



Exploratory approach to nature-based solutions for human-ecological well-being and health in cities. Towards an integrated NBS planning and policy approach framework.

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Abstract. Cities encounter today systemic societal challenges. Therefore, a comprehensive and holistic approach to overcome them is needed, instead of dealing with them individually. The New Urban Agenda proposed a new paradigm shift in sustainable development, calling for a global action on well-management and well-planning of urban spaces in cities in a sustainable and equitable approach, in order to boost health, well-being and quality of life. The NBS Cluster GoGreen Routes project aims to help solve urban and territorial challenges towards an inclusive, resilient, healthier and sustainable future ahead with nature-based solutions (NBS), in order to provide environmental, social and economic benefits through systemic adaptation interventions. In this paper we described the framework to the exploratory analysis on the NBS Cluster Go Green Routes , conducted under the EU-funded H2020 project GO GREEN ROUTES. The exploratory analyses on the NBS Cluster Go Green Routes project was intended to bring new insights in the debate about NBS. Specifically related to the integration of human -ecological well-being and health in cities. This paper reflects on four domains, challenges, impact, and definitions of well-being and health in general, coupled with the key enablers and barriers identified by stakeholders in the 4 workshops held during 2021. This paper contributes to filling knowledge and evidence gaps. With the aim to broaden the discussion and advance the understanding of environmental and ecological, political socio-economic perspectives related to NBS interventions in public spaces as a drive for human and ecological well-being and health in cities and enhance NBS mainstreaming.

Keywords: nature-based solutions, sustainable urban planning, well-being, co-governance, green urban design and planning, transdisciplinarity

1 Introduction

Urban areas bring together the major challenges facing society today, such as environmental pollution, lack of social cohesion, biodiversity loss, depletion of the ecosystem, climate change, well-being and health problems, economic and governance issues [1]. In the past, working in silos has been the way forward that delivered unsustainable development and focused mainly on economic growth, given social and environmental factors apart. Global and European Environment and climate frameworks and programmes have been guiding cities and regions to facilitate green growth, a healthy planet and improving human and ecological well-being. In particular, the United Nation Agenda for Sustainable Development, i.e. the Sustainable Development Goals SDGs [2] are calling for action to all sectors of society regarding transformation and accelerate the progress for environmental sustainability.

In order to reverse societal challenges, the New Urban Agenda highlighted the necessity to design, plan, manage, build and set implementation policies for good urbanisation and sustainable urban planning, towards sustainable development, job creation and enhancing quality of life [3]. Likewise, define five main components to take into consideration when designing, governing, planning, developing and managing cities, such as: (i) urban policies;(ii) legislation and regulation; (iii) urban planning and design; (iv) local economy and (v) local implementation [3] . Scientific evidence is starting to consider nature-based solutions as a way to tackle human and ecological well-being and health, ecosystem restoration, resource efficiency and climate change. Nature-based solutions can lead towards a balanced natural resource use, while at the same time enhance ecological and social sustainability [4, 5, 6]. To this end, concerns regarding how cities are managed and planned in the long term recognize the benefits that nature-based solutions can bring to society, to the environment and the economy. Moreover, sociocultural values are considered essential for human well-being [7]. The current progression and situation regarding the well-being of society and the planet in terms of social and environmental metrics, beside the economic growth -the global metrics-GDP, are starting to be considered not aligned with the recent issues (Covid-19 or war conflicts), notably lacking consideration on social and environmental current challenges [8] .

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Universally, global policies and frameworks, particularly, the Convention of Biological Diversity (CBD) section E, set a 2050 Vision and 2030 mission: “*a world of living in harmony with nature*” and the vision of the framework: “*By 2050, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people.*” [9]. See more on NBS and EU and global policy enabling NBS in [10]. Back in the 1970s, the United Nation Habitat I conference held in Vancouver in 1976 represented the first Global conference recommending taking action with a defined action plan advocating national action towards environment and human well-being [11]. The EU 2050 vision for sustainability: living well, within the limits of our planet, shares a common strategy promoting green growth, healthy environment and human well-being. The action programme is a legal binding guide to the EU institutions and Member States, sharing responsibility for the implementation. Furthermore, it encourages knowledge sharing to policy-makers and stakeholders, enlarging the evidence base and fostering a more systemic approach [1].

NBS have the potential to provide social, environmental and economic benefits and deliver associated co-benefits to biodiversity and enhance ecosystem services. NBS are considered cost-effective, while at the same time improving resilience throughout systemic interventions [12]. A call for action to all sectors of society regarding transformation and accelerate the progress for environmental sustainability. That may guide governments in achieving more sustainable, green and resilient societies as highlighted in the United Nation Agenda for Sustainable Development and the SDGs [2]. The need for a paradigm shift towards a more integrated way to design settlements will enhance well-being and health in cities, promote resilience and sustainability and guard the environment [3].

Furthermore, the new EU Green Deal sets a strategic roadmap to enhance human and ecological well-being and health in cities, ensuring a healthy natural environment, and encouraging active public participation to tackle environmental and climate related challenges, throughout a set of EU policies [13]. Moreover, large scale nature-based solutions implementations help contribute to climate resilience [14]. Nature-based solutions provide social, environmental and economic benefits and deliver associated benefits to biodiversity and enhance ecosystem services. NBS are considered as cost-effective, while at the same time improving resilience throughout systemic interventions. In this prospect the added value of co-creation and co-governance of NBS helps to achieve the transition towards an inclusive approach to sustainability [10].

The definition taken for this research article is the one defined by the European Commission ,n.d.

Nature-Based Solutions (NBS) *

* **Solutions** that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience. Such solutions bring more, and more diverse, nature and natural features and processes into cities, landscapes and seascapes, through locally adapted, resource-efficient and systemic interventions.

Nature-based solutions must therefore benefit biodiversity and support the delivery of a range of ecosystem services” E.C. , n.d.

In addition, acknowledge the Kuming Montreal Biodiversity Framework target 8, where nature-based solutions are refer to actions to protect, restore, sustainably use and manage natural or modified ecosystems, which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services and resilience and biodiversity benefits [9]. The EU research and innovation agenda aims to help solve urban and territorial challenges towards an inclusive, resilient, healthier and sustainable future ahead with nature-based solutions (NBS), in order to provide environmental, social and economic benefits through systemic adaptation interventions [15, 16].

The exploratory analyses on the NBS Cluster Go Green Routes (GGR) project was intended to bring new insights in the debate about NBS. Specifically related to the integration of human –ecological well-being and health in cities. This paper reflects on four domains, challenges, impact, and definitions of well-being and health in general, coupled with the key enablers and barriers identified by stakeholders in the 4 workshops held during 2021. This article encompasses the UN’s Sustainable Development Goals as an astringent model to achieve the EU and global policy target set to facilitate the transition towards sustainability within nature-based solutions mainstreaming in planning and policies.

1.1 Set the scene framework.

The NBS Cluster GoGreen Routes project aims to help solve urban and territorial challenges towards an inclusive, resilient, healthier and sustainable future ahead with nature-based solutions (NBS), in order to provide environmental, social and economic benefits through systemic adaptation interventions. In this paper we described

the framework to the exploratory analysis on the NBS Cluster Go Green Routes (GGR), conducted under the EU-funded H2020 project GO GREEN ROUTES. With the aim to broaden the discussion on environmental and ecological, political socio-economic perspectives related to NBS interventions in public spaces as a drive for human and ecological well-being and health in cities. In order to enable a comprehensive approach to the co-design, co-creation, co-implementation, co-assess and co-monitoring of NBS in Cultivating Cities in the GGR project; Umea (Sweden), Lathi (Finland), Tallinn (Estonia), Limerick (Ireland), Versailles (France) and Burgas (Bulgaria). The overview of the exploratory NBS Cluster workshop session contemplated the following aspects: (i) main challenges, (ii) expected impact, (iii) NBS for human well-being and health in cities and (iv) enablers and barriers.

The Vision of the NBS Cluster GOGREEN ROUTES framework. is defined by three dimensions : (i) Help overcome the key societal challenges that cities face through Nature Based Solution, design and implementation, strengthen the European Green Deal and foster the mainstreaming of NBS; (ii) Innovating Cities for sustainable urban design and resilience, from a holistic approach (key ecological and social perspective), focused on innovation in the design, implementation and governance of the public spaces and (iii) Strengthen the co-design and co-implementation of integrated and visionary Nature-Based Solutions (NBS) in public urban spaces, to enhance human health and well-being in cities through locally adapted, resource-efficient and systemic interventions.

The NBS Cluster GO GREEN ROUTES aims to bring Nature back to cities. With the key aim of study, analysis and integrate Nature-based solutions (NBS) through sustainable urban design, urban development and urban governance of public spaces in urban settings in cities, as a huge potential to transform these spaces into diverse, inclusive, safe, accessible and high quality green areas, that increase well-being and health and deliver a fair allocations of the associated benefits and co-benefits.

The United Nation 2030 Agenda is the global framework to guide us to reach sustainable development, acting towards the enhancement of the social, economic, environmental and governance dimensions [17]. Moreover, **mainstreaming NBS in urban planning and NBS policies** have been identified as helpful for managing associated societal demands [18]. The EU was one of the leading forces behind the United Nations 2030 Agenda and has fully committed itself to its implementation. jointly with 197 parties. This article specifically address the Sustainable development Goal (SDG) 11, Target 11.a: *Support positive economic, social and environmental links between urban, per-urban and rural areas by strengthening national and regional development planning and Target 11.3: By 2030, enhance inclusive and sustainable urbanisation and capacity for participatory, integrated and sustainable human settlement planning and management in all countries.*

Under the EU Work Programme, climate action environment and resource efficiency, jointly with the umbrella of the Horizon 2020 framework programme. The GO GREEN ROUTES project aims to enhance the framework conditions for NBS at EU and international level.

2 Materials and Methods

This paper presents a mix methods approach methodology. Qualitative methods will serve as adequate tools for investigating these complex phenomena- acquiring an interpretative approach and providing understanding to social reality. This methodology deployed in the NBS Cluster GGR: firstly, proceeded with research literature review on the main concepts, after that through an exploratory qualitative analysis- focus group- aimed to augmenting a comprehensive perception of social issues; provided with four workshops during 2021 and finally, validation of the theoretical and procedural dimensions for the implementation of the NBS.

Focus group- Qualitative methodology Structured discussion of an issue by a group of people, purposely selected usually to involve different stakeholders and/or potentially differing perspectives of an issue at hand. The joint discussion allows participants to consider and react to arguments put forward by other participants so it allows examination of group dynamics and opinion formation

Through an exploratory qualitative analysis and research literature review, this study followed a mixed methodological approach and encompasses three main procedures.

2.1 Literature Review

Firstly, we conduct a literature review process where we analyse the state of the art of key publications to address the main keywords; “nature-based solutions” “health” “well-being” “societal challenges” “urban planning”..

coupled with authors' know-how and practice experience- key references were added to further review key discussion concepts.

2.2 Expert workshop. partners involved in NBS co-design, co-implementing, co-asses and up-scale

A qualitative research method was undertaken with the aim of allowing exploration of ideas regarding NBS interventions and experience in depth, through four workshops run during 2021. As a first exploratory research approach with the goal to raise a comprehension of uphold understanding, view, motivations related to NBS concept, well-being and health respectively among partners. In order to provide with perceptions about that and aid to devise ideas or hypotheses. Key aspects to highlight: (i) The Focus group methodology was applied; (ii) The process contemplated four workshops in order to gather information from municipal officials and experts in planning and implementation process with the main aim of explore and understand the views, motivations related to the concept of nature-based solutions, jointly with providing awareness of the benefits and co-benefits that nature-based solutions. Specifically the benefits that NBS will bring into the co-design, co-planning, co-management, co-governance of the pathways, to shift decision into a transdisciplinary approach; (iii) Transdisciplinary stakeholders group, with expertise in social, environmental, health and climate sciences. Overall, innovative visual tools were used in the four different workshops, in order to facilitate data collection.

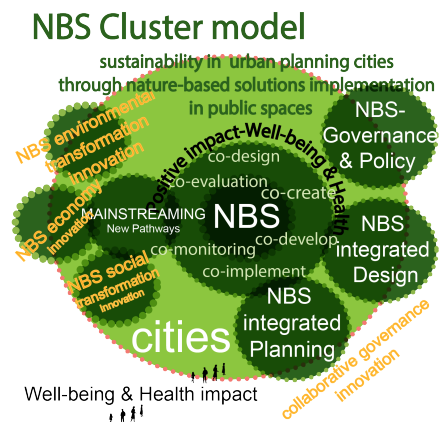
2.3 Analyses of data

This paper reflects on the result obtained through exploratory qualitative analysis method. Specifically, a focus group- structured discussion of an issue by a group of people, purposely selected usually to involve different stakeholders and/or potentially differing perspectives of an issue at hand. The joint discussion allows participants to consider and react to arguments put forward by other participants so it allows examination of group dynamics and opinion formation. Amongst them, key enablers and barriers identified by stakeholders in the four workshops, encompassing the UN's Sustainable Development Goals as strengthened models to achieve the EU and global policy targets set to facilitate the transition towards sustainability.

3 Foresight Framework

According to the New Urban Agenda, Habitat III Quito conference, research, innovation and science interfaces in urban and territorial planning. Likewise are key to achieving SDGs and Sustainable Urban development [3]. The exploratory analyses conducted on the NBS Cluster model GoGreenRoutes (Fig. 1) was intended to bring **new insights into the NBS framework approach**, to reach a comprehensive sustainable NBS urban interventions. The research is intended to aid the discussion on environmental and ecological, political socio-economic perspectives related to nature-based solutions interventions in public spaces as a drive for human and ecological well-being and health in cities, with the expected impact to **mainstream NBS into the EU policy and global agendas**.

Fig.1. NBS Cluster model. Credits main author of the article.



GO GREEN ROUTES actions aims to provide the evidence based and coherence of nature-based solutions embedded into a novel and creative approach to innovative **NBS planning and NBS urban design planning**, fostering creative and **collaborative governance and redevelopment of public spaces**, to help reduce social, economic and environmental challenges in each of the six cultivating cities (Umea, Tallinn, Limerick, Bugas Versailles and Lathi). Likewise, fostering equal access for all to public space with co-creative approach, mainstreamed into governance and policy making process. Towards enabling the design, planning and policy integration of nature-based solutions (in the local context). In the process new innovative ways of collaborative governance through the NBS Cluster GO GREEN ROUTES were explored.

Based on the above methodology, this article presents the findings from this exploratory study (Fig.2.). The analysis uses key informant workshops with public, private and non-profits actors partners in the GO GREEN ROUTES project, in order to examine the challenges to be overcome with the NBS framework with the implementations of NBS, the **benefits and co-benefits** and the kind of potential NBS to be implemented in those municipalities.

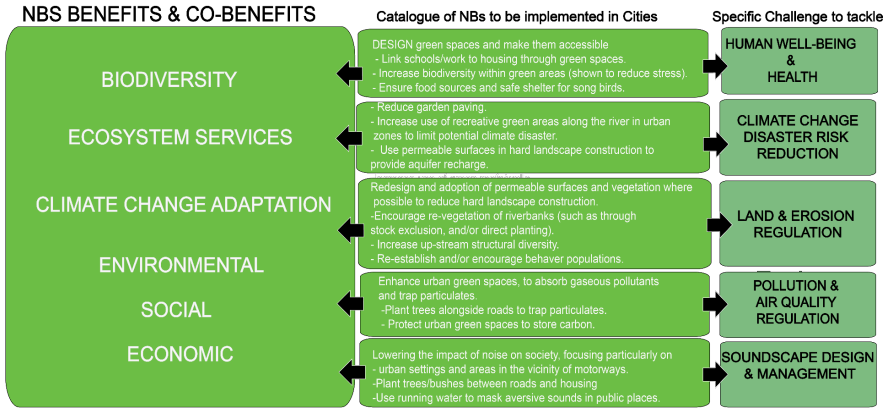


Fig.2. Foresight NBS framework (preliminary). Credits main author of the article.

This article analyses seven (Fig. 3) specific domains; (i) Nature-based solutions: What does it mean to me?. (ii) Well-being: What does it mean to me?; (iii) Health: What does it mean to me?; (iv) Main challenges expected - environmental, social or economics; (v) Expected impact of NBS planning, design and

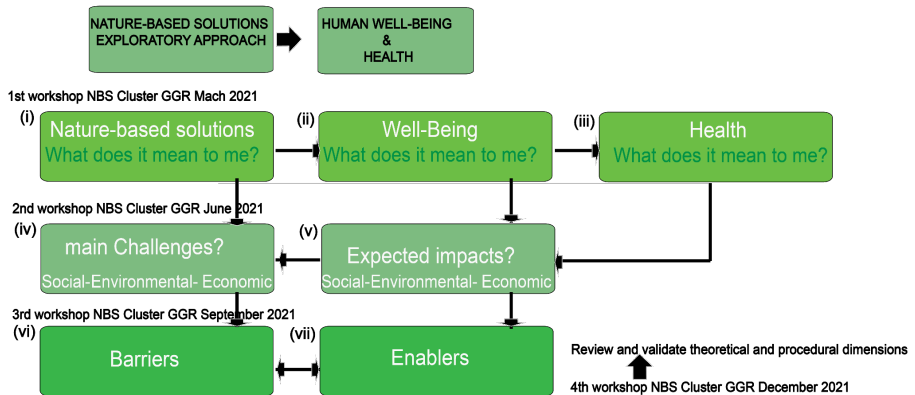


Fig.3. Exploratory domains NBS framework analyses (Seven specific)

implementation, that is envisaged?; (vi) Barriers and (vii) Enablers to NBS mainstreaming?.

4 Discussion and Conclusion

The presented study and exploratory framework can be applied to a variety of specific local conditions of cities or regions, in order to preliminary analyses the approach, directions and intentions of the analyses towards an NBS

implementation and mainstreaming to solve different societal challenges. For instance, the side effects of unsustainability urbanisation, namely soil sealing or extensive resources used, lead to high urban temperature, increase noise levels and decrease air quality or even reduce urban green space [19]. Due to nature-based solutions appear as an innovative way of operationalizing the planning, management, governance and evaluating process of the solutions to societal challenges. NBS should be enhanced in diverse aspects of planning [20], consideration should be given to drivers of change [9, 7]. Likewise, nature-based solutions offer a positive prospect on dealing with social, environmental and economic challenges, while at the same time enhancing the benefits of biodiversity and ecosystem services in a systemic way [15, 16]. Consequently, the overwhelming impact of resource use on the planet boundaries by humans needs a paradigm shift to a natural systems approach, by means of an ecological reuse and recovery balance. Above all, to contribute to tackle the environmental, social and economic challenges, the deployment of NBS should be oriented to a coherent, integrated and holistic approach, in order to foster resilience, quality of life and sustainability, while at the same time help mainstreaming NBS in urban planning and NBS policies [18].

The EU environment action policy programme foreseen that: *'In 2050, we live well, within the planet's ecological limits. Our prosperity and healthy environment stem from an innovative, circular economy where nothing is wasted and where natural resources are managed sustainably, and biodiversity is protected, valued and restored in ways that enhance our society's resilience. Our low-carbon growth has long been decoupled from resource use, setting the pace for a safe and sustainable global society'* [1]. Moreover, the programme defines two horizontal priority objectives related to local, regional and global challenges; (i) First and foremost, assist cities to transform into sustainable cities with the aim that more EU cities implement policies for nature-solution integration enhancing sustainable urban planning and design through the available funding for this purpose and secondly, more broadly related to global challenges, effective collaboration between Member States and EU working internationally with partners to achieve the Sustainable Development Goals. The EU 7EAP Environment action programmes encourage EU institutions and Member States to secure natural capital, and stimulate resource-efficient, low-carbon growth and innovation, and **safeguard people's health and wellbeing – within the boundaries of the Earth's natural limits** [1]. The European Union has been establishing environmental action programmes since the 1970, specifically eight of them until now. Furthermore, cities that promote the inclusion of NBS in urban planning and decision making demonstrated more capacity to help improve the citizens' well-being and health, unsustainable urbanisation, biodiversity loss and climate change [18].

The overall preliminary findings of the study are as follows: (i) Transdisciplinary approach is key in the overall process; (ii) A comprehensive approach to sustainability when we co-design, co-implement, co-assess, co-governance and co-evaluate NBS is highly valuable; (iii) Key principles about science, research and innovation from research to practice, from strategy to design to implementation and policy mainstreaming are considered essential to achieve a holistic, resilience and sustainability approach to tackle societal challenges; (iv) Mainstreaming nature-based solutions in cities. is key for well-being and health; (v) Co-creation of Nature-based solutions with local communities is essential to take ownership and locally adapted integrated solutions; (vi) Ensure that EU funding makes a real impact on the ground; (vii) Support directly the uptake and implementation of EU legislation, targets and initiatives.

In conclusion, this present paper that explore and describe a NBS model and an exploratory framework that was deploy in the frame of the NBS Cluster GO GREEN ROUTES project in order to facilitate a comprehensive, holistic and coherent approach to underline the research questions and come along with the exploratory NBS processes. Moreover, science, research and innovation are a mechanism to demonstrate how NBS is integrated and mainstreamed from research to practice, from strategic to design to implementation. Therefore, in order to tackle societal challenges the innovative NBS transformative shift towards a sustainable and holistic approach system is essential through the implementation of nature-based solutions. NBS have the potential to contribute to a variety of ecosystem services, namely regulation of micro-clima, flood prevention, allow recreation, absorb and store CO₂, hold the cure to diseases and give cultural or artistic inspiration, enhancing human-ecological well-being and health in cities, with the need of locally adapted nature-based solutions. Notwithstanding, further analyses on monitoring and evaluation the process are convenient to further research, in order to assess the effectiveness, efficiency, coherence and relevance of the performance.

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