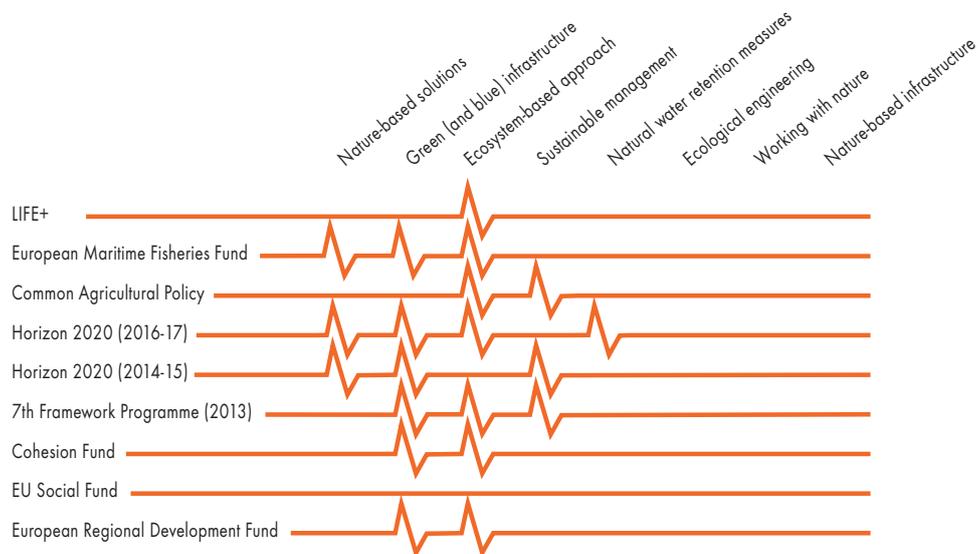


Figure 7: Elements of NBS mentioned in analysed EU policies.

additional calls for research proposals also include mention of NBS, but are not as specifically targeted on this theme as those outlined below.

For the remaining funding instruments included in the review, it is harder to specify the amount of funds dedicated to fostering NBS-related activities. However, as a useful overview, a recent study by Trinomics et al. (2016), conducted a review of European funding levels for green infrastructure across various European financing instruments. Though their review focused solely on GI, which is only one of the concepts relating to NBS, this provides an initial indication of European-level financing for NBS. Their results were that for the period of 2014-2020, available financing for green infrastructure amounted to €6,397 million: €1,248 million from LIFE+ funding, €45 million from the EMFF, €4,967 million from the EAFRD, and €137 million combined from the ESF and the ERDF.

Societal challenges addressed in the reviewed funding instruments were identical with the societal challenges addressed by the analysed policies, especially with regards to *green space, habitats and biodiversity* as well as *climate action for adaptation, resilience and mitigation*. Interestingly, however, funding instruments did not place *economic development and decent employment* as highly on the priority list as the analysed policies; instead, *water management* was found to be more highly focused on within the reviewed instruments. Instruments such as the LIFE+, CAP, and both Horizon 2020 frameworks

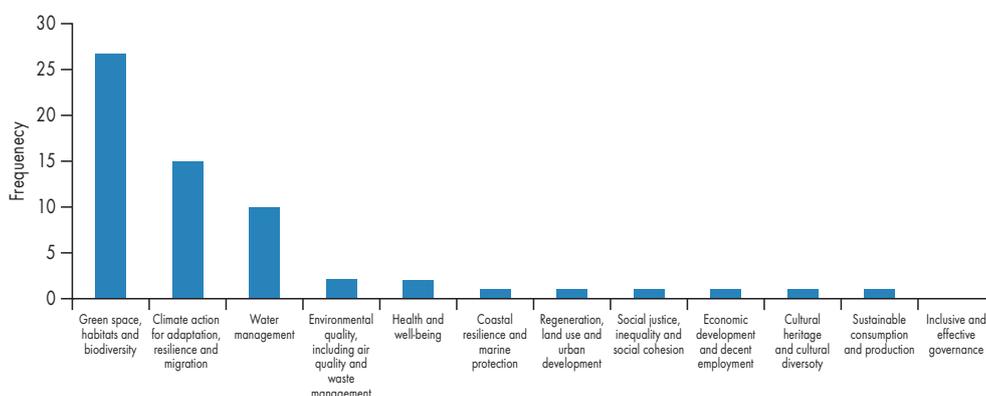


Figure 8: Societal challenges addressed in analysed EU funding instruments



Box Nr: 2

HORIZON 2020 RESEARCH AGENDA: NATURE-BASED SOLUTIONS

In the most recent round of research funding for Horizon 2020 Research and Innovation (2016-2017), the work programme highlighted NBS as a key theme, along other themes like climate services, water, and raw materials. The programme included four research calls specifically focusing on “Nature-based solutions for territorial resilience”: (1) Large-scale demonstrators on nature-based solutions for hydro-meteorological risk reduction, (2) Operationalising insurance value of ecosystems, (3) Multi-stakeholder dialogue platform to promote innovation with nature to address societal challenges, and (4) Biodiversity scenarios. Additionally, the call ‘Demonstrating innovative nature-based solutions in cities’ was published under the cross-cutting activities work programme. In total, the amount of funding offered for these projects amounted to €71 million.

all mentioned water management as a key topic. Interestingly, the EMFF included a scattering of NBS-related terms in its text, highlighting the need for ecosystem-based management, ecosystem-based approaches for fisheries management, as well as references to GI and NBS. Much of the EMFF focused on protecting marine biodiversity and ecosystems, including management of Natura 2000 sites, and accounted for the majority of total references to green space, habitats and biodiversity.

As a sharp contrast to the cohesion and growth policies, which generally contained no linkages to NBS, the cohesion and growth funding instruments did include references to NBS. In particular, the EU Cohesion Fund and the ERDF both included the terms ecosystem-based approaches and GI and addressed societal challenges related to *green space, habitats and biodiversity, climate action for adaptation, resilience and mitigation, and environmental quality including air quality and waste management*. The ERDF, ESF and EU Cohesion Fund also specifically included urban areas as places for green improvement. Interestingly, the ESF, which mentions urban areas and societal challenges, did not specify which societal challenges it aimed to address and or explicitly mention any NBS-related terms. The 7th Framework Programme for research included a call in 2013 for 'Urban biodiversity and green infrastructure', which sought to provide an evidence base for the planning and design of green infrastructure in cities and urban areas.

EUROPEAN REGIONAL DEVELOPMENT FUND, ARTICLE 5.6E, PG294



The ERDF shall support the following investment priorities: Preserving and protecting the environment and promoting resource efficiency by... taking action to improve the urban environment, to revitalise, cities, regenerate and decontaminate brownfield sites (including conversion areas) reduce air pollution and promote noise-reduction measures.

The **types of NBS interventions** mentioned in the reviewed EU funding instruments were predominantly focused on the *maintenance or management of existing spaces*. Unlike the analysed policies that had a majority of cases where the type of NBS intervention was not specified or relevant, most of the funding instruments provided arguments in favour of the maintenance and management of existing spaces. The majority of these recommendations came from the CAP, followed by the EMFF and LIFE+. In comparing the EU policy analysis and the funding instrument analysis, there were strong similarities between the percentages of maintenance and restoration. As in the policy instrument analysis, many of the funding instruments advocated for both *maintenance and restoration of natural areas*; although the frequency of calls for maintenance outweighed those for restoration, both were common. This similarity was also seen for the creation of new spaces, which received the least inclusion between the categories. The only funding instruments that called for the *creation of new spaces* are the EMFF, CAP, Horizon 2020 research programme for 2016-2017 and the ERDF. Some of the funding instruments failed to specify any form of NBS intervention, such as the Horizon 2020 research programme from 2014-2015, the 7th Framework Programme for research as well as the ESF.

EU SOCIAL FUND, ARTICLE 12.2, PG9



The ESF may support sustainable urban development through strategies setting out integrated actions to tackle the economic, environmental and social challenges affected the urban areas identified by the MS on the basis of the principles laid down in their respective Partnership Agreements

The **elements of NBS** mentioned in funding instruments are mainly blue areas. However, for contextualising this finding, it is important to point out that all textual references from the EMFF related to the marine realm, and thus all references were categorised as '*blue areas*' (e.g. lagoons, coastal areas, fish stock recovery areas, Natura 2000 sites and other marine ecosystem areas) in our analytical approach. Apart from the EMFF, many of the funding instruments failed to specify the elements of NBS to be applied. The only other instruments that specified NBS elements included the CAP (*derelict areas and green indoor areas*) and the Horizon 2020 research programme for 2016-2017 (*(external) building greens, blue areas and green areas for water management*).

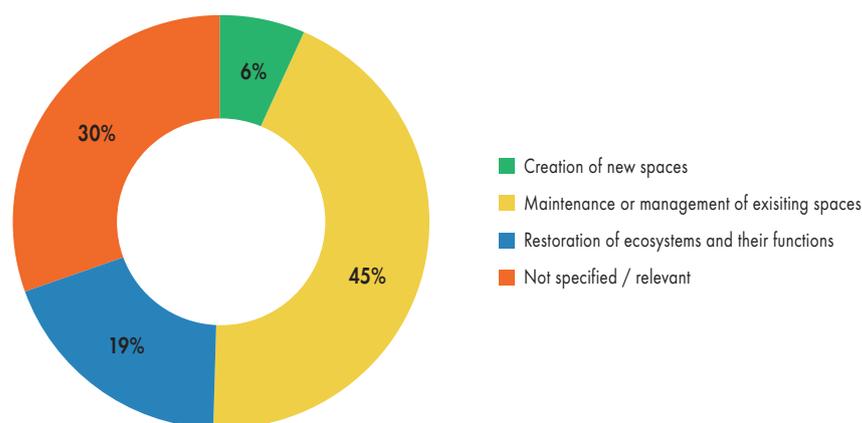


Figure 9: Types of NBS interventions addressed in analysed EU funding instruments

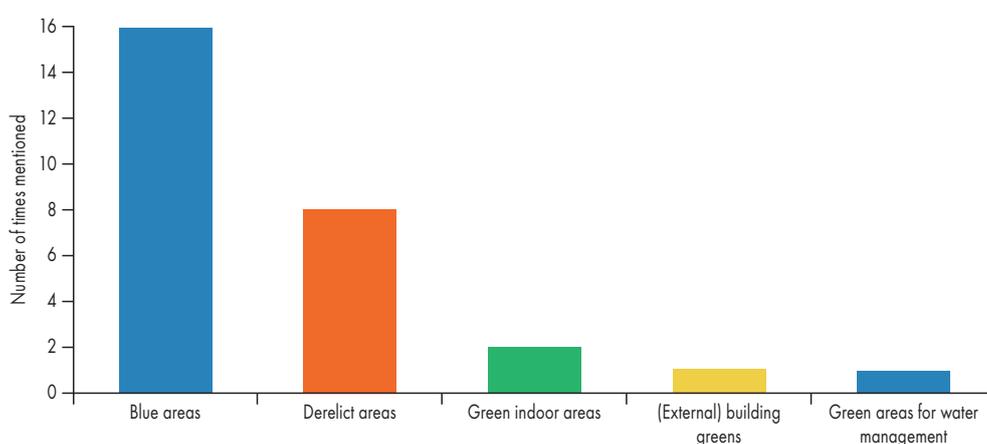


Figure 10: Elements of NBS mentioned in analysed EU funding instruments

The **nature of NBS instruments** in EU funding instruments is mainly *encouragement of voluntary action* (90%). While the EU policy analysis revealed an almost equal frequency of statements that encourage voluntary actions and statements that relate to NBS thematic, but which *do not encourage nor require action*, the funding instruments revealed a different tendency. Many of the references to NBS included in the respective instruments had a clearly encouraging tone for taking voluntary action, with far fewer informative statements (10%). However, there were no statements that included *mandatory requirements or standards*.

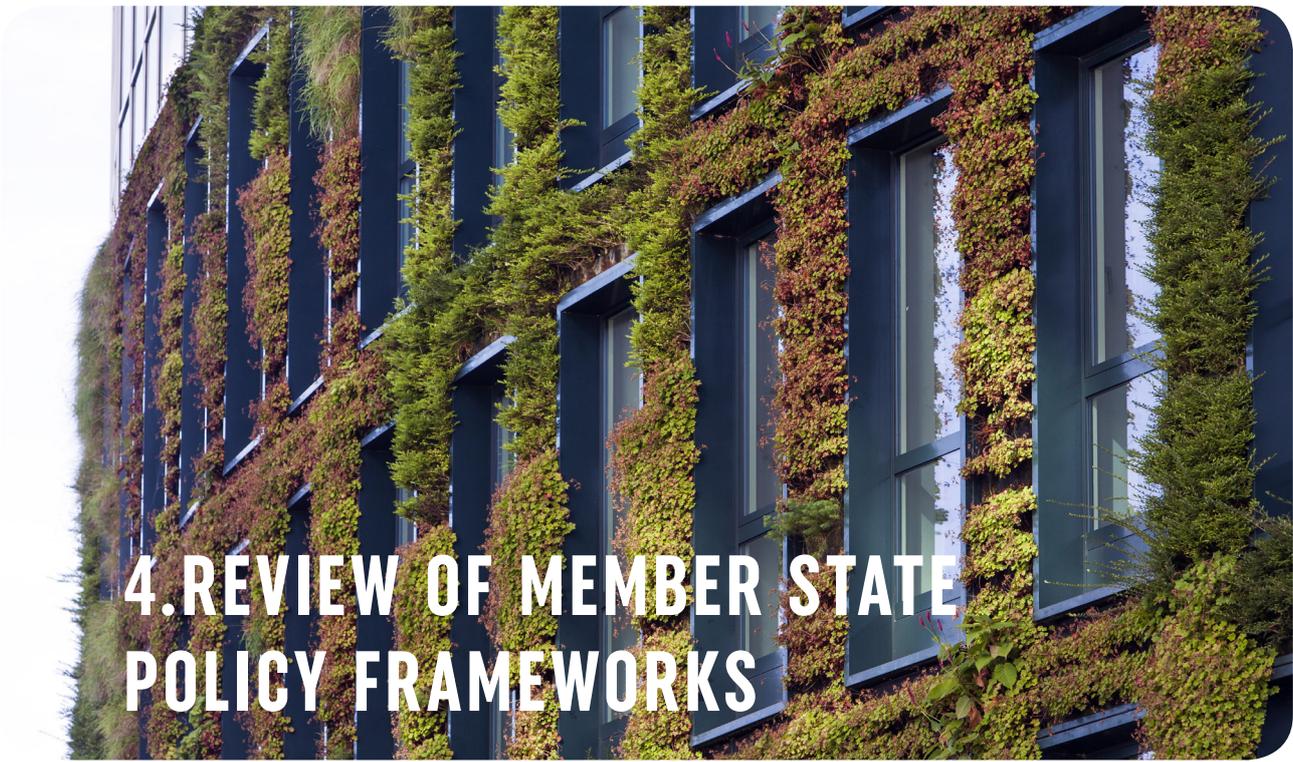
Support for NBS in funding instruments is mainly *'strong explicit support'* (34%), followed closely by *'medium support'* (33%). Strong explicit support was seen in the CAP as well as both Horizon 2020 programmes. Medium support was seen in the 7th Framework Programme, Cohesion Fund and ERDF. Though the Cohesion Fund and ERDF explicitly mentioned urban areas and NBS, the prevalence of NBS throughout the funds was not enough to suggest strong explicit or implicit support.

In contrast to the analysed EU policies, the funding instruments were more implicitly supportive of NBS (22%). These funding instruments, i.e. the LIFE+ and EMFF, both included explicit mentions of NBS, but not consistently; instead, they strongly encourage actions related to NBS, without explicitly using NBS-related terms throughout. The remaining instruments (11%) were classified as having 'low support' to NBS.

LIFE+, PG5



For the sub-programme for Environment, integrated projects should focus primarily on the implementation of the Union Biodiversity Strategy to 2020, with particular regard to the effective management and consolidation of the Natura 2000 network...through the implementation of prioritised action frameworks...



4. REVIEW OF MEMBER STATE POLICY FRAMEWORKS

4.1. METHODOLOGICAL APPROACH TO GAINING INSIGHTS ON MS SUPPORT FOR NBS

Alongside the EU policy framework review, this report also explored MS discourses and support for NBS and related concepts in national policy frameworks. The six cities that the NATURVATION project focuses on (Barcelona, Győr, Leipzig, Malmö, Newcastle, Utrecht) served to define the geographic focus on the MS level review. Accordingly, the policy frameworks and national support for NBS were reviewed in Germany, Hungary, Spain, Sweden, England and the Netherlands. A three-tiered methodological approach was followed, as described below.

In a first preparatory step, desk-based research was conducted to **identify expert interviewees** and initial impressions of **key policy instruments** of relevance for the review in each MS. Researchers with a familiarity with each country and having native language skills were selected to the extent possible to conduct the reviews in the different MS. The preliminary review utilised sources like the Green Infrastructure sheets⁷ available on the Biodiversity Information System for Europe ('BISE') website as a starting point for identifying potentially relevant policy instruments on the national level, and served as a basis for broadly understanding the policy framework in approaching the interviewees.

For each MS, the most relevant national agencies and experts therein were identified based on the preparatory desk-research, but also via an email consultation of the respective NATURVATION country partners (so-called 'academic leads' and 'city leads') across the six case study countries. The identified individuals predominantly included government officials and members of relevant administrations. However, in cases in which government officials or members of the administrations highlighted the role researchers or NGO representatives play in supporting NBS on a national level, these individuals were also included in the interview process. Furthermore, interviewees were asked during the interviews for recommendations about other relevant individuals to contact (applying the 'snowball' approach).

In a second step, expert input was gathered via e-mail correspondence and **semi-structured interviews** (see Annex B for the interview protocol). In total, 21 experts provided input across the six MS (three from Germany, three from Hungary, three

⁷ <http://biodiversity.europa.eu/countries/gi>

from Spain, three from Sweden, seven from the UK and two from the Netherlands). A single interview lasted between 30 and 40 minutes by phone and – if approval was given by the interviewee – was recorded for easy reference by the interviewer for future use. Each interview started with a brief introduction presenting the background of the interview and the project, which also served as an icebreaker.

The interview itself then focused on three primary aspects:

- Inclusion of and support for NBS and related concepts in the national policy framework and discourse,
- Availability of financial support for activities relating to nature-based solutions (e.g. implementation, research and capacity building), and
- Potential opportunities for increasing NBS implementation in the future.

Furthermore, interviewees also drew attention to potential differences in discussions between the national and local/regional levels as well as further literature and documents to be consulted in the subsequent policy instrument review.

Information stemming from the interviews was used in the third step as a starting point for conducting the **national policy instrument review**. For each of the six MS included in this study, a review of policy instruments was undertaken at the national level, focusing on the elements of the policy framework that the interviewees have pointed out or confirmed as being of highest relevance to NBS action within the country. A total of 28 national policy instruments were looked at, including six in Germany, five in Hungary, six in Spain, five in Sweden, six in the UK and one in the Netherlands. Unlike in the EU review, a qualitative approach was followed for reviewing the MS policies. This was mainly due to language considerations, and the high potential to lose vital information by limiting the review in MS languages to the list of EU-relevant key terms that often had no direct language equivalent. Instead, the interpretation of the identified terms and concepts were prioritised. Thus, for the review of the individual policy instruments, a template with open-ended questions was used rather than the template applied in the EU analysis. Nevertheless, the various forms and areas of support considered in the EU review are also highlighted in the MS reviews – only in a qualitative rather than quantitative manner. The experts conducting the MS preparatory research and interviews were also responsible for carrying out the respective national policy instrument review.

The results of the interviews and policy review form the basis for the national discourse and policy framework comparative assessments, presented in the subsequent sections.

4.2. ASSESSMENT OF NATIONAL NBS DISCOURSES ACROSS REVIEWED MEMBER STATES

On the basis of the conducted interviews, insights regarding the national discourse and its inclusion of NBS-related terms and concepts have been summarised across the explored MS. Of particular interest are indications about which NBS-related terms are prevalent in the national discourse, the context and timing of their emergence and use, and discrepancies between local and national discussions. These considerations are outlined below in more detail, revealing the limited use of the term ‘nature-based solution’ in national discourse for all six MS, and the much stronger push by national administrations for the concept of green infrastructure, according to the interviewees.

In **Germany**, the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety was enlarged to include the topic ‘building’ at the end of 2013, turning into the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety. This strongly influenced the national discourse, leading in part to the introduction of ‘GI’ as a term within the Green Paper “Urban green space” in 2015 and the development of the subsequent the White Paper, which was published in 2017 and outlines a the national strategic approach and related actions towards creating healthier and more liveable

German cities. Moreover, a federal strategy on GI – aiming to implement the EU Green Infrastructure Strategy at landscape level - was published in 2017 by the Federal Agency for Nature Conservation. Interviewees highlighted that the terms ‘urban green’ or ‘urban green space’ were still prevalent in discussions and documents during its development process. According to the consulted experts, NBS itself is not used as a term or concept in Germany, which can be credited to two main reasons: First, the translation of ‘nature-based solution’ into German results in a term which cannot be easily understood by itself and without further clarifications. Second, given the ongoing efforts to establish the use of the term ‘green infrastructure’ across the country, there is no desire to reintroduce a new term and to potentially confuse the various sectors and members of the population being confronted with similar, yet different concepts.

In **Hungary**, interviewees indicated that while the term NBS rarely appears at the national level (neither in policies nor in discourses), it has emerged in recent years in local discussions. Other related concepts have been around for over 10 years, with terms like GI more recently being integrated into sectoral discourses, national strategies, and informational campaigns. ‘Sustainable management’ is the term that is estimated to have been used most frequently within different sectoral discussions, but more recently the ‘green (and blue) infrastructure’ or ‘ecosystem-based approaches’ have gained in usage within nature conservation discussions.

SPANISH NATIONAL COASTAL ADAPATATION STRATEGY, P.83



the Strategy prioritises, to the extent possible, those adaptation measures base don natural solutions, since they contribute ecological, economic and social benefits thanks to the provision of an extensive range of services ecosystems. Failing that, preference will be given to solutions where green infrastructures are combined with other measures to ensure risk reduction.

The Netherlands seems to not have widely adopted EU vocabulary in national discourse, such as the terms ‘green infrastructure’ or NBS. Instead, it seems that discourse and policies utilise a variety of their own closely-related terms, such as ‘building with nature’, ‘natural climate buffers’, natural eco-corridors, and ‘allowing natural processes more space’. One interviewee highlighted that given the centrality of flood risk/safety in the country, a significant part of the green and blue infrastructure has been acquired, designed and/or maintained to create and improve water retention capacity. However, only the concept of ecosystem services, which is a crucial component of NBS and related discussions, can be found in some national strategies. The lack of EU vocabulary in Dutch strategies might be explained by the fact that the country has an established history of implementing and financing NBS-related concepts, and has not felt pressured to change its wording simply as a result of the EU introduction of new terms in recent strategies and policies. For example, a policy for realising a National Ecological Infrastructure has existed since 1990; this policy has significant resources available for its realisation, set-up and maintenance on a national as well as province level (the later since 2013).

GI was introduced as an official term in **Spanish** policy in 2007 within the National Biodiversity Law. The term is used mainly in reference to ecological connectivity/eco-corridors, and has less of a focus on urban infrastructure. Some of the interviewed experts estimate that the term ‘ecosystem based solutions/approaches’ has been used in national discourse since around 2014 in the context of climate change adaptation. One could assume that EU policy developments around this time (e.g. the EU Biodiversity Strategy, Adaptation Strategy and Green Infrastructure Strategy) played a role in this development. According to the interviewees, the term NBS is not widely-used in policy instruments simply due to the fact that not many revisions of existing policies or introductions of new related policies have taken place since NBS gained momentum on the European level. Yet, the NBS concept and related terms have already been adopted to some degree in the broader national political discourse. For example, the Spanish Labour Party (PSOE) made the following reference in its 2015 electoral campaign manifesto⁸: “We will ... restore climate change policies...(and) apply adaptation strategies that favour **ecosystem based solutions and green infrastructures.**”

⁸ <http://www.psoe.es/programa-electoral/economia-2/mas-productiva/medio-ambiente-y-sostenibilidad-nuestra-riqueza-nuestro-futuro/>

In **England**, several of the interviewed experts estimate that NBS emerged as a term in national discourse only in late 2016, but is still not used with much frequency. The term green infrastructure has emerged mainly in the context of urban planning and can be found in policy documents dating back to 2011 and 2012, in line with the publication of the EU Biodiversity Strategy and its inclusion of green infrastructure in its second Target. According to one expert, a model of 'NBS-thinking' which is connected to the concept of ecosystem services and multiple benefits took a more prevalent role in 2014 within flood management discussions relating to the WFD and River Basin Management Plans. Overall, the national discourse seems to mainly focus on the idea of natural capital, which was reinforced by the establishment of the Natural Capital Committee in 2012 to advise the government on the sustainable use of natural capital – that is, UK's natural assets including forests, rivers, land, minerals and oceans – as well as on the benefits people derive from natural assets.

While Swedish national agencies from a range of relevant sectors are said to have already widely adopted the concept of NBS in **Sweden**, the interviewees have pointed out that the term NBS is not used as such. Instead, green infrastructure and ecosystem services are more commonly applied, particularly since 2014. Swedish experts highlight the desire to avoid the introduction of NBS as "yet another new term or concept", as it might lead to additional burden, stress and confusion for municipalities. The Swedish Environmental Protection Agency and National Board of Housing, Building and Planning play a crucial role with respect to shaping the national discourse on NBS, with both occasionally running trainings on NBS-related topics. Furthermore, there is an official position for coordinating the field of green infrastructure on the national level, located within the Swedish Environmental Protection Agency (Naturvårdsverket) called 'koordinator för arbetet med grön infrastruktur' (i.e. coordinator for work with green infrastructure). This individual works closely with municipalities, county administration boards and with the different agencies covering different sectors, including marine and water management, forestry, agriculture, and transportation. Another person has a similar position and coordinates work on the communication of ecosystem services (also located within the Swedish Environmental Protection Agency), targeting both private and public stakeholders of the forest, agriculture and construction sectors, as well as municipalities. Overall, interviewees indicate that NBS-related discourse is quite strong on the national level in Sweden, as well as are efforts to establish the widespread use green infrastructure and ecosystem services.

According to the interviewees, NBS and related concepts appear to have been increasingly introduced in the national discourse and activities of the six MS during the last decade. While differences between MS exist, there is an overall trend to use NBS and related concepts more explicitly in discourses and policies. Unsurprisingly, NBS and related concepts were raised most frequently within biodiversity and nature conservation discourses. With reference to specific key terms, interviewees indicate that 'green infrastructure' has been most commonly used across the reviewed MS, with the exception of the Netherlands, which has adopted conceptually-similar terms.

4.3. MEMBER STATE ANALYSIS AND FINDINGS

As with the EU level analysis, the MS-focused review revealed the prevalence of the terms used across the national policy frameworks and enables a cross-sectoral comparison. The results additionally indicate the uptake and integration of different types of NBS and related interventions and allows for comparisons to be made between the reviewed MS. In addition, this section highlights the different elements of NBS that are part of the analysed MS policy frameworks.

The **most common NBS-related term** found in the reviewed policy instruments is GI. While 'ecosystem services' was not a specific focus of this review, the term was noted as also appearing with very high frequency. Aside from GI, related terms such as green spaces/green area/green in the city/urban green/etc. are frequently included in the context of urban planning. Use of such terms is particularly high in Germany, but also to a lesser degree in England, Sweden, and Spain. Interestingly, the term GI is used in Spain with regard to coastal adaptation and as a concept related to biodiversity and natural heritage, but not in the context of urban planning or sustainable urban development, as in other MS. In the Netherlands, the term

'ecological infrastructure' has been used since 1990 within the context of the Dutch National Ecological Infrastructure, conveying a similar idea to that of GI. Although this policy was renamed to the 'Nature Network Netherlands' in 2013 (after the introduction of the EU Green Infrastructure Strategy), it nevertheless continues to disregard 'European terms' and focus on 'ecological infrastructure' as this term is embedded so strongly in the national discourse/policy framework.

Within the individual MS, there are also differences regarding the frequency and choice of terms included in policy instruments. In Hungary, the term 'sustainable management' is commonly used in correlation with GI. Here, newer documents from 2015 onwards include the term GI alongside 'sustainable management'; older documents (from 2003-2009) only refer to 'sustainable management'. In England, terms such as 'natural flood management' and GI are only used in specific policy sectors, such as water management and urban planning. In comparison to the other reviewed MS, Spain most frequently uses different NBS-related terms and seems to be the only MS that started to include 'EU vocabulary' such as 'nature-based solutions' and 'ecosystem-based approaches' in recently adopted national strategies and policies (e.g. in the National Coastal Adaptation Strategy, the Award of grants by the Biodiversity Foundation for climate change adaptation projects, and the Guide to Creating Local Climate Change Adaptation Plans, which came into force in 2016, 2016 and 2015, respectively). In Germany, of the reviewed documents, only The Economics of Ecosystems and Biodiversity (TEEB) report makes use of different terms related to NBS, including 'nature-based solutions', 'integrated forest management' and 'sustainable river basin management'. Interestingly, the Dutch TEEB equivalent - 'Green pays with TEEB City' – does not make reference to EU discourse, but rather only mentions 'green spaces' and 'benefits', as well as mentioning the concept of ecosystem services in a side note.

As one might expect, NBS-related terms are mostly mentioned in policy instruments relating to biodiversity/nature conservation, but also in some relating to planning, land use, climate adaptation, and flood management. What seems to be lacking across MS are references to NBS-concepts in agriculture and health-related policy instruments as well as in legislation or strategies on (sustainable) mobility. The review also indicates a difference between the use of NBS-related terms depending on the type of instrument, e.g. NBS and related terms are more frequently explicitly mentioned in guidance documents and non-binding strategies, as compared to binding laws and regulations. However, an exception is the Spanish Law on Natural Heritage and Biodiversity (*Ley del Patrimonio Natural y de la Biodiversidad*), which requires mandatory green infrastructure strategies for the autonomous regions of Spain.

A specific **focus on the deployment of NBS and related concepts in urban areas** was found in at least one of the reviewed policy instruments from Hungary, the Netherlands, Spain, Sweden, England, and Germany. However, the focus on urban issues was strongest in Germany, where five out of six instruments reviewed (all except the German Biodiversity Strategy) had a specific urban focus. The instruments dealing specifically with NBS in urban areas from the other MS were:

- **Hungary:** Green Infrastructure Development and Sustainability Action Plan, 2017⁹
- **Netherlands:** Green pays with TEEB City, 2012¹⁰
- **Spain:** Strategy for Urban and Local Sustainability, 2011¹¹
- **Sweden:** Guidelines for Regional Action Plans on Green Infrastructure, 2014¹²
- **England:** Natural Environment White Paper, 2011¹³

⁹ <https://www.palyazat.gov.hu/top-212-16-zld-vros-kialaktsa-1>

¹⁰ <http://en.biodiversiteit.nl/teeb/groen-loont-met-teeb-stad/rapport-groen-loont-met-teeb-stad.pdf/download/en/2/green-pays-with-teeb-city.pdf?action=view>

¹¹ http://www.mapama.gob.es/es/calidad-y-evaluacion-ambiental/temas/medio-ambiente-urbano/EESUL-290311-web_tcm7-177531.pdf

¹² <http://www.naturvardsverket.se/upload/miljoarbete-i-samhallet/miljoarbete-i-sverige/regeringsuppdrag/2015/ru-gron-infrastruktur-delredovisning/ru-gron-infrastruktur-riktlinjer-20150924.pdf>

¹³ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/228842/8082.pdf

An example of how GI is promoted in the UK White Paper is provided in Box 3 below.

Most of the reviewed policy instruments include no direct **objectives and targets relating to the deployment** of NBS or related concepts in urban areas. Exceptions are, for instance, the Natural Environment White Paper (England) and the White Paper "Urban Green Space" (Germany) which include very general qualitative objectives such as the aim to have "more urban green" (White Paper Germany, p. 5) and "restoring nature in towns, cities and villages" (White Paper England, p. 30). No quantitative targets were identified in the policy instruments reviewed.

Of the four biodiversity strategies included in the review (from Hungary, Sweden, England and Germany), the German one again seems to include the most direct objective to increase green in the city (see quote). Apart from this example, more general objectives with indirect support for NBS are found in the biodiversity strategies of the reviewed MS. England's Biodiversity Strategy, for example, states that "the Natural Environment White Paper...outlines the Government's vision for the natural environment and the shift in emphasis from piecemeal conservation action towards a more effective, innovative and integrated landscape scale approach to conservation" (p. 11). The Swedish Biodiversity Strategy (2013) includes the mandatory requirement for county administration boards to develop Regional Action Plans for Green Infrastructure by October 2018 (see Box 4 below).

A broad range of **societal challenges is addressed** within MS policy instruments with regard to the deployment of NBS in urban areas, and GI in particular. From the qualitative review, policy instruments appear to largely focus on challenges

GERMAN NATIONAL STRATEGY ON BIOLOGICAL DIVERSITY, P.42



By the year 2020, the greening of human habitations, including the green spaces close to residential environments (such as courtyard plantings, small areas of lawn, roof and facade planting) will have been significantly increased. Publicly accessible green spaces with varying qualities and functions are available within walking distance of most homes.



Box Nr: 3

UK NATURAL ENVIRONMENT WHITE PAPER: DESIGNATION OF LOCAL GREEN SPACE

The British Natural Environment White Paper (2011) aimed to introduce "a new Green Areas Designation that will give local people an opportunity to protect green spaces that have significant importance to their local communities" (p. 73, commitment 65). By designating land as Local Green Space, local communities are now able to rule out new development other than in very special circumstances (National Planning Policy Framework (NPPF), p. 73). According to the NPPF, identifying land as Local Green Space should be consistent with the local planning of sustainable development and complement investment in sufficient homes, jobs and other essential services. The NPPF also very clearly states: "The Local Green Space designation will not be appropriate for most green areas or open space" (NPPF, p. 73). Instead, the designation should only be used where (1) the green space is in reasonably close proximity to the community it serves; (2) the green area is demonstrably special to a local community and holds a particular local significance, for example because of its beauty, historic significance, recreational value (including as a playing field), tranquillity or richness of its wildlife; and (3) the green area concerned is local in character and is not an extensive tract of land.

related to *green space, habitats and biodiversity; climate action for adaptation, resilience and mitigation; health and well-being*; as well as *water management* and come from the (urban) planning and sustainable urban development sectors. *Coastal resilience and marine protection; environmental quality including air quality and waste management; regeneration, land use and urban development; as well as social justice, inequality and social cohesion* were less commonly cited. Finally, the least frequently targeted societal challenges are in reference to economic development and decent employment; inclusive and effective governance and participation; sustainable consumption and production; as well as cultural heritage and cultural diversity.

Societal challenges are most commonly mentioned without any connection to specific types of NBS, with a few exceptions. The German policy instruments (i.e. the Green and White Paper, TEEB report, and federal concept for GI), prove the exception to this trend and mention *green roofs* in connection to water management and climate action as well as *community gardens* in terms of their social function, possibilities for sustainable consumption and production as well as their important function to protect biodiversity in the city. *Derelict areas* are mentioned in connection to biodiversity and city climate regulation (German White Paper, federal concept for GI). The UK White Paper mentions *blue areas* in connection to water management and supporting biodiversity (p. 30) and green areas for *water management* ('Sustainable Drainage Systems') and their role for water management (p. 31).

Specific **types of NBS interventions**, referring to the *creation of new spaces, the maintenance and/or management of existing green and blue spaces* and, the *restoration of ecosystems and their functions*, are rarely explicitly mentioned by MS policy instruments. However, where they are included in the reviewed instruments, there is a variance between sectors as e.g. the *creation of new spaces* is not generally mentioned with regard to coastal resilience and marine protection, but rather in terms of green space, habitats and biodiversity in urban areas. In contrast, the *restoration of ecosystems* is specifically mentioned in terms of coastal adaptation (e.g. in the Climate Change Adaptation Strategy for the Spanish Coast). This variation in types of NBS interventions that are mentioned in different sectoral policy instruments leads to the overall impression that the *creation of new spaces* is more often included in the German and English instruments and less so in the Spanish instruments, as the former have a stronger urban focus.



Box Nr: 4

SWEDISH REGIONAL ACTION PLANS FOR GREEN INFRASTRUCTURE

The Swedish Strategy on Biodiversity and Ecosystem Services (2014) gave a push to NBS-related concepts by putting forward a series of government mandates and initiatives in the areas of ecosystem services and GI. These initiatives focus on the valuation, information and communication of ecosystem services, and on the development of Regional Action Plans on Green Infrastructure. These Regional Action Plans are currently under development by the County Administration Boards and must be delivered by October 2018. The plans are supposed to include physical conditions of the areas in question, their value, potential threats, current initiatives, the need for new initiatives, suggestions for new initiatives, a timetable etc. For the avoidance of doubt, the development of Regional Action Plans on Green Infrastructure does not mean that it is a mandatory requirement to deploy NBS, but to start a systematic planning process with respect to green infrastructure on the regional level. Thus, these Regional Action Plans will provide a framework for working with NBS in the future. Moreover, the Regional Action Plans will define hot-spots and areas of particular value. The ambition is to link these defined areas to the Environmental Code (Miljöbalken) via e.g. planning tools, special rules, or subsidies for beneficial use.

In the analysed policies, elements **of NBS**¹⁴ are mentioned to varying degrees across the MS. While none of the Swedish policy instruments included specific mention, German, Hungarian, Spanish and English policies referred to specific elements of NBS (in the Hungarian National Climate Change Strategy and the Territorial and Settlement Development Operational Program, Spanish Strategy for Urban and Local Sustainability, and the UK Natural Environment White Paper). In the UK White Paper, for example, *urban green areas connected to grey infrastructure* and *green areas for water management* are focused on, with the latter being supported through the Flood and Water Management Act of 2010. As most of the reviewed German instruments specifically deal with NBS in urban areas, these instruments also commonly highlight specific NBS elements. For example, the “Federal Concept for Green Infrastructure” explicitly mentions the *“integrated development of green, gray and social infrastructures; This includes the use of rainwater management, greening of building / living buildings, mobility concepts for pedestrian and bicycle traffic, as well as the provision of social facilities such as kindergartens, schools, hospitals and retirement homes with building-related green spaces such as areas for nature experiences, small parks or urban gardens”* (p. 40).

By ‘**nature of NBS instruments**’ in MS policies, we describe whether policies (1) include mandatory requirements or standards, (2) encourage voluntary action, or (3) relate to NBS thematically, but neither encourage nor require action. The majority of the reviewed instruments fall into the second category. However, it should be noted that there are differences between the instruments regarding whether or not NBS are encouraged simply by words (for instance the TEEB reports of Germany and the Netherlands), within planning frameworks (such as in England or Sweden) or with financial instruments (such as those reviewed for Spain, England and Germany). The self-commitment of the UK and Germany in their White Papers can be seen as being more substantive than simple reports and roadmaps. Additionally, two documents were reviewed that only include information relating to NBS deployment, i.e. the Act on National Spatial Planning (Hungary) and the Natural Capital Accounting 2020 Roadmap (England). Mandatory regulations are only identified in the mandate to create and implement Regional Action Plans for Green Infrastructure in Sweden, as well as the requirement in the Spanish Law on Natural Heritage and Biodiversity for a GI strategy to be created at the national level.

The **degree of support** of NBS through MS policies varies significantly within and across countries. This is a crucial point, as interview partners were specifically asked to name the most important policy instruments with regard to NBS in their country. It highlights the fact that the support of NBS generally remains at a rather low level, at least in some MS. Among those MS included in the analysis, German instruments provided the most explicit (with use of NBS-related terms) and strong support for (urban) NBS, while in Sweden the Environmental Code and the strategic Environmental Objectives provide low explicit, but high implicit support for NBS. In Hungary, support varies between medium and strong support, while strong support is always implicit. In Spain and England policies investigated vary a lot covering everything between low and strong explicit support. An interesting detail is that similar types of policies in MS do not imply a similar degree of NBS support: Biodiversity strategies, for instance vary between low (England), low to medium (Germany), and strong support (Hungary, Sweden). Another thing to keep in mind is that high explicit support in policies not necessarily means that specific measures or actions are supported.

¹⁴ Including (external) building greens; urban green areas connected to grey infrastructure; parks and (semi)natural urban green areas; allotments and community gardens; green indoor areas; blue areas; green areas for water management; derelict areas



5. COMPARATIVE EUROPEAN AND MEMBER STATE ANALYSIS

Taking the analyses of the European and MS policy frameworks into account, similarities as well as differences can be identified. Regarding **NBS-related terms**, for example, GI is the most used term in both the EU and MS policy instruments (with the exception of the Netherlands). MS additionally frequently address the concept of ecosystem services, which was not explored explicitly in the EU-level review. While ecosystem-based management is the second most frequently included term in EU policies, it was not frequently mentioned explicitly in the MS policies. As with the EU level, the MS review revealed that some NBS-related terms are often used in connection with one another. Hungary, for example, often uses the term 'sustainable management' in connection with GI, while Spain has started to include European terminology such as NBS and 'ecosystem-based approaches' together in national strategies and policies. In general, the explicit use of the term NBS is not common at either of the two levels of governance.

With regard to **policy sectors**, biodiversity-related policy instruments include the most explicit mentions of NBS-related terms at the EU level, whereas policies within the field of environmental assessment and cohesion and growth fail to mention any NBS-related terms. Similarly, NBS-related terms are mostly frequently mentioned in policy instruments related to biodiversity/nature conservation at the MS level. Policy instruments within the fields of planning, land use, climate adaptation, and flood management also feature a prominent role for NBS-related terms. Interestingly, none of the experts interviewed at the MS level mentioned instruments focusing specifically on agriculture, health policy or (sustainable) mobility as being relevant to include in the national policy framework review, even though these sectors hold significant potential in terms of supporting NBS. This could indicate a selection bias for the experts interviewed, or rather indicate the lack of current support within policy instruments in those fields.

Policies with relevance to NBS at the EU level mainly address **societal challenges** relating to *green space, habitats and biodiversity*; followed by *climate action for adaptation, resilience and mitigation*; *environmental quality, including air quality and waste management* as well as *economic development and decent employment*. This result is hardly surprising, as most of the policies reviewed focus on the need to ensure environmental quality of EU ecosystems and habitats and addressing climate change. For the MS level, the analysis focused on societal challenges that were mentioned in terms of NBS in urban areas. Here again, *green space, habitats and biodiversity* were most commonly mentioned, followed by *climate action for adaptation, resilience and mitigation*, but also *health and well-being* as well as *water management*. Thus, the EU and the MS

levels similarly prioritise societal challenges with regard to NBS and related concepts in their policy instruments.

While most of the reviewed policies on EU and MS level do encourage NBS implementation, the **types of NBS intervention** are often not specified, but rather implied. When mentioned at the EU level, however, NBS intervention types fall heavily towards the *maintenance and/or management of existing green and blue spaces* and, to a lesser extent, the *restoration of ecosystems and their functions*. Oftentimes, these two forms of intervention are jointly mentioned, highlighting that these measures are seen as complementary rather than mutually exclusive. While the *creation of new spaces* was only a minor issue in EU policies, it was found to receive more attention at the MS level, such as in the German Green and White Papers, the German funding instrument for “green in the city”, and the English efforts to foster the implementation of sustainable drainage systems, which support the *creation of new green spaces next to the maintenance of existing ones*. New spaces are thus encouraged by instruments, with a strong focus on green spaces in cities. This corresponds to the finding at the EU level that the creation of new green spaces is mostly included within the EU Green Infrastructure and Biodiversity Strategies. Overall, MS instruments encourage all three types of interventions (either implicitly or explicitly) more often than EU level policies do, with England and Germany being most explicit.

Specific **elements of NBS** are usually not mentioned in the analysed EU policies, nor in the policy instruments of the MS. Perhaps unsurprisingly, the EU Green Infrastructure Strategy and German Conceptual Paper on Green Infrastructure and the German Green and White Papers on Urban Green mentioned the most elements of NBS. Other instruments that explicitly mentioned elements of NBS in MS did so with regards to the issues of climate change, water management or urban development. At the EU level, most elements of NBS are included in the field of biodiversity, followed in scope by water. Regarding specific elements, *blue areas, parks and (semi)natural urban green areas*, as well as *green indoor areas* are most frequently mentioned at the EU level, while the focus at the MS level is placed far less on blue areas. This may be due to the fact that the policy instruments for review were chosen with a focus on NBS in urban areas, where possible. From the qualitative analysis it seems that *urban green space connected to grey infrastructure, parks and other urban green areas as well as green areas for water management* are focused on by all MS.

The **nature of NBS instruments** at the European level varies between being *information providing* and having *mandatory requirements*; this is true for, e.g. instruments dealing with environmental impact assessments, the Habitats Directive, the WFD and the EU Biodiversity Strategy. At the MS level, the focus of policies is different: Here, nearly all instruments reviewed encourage NBS, but the only mandatory elements refer to the creation of GI strategies or plans that need to be developed (Spanish Law on Natural Heritage and Biodiversity requires green infrastructure strategies for autonomous regions, Swedish Biodiversity Strategy requires county administration boards to develop Regional Action Plans for Green Infrastructure).

The **degree of support for NBS** at the EU level is classified as ‘strong (explicit or implicit)’ or ‘medium’ for 87% of the policies reviewed. ‘Strong explicit’ support for NBS is found in the EU Biodiversity Strategy, Green Infrastructure Strategy, the MSFD, the Forestry Strategy and the Adaptation Strategy. ‘Strong implicit’ support is found in the Blue Growth Strategy and the EU Urban Agenda. ‘Low support’ was only found in the cohesion and growth policies of the Europe 2020 Strategy and the EU Circular Economy Action Plan. Regarding the selection of instruments reviewed for the MS level, there is far less ‘strong explicit support’, with a very mixed overall picture. The ‘strongest explicit support’ was found in Germany, while Hungary and Sweden (to some extent) have policies that provide ‘strong implicit support’. In four countries (Spain, Germany, England, and Sweden) at least one policy instrument provided only ‘low support’, despite being earmarked as ‘highly relevant’ by interviewees in the MS policy framework scoping stage.



As an output of the EU and MS reviews and using the level of support for NBS-related concepts and the expert insights regarding the potential for NBS deployment, several insights regarding future perspectives for deployment and overarching conclusions have been derived and are presented below.

6.1. PLANNED DEVELOPMENTS AND SUPPORT FOR NBS

Several processes to foster increased NBS support have been identified that are already in motion at the EU and MS levels. Furthermore, the MS expert interviews revealed a number of insights regarding the currently unmet needs for mainstreaming NBS topics into national discourse and policy.

On the EU level, ongoing support is foreseen to continue through existing sectoral policies and financial instruments. This includes, for example, funding through H2020 for large-scale NBS demonstration interventions as well as financing research and networking projects. ERDF also has pledged upcoming funding support via its Urban Innovation Actions, a portion of which is earmarked for 'innovative actions' in the field of sustainable urban development over a seven-year period. Finally, the Trans-European Network for Green Infrastructure (TEN-G, or 'funding of GI projects') is envisioned as a new funding instrument for supporting GI deployment post-2020.

Untapped potential for increased NBS support on the MS level was cited by the interviewees as being high. In Hungary, for example, experts noted that even though the policy strategies are generally strong, they do not ensure the implementation of specific legislation or programs for NBS as these need to come from the Prime Minister's Office. As the Hungarian government operates in strong hierarchy, and state secretariats execute top-down instructions, there is a need for more evidence on the economic benefits of NBS as compared to traditional grey solutions to be presented to this office as a convincing argument, as well as to provide information and incentives to local governments to increase their interest in NBS-related concepts and create support in this way. In Germany, cemeteries were identified as an upcoming opportunity by the federal government due to a declining demand (more people are being cremated); there are already plans to research their potential and implement pilot projects to convert them to urban green areas.

Some MS additionally have supportive policies which are currently in development, including:

- **Spain:** The Spanish National Green Infrastructure Strategy is due to come into force in late 2018 and is expected to have significant impacts on regional GI deployment. However, interviewees expect that the focus will be largely restricted to ecological connectivity and regional development instead of urban GI development.
- **Netherlands:** It remains to be seen to what the extent the upcoming Environment and Planning Act and associated regulation will support NBS. It is expected that the Act will contain implicit or explicit elements of NBS, with its second objective already outlined: *'to effectively manage, use and develop the physical environment in order to perform societal needs'*.
- **England:** A 25 Year Plan for the Environment is under development, which will adopt a natural capital approach considering natural assets (such as air, soil, water, species), the services they provide, and the 'goods and benefits' that people derive from them to protect and improve the environment. UK experts also expect greater integration with national infrastructure and industry projects in the short-medium term, mainly related to transport infrastructure.

6.2. CONCLUDING REMARKS

Overall, it appears that current EU and MS policy frameworks do indeed provide a basis for supporting NBS and related concepts and present a foundation upon which to inspire action across all governance levels (i.e. national or regional/local). It should be noted, however, that the degree of ambition as well as the extent and type of support vary greatly across MS and between the MS and EU levels. Furthermore, the degree of uptake depends largely on MS self-initiative and commitment as there is a lack of mandatory standards or measures across EU policies.

While multiple MS and EU policy instruments explicitly acknowledge NSB-related concepts and sometimes even include them within strategic objectives, there is an almost universal lack of quantitative and measurable targets. Furthermore, NBS are overwhelmingly articulated in relation to policies that require no or voluntary action within the reviewed policy frameworks, which would challenge the potential impact of any quantitative targets even if they were more widespread. Given the focus of the NATURVATION project, it is worth highlighting that current policy instruments largely neglect urban areas when considering NBS. In the few instruments addressing urban areas and NBS, the focus lies on maintaining and restoring existing green and blue areas as opposed to deploying NBS to create new green and blue spaces.

Furthermore, experts from different MS mentioned that there is significant potential for NBS and related concepts if NBS can be linked to well-being and preventative health care policy and if the idea of GI is strengthened in the transport and mobility sectors. Such potential also exists on the EU level, with room for increased cross-sectoral integration of NBS and related concepts and increased provisioning of funds as a means to generate concrete implementation action, increase the knowledge and evidence base, and foster wider support and awareness of NBS as a multifunctional approach to addressing multiple societal challenges.

Taking these findings into account, it can be concluded that while the current policy mix provides a starting point for supporting/promoting NBS, there is significant potential on an EU and MS level to strengthen the level of ambition and degree of support across sectoral policy instruments in order to create new and optimise existing (urban) NBS interventions.

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ANNEX A

TEMPLATE AND KEY FOR EU POLICY FRAMEWORK REVIEW



TABLE 4. TEMPLATE FOR EU POLICY FRAMEWORK REVIEW

OVERVIEW																												
Date of entry into force:																												
.....																												
Updates/reforms, if applicable:																												
.....																												
Type of policy instrument (strategy, framework, directive, etc.):																												
.....																												
Aims, objectives and targets relating to NBS deployment (including quantitative and qualitative goals); <i>include page number(s)</i>																												
.....																												
Coverage:																												
.....																												
Funds/programmes used to finance regulatory framework ¹ : 1 2 3 4 5 6 7 8 Other (please specify)																												
.....																												
Additional accompanying documents of relevance:																												
.....																												
FOR FUNDING INSTRUMENTS ONLY:																												
Amount of funds available, timeframe for distribution, conditionality, other relevant details																												
.....																												
EXPLICIT OR IMPLICIT MENTIONING OF NATURE (BASED SOLUTIONS) TO ADDRESS SOCIETAL CHALLENGES																												
Cite relevant text (with key terms in bold)	Societal challenge addressed ²												Type of NBS intervention ³				Element of NBS mentioned ⁴									Nature of instrument ⁵		
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	1	2	3	4	5	6	7	8	9	1	2
...																												
...																												
SUMMARY OF RELEVANCE																												
Terms which have been explicitly mentioned ⁶																												
Which term was the most frequently mentioned?																												
.....																												
Short summary of the extent and type of support for NBS (as basis for assessment of relevance)																												
.....																												
Level of support for NBS ⁷																												
1 2 3 4																												
.....																												
Other relevant aspects for NATURVATION, not covered above?																												
.....																												

The template presented in Table 4 was used to assess the selected EU policy instruments. Each field whose response options are numerically coded is labelled with a footnote; the key for each of these response options is presented on the subsequent page in the 'Key for EU framework review'.

1 FUNDS / PROGRAMMES USED TO FINANCE REGULATORY FRAMEWORK

1 Cohesion fund

2 ERDF

3 H2020 / research

4 Marine and Fisheries Fund

5 LIFE+

6 EAFRD

7 EU Social Fund

8 TEG-G (mentioned as future source)

9 Other

2 SOCIETAL CHALLENGE ADDRESSED

1 Climate action for adaptation, resilience and mitigation

2 Water management

3 Coastal resilience and marine protection

4 Green space, habitats and biodiversity

5 Environmental quality, including air quality and waste management

6 Regeneration, land use and urban development

7 Inclusive and effective governance

8 Social justice, inequality and social cohesion

9 Health and well-being

10 Economic development and decent employment

11 Cultural heritage and cultural diversity

12 Sustainable consumption and production

³ TYPE OF NBS INTERVENTION	
1 Creation of new spaces	Creation of new natural spaces such as green roofs, areas, or habitats; transformation of grey infrastructures into green spaces, e.g. renaturing brownfield sites or former industrial areas
2 Maintenance/management of existing spaces	Maintaining and managing existing green and blue spaces e.g. protected areas, corridors and stepping stones; taking actions specifically aiming to improve maintenance and delivery of ecosystem services, management measures under Natura2000 areas or river basin management plans
3 Restoration of ecosystems and their functions	Restore ecosystems and their functionality to deliver a wider range of ecosystem services and benefits, e.g. wetland and floodplain restoration, relocate dykes, remediate polluted areas, removal of concrete along rivers
4 Not specified/relevant	Not specified/relevant

⁴ ELEMENTS OF NBS MENTIONED	
1 (External) building greens	green roofs, green walls or facades, balcony green
2 Urban green areas connected to grey infrastructure	alley and street trees/hedges/greens, railroad playground/school grounds; institutional green space; green parking lots; riverbank greens
3 Parks and (semi)natural urban green areas	large urban park or forest; pocket parks neighbourhood green spaces; botanical garden; green corridor
4 Allotments and community gardens	allotments, community gardens, horticulture
5 Green indoor areas	indoor vertical greeneries (walls and ceilings), atrium
6 Blue areas	lake/pond, river/stream/canal/estuary, delta, sea coast, wetland/bog/fen/marsh
7 Green areas for water management	rain gardens, swales/filter strips, sustainable urban drainage systems
8 Derelict areas	abandoned and derelict spaces with growth of wilderness or green features
9 Other (please specify)	

5 NATURE OF INSTRUMENT	
1 Mandatory	Inclusion of mandatory requirements or standards
2 Voluntary	Encouragement of voluntary action
3 Statement	Statement which relates to NBS thematic, but which neither encourages nor requires action.

6 TERMS THAT HAVE BEEN EXPLICITLY MENTIONED	
1 Nature-based solution	
2 Green (and blue) infrastructure	
3 Ecosystem-based approach / adaptation / mitigation	
4 Sustainable (ecosystem/water/forest/natural resource/etc.) management	
5 Natural water retention measure(s)	
6 Ecological engineering	
7 Working with nature	
8 Nature-based infrastructure	

7 LEVEL OF SUPPORT FOR NBS	
1 Strong explicit support	NBS or related terms are explicitly mentioned and strongly embedded throughout the framework, including in objectives, policy measure design and/or supported actions.
2 Strong implicit support	Strong framing of nature as a means to address (select) societal challenges, with multiple references to/support for elements of NBS or NBS intervention types; no explicit mentioning of NBS or related terms.
3 Medium support	NBS and related concepts are not a prominent feature, but deployment is supported through references to/support for individual NBS elements and interventions.
4 Low support	NBS are neither a prominent feature nor relevant for/mirrored in policy measure design and supported actions.

ANNEX B

QUESTIONNAIRE FOR MEMBER STATE PHONE INTERVIEWS

Exploration of how NBS are used or supported by national agencies within the respective countries

(Germany, Spain, Netherlands, Sweden, Hungary and UK)

Country:

Interviewer:

Interviewee Name:

Employer, Department:

Position:

A. Introduction & Background

[Interviewer briefly explains project background (incl. that we have conducted a review of EU policy, and are conducting this review in 6 Member States (MS). On the basis of several interviews, we will conduct a policy analysis at MS level and compare to EU findings). Interviewer asks interviewee if s/he agrees that the interview will be recorded – not for transcribing answers, but to ease the note taking during the interview.]

1. Please briefly describe your role in your Ministry/agency?

[This question serves as an icebreaker, we usually know the answer in advance.]

2. Since when are you roughly familiar with the term nature-based solution? *[If the interviewee is not familiar with the NBS we will alternatively ask for GI, EbA, etc.]*

How would you describe your understanding of a nature-based solution?

[Information for interviewee: For the purposes of this discussion, we would welcome information on nature-based solutions as such, but also action which has been labelled as 'green (and blue) infrastructure', 'ecosystem-based approaches to climate change mitigation or adaptation', or 'working with nature' to address societal challenges. In responses, it's important to specify if NBS specifically, or rather one of alternative terms are being referred to (particularly in terms of integration into policy).]

B. Nature-based solutions (and related concepts) in [interviewer to insert country] national policies, strategies and targets

3. How do you at *[interviewer to insert institution of interviewee]* consider NBS in your work? And since when?

[Here, in order to introduce the next question, the interviewer should say that we/they've conducted a brief search and have come up with a few ideas of where NBS (and related concepts) are being integrated in these aspects. If comfortable, list a few examples and ask the interviewee for confirmation and/or additional items.]

4. Is NBS or NBS-related terminology already included in:

- **national policies** (e.g. strategies, legislative acts, mandates)? If so, which ones?
- specific **national targets**? If so, which ones? *[e.g. 'area of/access to green space per urban resident' or 'xx% of green roofs implemented by XXXX']*
- national **programmes**? If so, which ones?
- **national funds**? If so, which ones?
- **others**?

[Interviewer should relate here to what has been said before!]

5. Do you know of any **national mandates** for the use of NBS, or even **quantitative targets** to those asked about earlier??

[Interviewer should try to find out the piece of legislation and name of the responsible authority.]

Are NBS predominantly pursued in a specific sector or by a single or multiple agency(ies), institution(s) or group(s)?

In the areas in which NBS or related terms aren't yet integrated, is this foreseen on the national agenda? Please specify.

6. Are you aware of **efforts or activities to encourage NBS implementation** that are coordinated by or participated in by *[interviewer to insert institution of interviewee]*? Or which are taking place on a national level, in which *[interviewer to insert institution of interviewee]* is not necessarily involved? e.g. through the **provisioning of informational materials, trainings/ capacity building or information campaigns** - Please specify.

7. Are you aware of any **information sharing platforms** for exchanging knowledge on or examples of NBS within *[interviewer to insert country]*? *[The platforms could be focused on sharing e.g. best practices or case studies, scientific studies, providing information on funding sources, etc.]*

C. Financial support for activities relating to nature-based solutions in [interviewer to insert country] (e.g. implementation, research and capacity building)

8. Are you aware of any government funded (research) projects, financial support programs or initiatives aiming specifically to **implement NBS**? *[e.g. financing pilot programs, provisioning of subsidies for certain NBS-related measures, fostering*

PPPs, etc.]. Are these predominantly focusing on a **specific type** of NBS, region, societal challenge or a specific **sector or group of stakeholders**?

9. Are you aware of any financial support programs to support NBS **capacity building, knowledge transfer and/or training**? Which ones?

10. Are you aware of any national support programs to encourage **research on and the advancement of NBS-related knowledge**? Which ones? Do these programs include a physical implementation aspect? If yes, can you provide examples of supported studies and an indication of their focus. [e.g. *costs and benefits associated with NBS, success factors and barriers, identification of funding sources, stakeholder mobilisation strategies, etc.*], or a link].

D. Potential opportunities for increasing NBS implementation in the future in [interviewer to insert country]

11. How do you currently or could you potentially improve the promotion of the NBS concept within other government agencies and ministries in [interviewer to insert country]? Are there other main institutions or bodies which are not currently involved in NBS activities, regulation, etc. but which you believe should be?

12. Which other institutions or specific NBS experts in [interviewer to insert country] would you recommend to further discuss these questions with? [Ask openly without specifying what we are looking for in order to get what they first have in mind. Only if they do not mention any experts from the government or the administration, we will ask for them. We will take note of experts from NGOs, research institutions, etc., but not explicitly ask for them.]

13. Which reports or documents would you recommend to read to learn more about NBS and its implementation in [interviewer to insert country]?

14. Is there any other information that you think is useful for us to know in the context of our research that I have not asked you about?

[Interviewer to thank interviewee for time and insights that were shared. Ask if s/he wants to be informed about the report once it is published – probably end of 2017.]

ANNEX C

MS POLICY INSTRUMENTS REVIEWED

COUNTRY	POLICY INSTRUMENT REVIEWED
Germany	National Strategy on Biological Diversity, 2007 (Nationale Strategie zur Biologischen Vielfalt)
	Green Paper 'Urban green space', 2015 (Grünbuch Stadtgrün)
	White Paper 'Urban green space', 2017 (Weißbuch Stadtgrün)
	Conceptual Paper Green Infrastructure, 2017 (Bundeskonzept Grüne Infrastruktur)
	Urban development funding "Future Green in the City", 2017 (Städtebauförderung: Zukunft Stadtgrün)
	TEEB DE: Ecosystem Services in the City, 2016 (TEEB DE - Ökosystemleistungen in der Stadt)
Hungary	National Climate Change Strategy 2008-2025, 2008
	National Strategy for the Conservation of Biodiversity in 2015-2020, 2015
	XXVI of 2003. Act on National Spatial Planning (2003. évi XXVI. törvény az Országos Területrendezési Tervről)
	Green Infrastructure Development and Sustainability Action Plan, Territorial and Settlement Development Operational Program, 2017 (Zöld Infrastruktúra Fejlesztési- és Fenntartási Akcióterv, TOP-2.1.2-16)
	Rehabilitation of Brownfield sites, Territorial and Settlement Development Operational Program, 2017 (Felhívás a városi barnamezős területek megújítására, TOP-2.1.1-15)
Spain	Law on Natural Heritage and Biodiversity, 2007 (Ley 42/2007, de 13 de diciembre, del Patrimonio Natural y de la Biodiversidad)
	Third Work Programme of the National Plan for Adaptation to Climate Change 2014-2020 (Tercer Programa de Trabajo del Plan Nacional de Adaptación al CC 2014-2020)
	Climate Change Adaptation Strategy for the Spanish Coast, 2016 (Estrategia de Adaptación al Cambio Climático de la Costa Española)
	Guide to creating local climate change adaptation plans, 2015 (Guía para la elaboración de Planes Locales de Adaptación al Cambio Climático)
	Royal Decree on flood risk assessment and management, 2010 (Real Decreto 903/2010 de 9 de julio, de evaluación y gestión de riesgos de inundación.)
	Award of grants by the Biodiversity Foundation for climate change adaptation projects, 2016 (Convocatoria de concesión de ayudas de la Fundación Biodiversidad, en régimen de concurrencia competitiva, para la realización de proyectos en materia de adaptación al cambio climático)
	Spanish Strategy for Urban and Local Sustainability, 2011 (Estrategia Española De Sostenibilidad Urbana Y Local)

COUNTRY	POLICY INSTRUMENT REVIEWED
Netherlands	Draft of Environment and Planning Act, along with consultation versions of complementary laws on soil, noise, land ownership and nature, 2017 (Omgevingswet)
Sweden	Planning and Building Code, 2010, (Plan och bygglag)
	Environmental Code, 1998 (Miljöbalk)
	Swedish Environmental Objectives, 1997, updated 2009 (Svenska Miljömål)
	A Swedish Strategy for Biodiversity and Ecosystem Services, 2013 (En svensk strategi för biologisk mångfald och ekosystemtjänster)
	Guidelines for Regional Action Plans on Green Infrastructure, 2014 (Riktlinjer för regionala handlingsplaner för grön infrastruktur)
England	Biodiversity 2020: A strategy for England's wildlife and ecosystem services, 2011
	Natural Environment White Paper (The Natural Choice), 2011
	National Planning Policy Framework (NPPF), 2012 and Guidance
	Flood and Water Management Act 2010
	Natural flood management schemes, 2017
	Natural Capital Accounting 2020 Roadmap, 2015



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