

Overview

The uptake of Nature-based Solutions (NbS) is essential in improving urban climate resilience and is increasingly implemented around the world. However, there may be unintended consequences that could negatively impact human health and well-being.

In urban areas, some NbS measures could potentially lead to an increase in the risk of infectious diseases. Parks, green corridors, blue spaces, bio-retention facilities, stormwater wetlands, etc., could provide a suitable environment for vectors such as mosquitoes, ticks, and fleas to thrive (Heylon et al., 2019; Löhmus & Balbus, 2015; Medeiros-Sousa et al., 2017). These vectors are known to be able to carry a variety of infectious diseases. Furthermore, anthropogenic climate change has driven the expansion of vector distribution (Rocklöv & Dubrow, 2020; Semenza et al., 2022), resulting in their slow migration from tropical areas to higher latitudes where they are not commonly found, as in the case of some regions in Europe.

Given the projections of climate change and further warming, the simultaneous expansion of green spaces in urban areas and the emergence of new vectors and pathogens in Europe may lead to substantial future outbreaks of infectious diseases (Hansford et al., 2022). This could have detrimental effects on public health and pose a significant challenge to the capacity and efficacy of public health systems and biodiversity. Consequently, safeguarding health and well-being within the One Health framework would then become notably more demanding.

These complex and cross-cutting challenges require a system-wide response. In order to actively enhance urban resilience (Biesbroek, 2021; Tosun & Lang, 2017), the governance of Nature-based Solutions (NbS) must surpass the conventional sectoral boundaries that have historically shaped political regimes.

The governance of Nature-based Solutions (NbS) has emerged within public policy as a distinct category, often compartmentalised, operating in isolation and detached from the interconnected subsystems within urban environments (Wamsler et al., 2017). This mirrors the longstanding patterns of a global governance system that has perpetuated significant inequalities and overlooked the intricacies of environmental sustainability.

Fragmented, divided and compartmentalised governance structures are inflexible, limiting the incorporation of intra-sectoral concerns and also hindering the ability to make decisions swiftly, which is crucial given the present challenges posed by climate change (Howitt, 1993).

In contrast, climate resilience is multifaceted, multidirectional and dynamic (Rocklöv et al., 2023). In concordance, NbS governance must be conceived in this direction, transforming the fragmented, compartmentalised and siloed structures into more collaborative, systemic, and interconnected governance systems with the capacity to articulate and include the diversity of aspects that constitute the multidimensional urban system.

Policy integration and coherence have been identified as an underdeveloped concept in this setting. There is a knowledge gap in understanding the factors influencing the relationship between health, urban planning and environmental policy subsystems or sectors in urban spaces.

In addition, improving the understanding of how health risks are integrated into NbS governance would contribute to enhance the decision-making process by adopting a system perspective and strengthening the individual and collective capacity to recognise the relationships between different factors rather than just focusing on individual and specific components.

Better integrated analytical frameworks across health and environmental sectors are necessary to reduce the prevalence of vector-borne diseases and simultaneously enhance the climate resilience of urban systems.

Goal

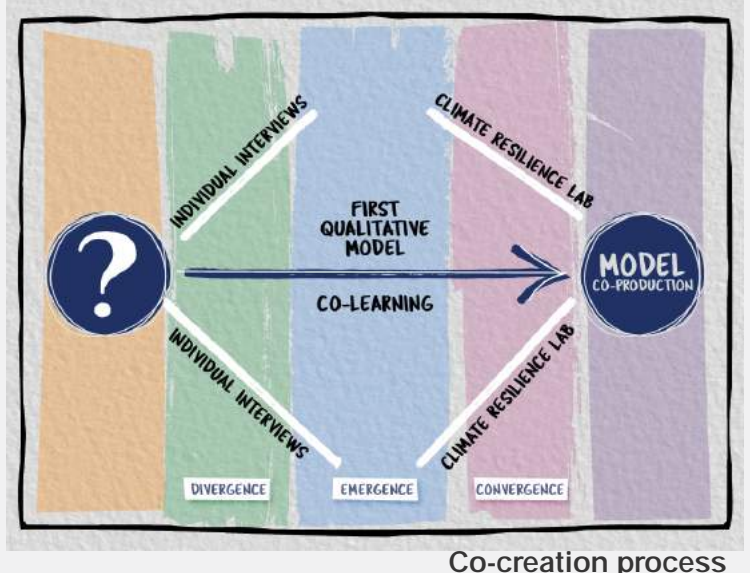
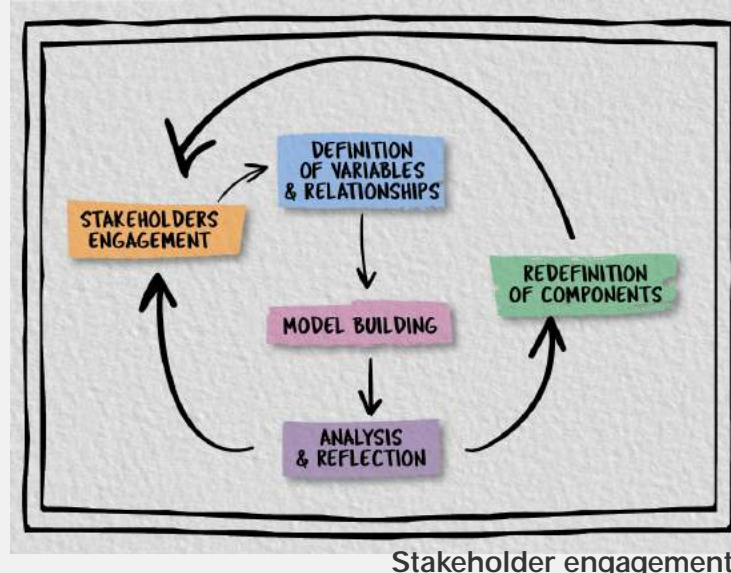
The research aim is to contribute to science-based knowledge on policy integration and coherence in urban systems with respect to NbS measures and health outcomes. Specifically, we will be focusing on the connections between health, urban planning and environmental subsystems when implementing NbS taking special attention to governance transition needs. To support this process, a decision-support tool will be developed using Participatory System Dynamics Modelling (PSDM).

The question that guides the research is: Which factors shape opportunities for and constraints on integrating health risks into NbS governance in European cities?

Methodology

PSDM was selected as the tool to map the interactions on the complex interplay between health and NbS. A system model co-creation process will be conducted to gain an understanding of how components from health, urban planning and environmental policy subsystems interact, how policy instruments from those sectors can be combined, and which arrangements are necessary to integrate health risk into NbS management and governance.

PSDM has been previously used to understand how the causal relationships between the different variables drive system behaviour over time. These causal relationships are circular, creating feedback loops that are either reinforcing or balancing and leading to system patterns. The co-creation process allowed stakeholders to interact with each other to make synergies and trade-offs visible.



Case Study

A case study will be conducted in Barcelona to test the co-development of participatory modelling. The city is committed to the secure of 1 square metre of green area per inhabitant, equivalent to 160 hectares of new green space by 2030. In addition, vector species (especially mosquitoes) have been established in the Mediterranean littoral from Girona to Cádiz and in Balears, increasing the risk of possible outbreaks of Dengue, Zika and Chikungunya in this case study area.



Partners

The Climate Service Center Germany (GERICS) and the University of Heidelberg co-developed the case study in collaboration with the Municipality of Barcelona. The case study is part of the IDAlert project, funded by the European Union. This project focuses on tackling the emergence and transmission of zoonotic pathogens by developing efficient tools for decision-makers and evaluating adaptation strategies to build a more resilient Europe to emerging health threats.



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Integrating Health in Nature-based solutions governance.

The missing piece to build urban climate resilience in a warming world.

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