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Spanning boundaries of urban nature plans: governance and urban biodiversity in Hamburg and Genova

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Abstract

Purpose – European cities still face various hindrances and bottlenecks to adopt the latest European Biodiversity strategy, target 14, which requires cities with at least 20k inhabitants to establish an urban nature plan (UNP) by including nature-based solutions (NBS) as urban planning tools to combat climate change issues. In this research paper, the purpose stands for analyzing the urban spatial boundaries by which cities can span or not in order to deisgn and implement their urban nature or green plans in conformity with the European Nature Restoration Regulation. For this, two case studies (Hamburg in Germany and Genova in Italy) were selected as paradigmatic examples in the EU context to implement a mixed methodological approach that analyzes climate change adaptation and mitigation measures in their respective UNPs.

Design/methodology/approach – By using an analytical framework of 20 criteria, the authors conducted a content analysis of Hamburg's and Genova's plans and the included actions through a three-step methodology. Particular attention in this research is given to the aspects of urban governance and commitment to implementation of biodiversity actions and goals, institutional support and policy as well as a focus on public participation.

Findings – Discussions suggest the two cities attribute nature to specific boundaries that may not coincide with the ones identified in other traditional or legislative plans. Thus, the authors identify the existence of at least two types of boundaries (knowledge and administrative) in consideration with local urban governance aspects, such as stakeholders' engagement mechanisms and evidence-based results from citizens' participatory approaches, whereas the boundaries of actionable knowledge span toward the existing administrative and spatial boundaries.

Research limitations/implications – The research limitations and implications of this study are as follows: prioritizing the development of urban nature plans toward encompassing nature beyond the boundaries of cities by merging different tools and knowledge; development of a methodological framework for assessment of urban biodiversity in cities, giving more weight to collaborative governance and public participation aspects; administrative boundaries of nature reflect the regulative limits of the planning system; involve local

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governments planners and decision-makers to establish their urban nature plans through crossing the boundaries of their municipalities spatially and administratively as a future research agenda.

Originality/value – This research proposes a fresh perspective on urban biodiversity planning based on a sound methodology that unites quantitative and qualitative aspects to demonstrate the consistent mismatch in considering permeable boundaries of nature *vis-à-vis* administrative responsibilities in current planning practices.

Keywords Urban nature plans, Collaborative governance, Nature-based solutions, Spanning boundaries, Policies and institutional support, urban biodiversity

Paper type Research paper

Introduction

In the current landscape of research on climate adaptation and mitigation, cities are demanded to transform their ways of dealing with urban development on various levels. Since the early years of 2010, transition research has expanded its object of interest from single products to the governance of urban spaces, heralding a "revolutionary systemic change in the very long term" into planning practices (Loorbach, 2017; Newton and Frantzeskaki, 2021). In this quest, there are several hindrances keeping cities on guard from advancing the battle on climate action, such as governance silos, coordination of stakeholders and the right public-policy transition for this goal (Birkmann *et al.*, 2010; Creutzig *et al.*, 2024; Diep and McPhearson, 2025). On this landscape, the European Biodiversity Strategy for 2030 encourages cities with at least 20k inhabitants to adopt an urban greening or urban nature plan (UGP/UNP) (Robuchon *et al.*, 2024; Viti *et al.*, 2024) to mend the way for a better preparedness level to match the higher temperature increase by 2°C as per the latest the intergovernmental panel on climate change (IPCC) report (IPBES, 2025; Shukla *et al.*, 2022). Urban greening plans should work as a bridge to the Kunming–Montreal Global Biodiversity Framework (GBF; Target 12) [1] that aims at enhancing green and blue spaces, human well-being, as well as mainstreaming biodiversity-inclusive urban planning (CBD, 2022).

Several cities have started drafting their urban greening plans as part of their overall climate action plans (Buzási *et al.*, 2024; Salvia *et al.*, 2023). Specifically, some research confirms the inclusion of nature-based solutions (NBS) in the local climate action plans, which is the cross-over point to the green/nature plan as defined by action 53 in target 14 of the latest EU Biodiversity strategy 2030 (Robuchon *et al.*, 2025). NBS are defined as measures and actions to preserve, manage and restore ecosystems in a sustainable manner (Cohen-Shacham *et al.*, 2019). Thus, urban planning works as a hinge to systematically promote green infrastructure and NBS into green/nature plans (Costadone and Vierikko, 2023; Pierce *et al.*, 2024).

Several researchers also highlighted that incorporating NBS as a priority in their spatial planning helps fight climate change, increasing social justice and reducing vulnerability to climate risks, such as extreme floods and wildfire disasters (Aghaloo and Sharifi, 2024; Castaldo and Mahmoud, 2024; Liquete *et al.*, 2016). As the integration of NBS into urban planning continues to proliferate in both theory and practice, the scientific debate must provide the necessary tools to overcome the knowledge gaps that hinder understanding of NBS co-benefits in an integrated manner. Nonetheless, such integration requires clear collaborative governance arrangements (Battisti *et al.*, 2024; Bradley *et al.*, 2022; Mahmoud *et al.*, 2024) in which different stakeholders' groups dialogue and co-create impactful solutions using the best-case scenarios designed. Such multi-governance processes are, however, often conditioned by the types and scales of NBS interventions or the institutional support systems that should help them endure (Mahmoud *et al.*, 2025).

One main obstacle to such integration is operationalizing the multi-level governance, including the scales and actions across international, national, regional and local authorities that require both horizontal coordination between different agencies and policy divisions (McCormick *et al.*, 2024; Salvia *et al.*, 2024), as well as vertical coordination between

municipalities, regional authorities and supra-national governments (Pierce *et al.*, 2020, 2024). The opportunity to unpack the several layers of collaboration on urban nature plans based on their structure and priorities is still, however, untapped (Egerer *et al.*, 2021; Gómez Martín *et al.*, 2021). That is, *on one hand*, owing to the complexity of embeddedness of urban nature concepts within traditional urban planning settings as usually established by public administration authorities, while involving many actors from public and private sectors (Kowarik *et al.*, 2025; Xie *et al.*, 2022). *On the other hand*, the lack of awareness on the importance of urban biodiversity aspects within local communities, whether using co-creation, collaborative governance or any similar participatory methods (Mahmoud, 2024).

From this angle of research, it is worth noticing that at the European level, there are considerable advancements in researching urban nature plans in terms of visions, strategies, financing, governance and their structural aspects (Armondi *et al.*, 2023; Lazzarini *et al.*, 2024; Vitulano, 2024). Meanwhile, the gap on actionable knowledge is mainly related to the local level of public participation, tools of engagement and how these plans could come to life in terms of tangible impacts from actual implementation of NBS to their monitoring and maintenance viability (Räsänen *et al.*, 2024). While our focus in this paper is the boundary spanning phenomenon, few literatures do highlight how boundary spanning- as borrowed from the organizational theories (Conteh and Harding, 2023; Hofstad *et al.*, 2021)- mismatches between public administration practices and urban planning spatial boundaries constitute a knowledge–action gap.

In *other words, it was noted that spatial boundaries at the local administrative plans often do not cross over the local communities' boundaries in terms of implemented actions*. This phenomenon is mostly observed in cities in which their urban green/nature plans at the spatial scale were altered to match their neighborhood's plans, such as the case of Utrecht in The Netherlands, where the green plans are at the local neighborhood scales and not at the city level (Mahmoud *et al.*, 2025). In this research, the attempt is to understand what the spatial hindrances are through which cities need to operate to establish an ambitious green (or nature) plan as per the EU Biodiversity strategy 2030 to be achieved.

The research paper is divided into five parts. Section 1 introduces the topic of urban biodiversity planning in Europe, Section 2 presents the selection of the case study cities (*Genova and Hamburg*), Section 3 develops the methodology of the analysis, followed by Section 4 on results and discussions; Section 5 of this paper presents the conclusions and possible recommendations. Research results suggest that there are differences between the two cases in the perception and representation of nature in the urban context, whereby Genova englobes more NBS as one integrated concept for climate adaptation and mitigation whereas Hamburg concentrates on the detailed analysis of different biotopes to highlight biodiversity related aspects and propose actions.

Research question

While the domain of urban governance is well-researched in the literature, this research article addresses the following research question: How do urban nature plans bridge the gap between cross-boundary existing plans for nature and existing planning regulations? Particularly, we want to understand *how these plans can combine the spatial boundaries resulting from the overlap between nature going beyond boundaries on one hand and local urban planning instruments on the other.*

The possible spaces of urban biodiversity actions and implementation where nature thrives do not geographically coincide with the local urban transformation and knowledge (Creutzig *et al.*, 2024; Räsänen *et al.*, 2024) where the public participation and engagement of stakeholders happen. We argue that through co-creation mechanisms based on co-governance approaches, we can reduce the gap between boundaries of nature and knowledge. This mismatch of boundary spanning where knowledge production and

informed decision-making is observed in the two cities of Hamburg and Genova, see Figure 1. This research paper is based on their current benchmarked urban greening plans and strategies of these two European cities that have proven successful governance mechanisms that work across boundaries of actionable knowledge as were planned by their local administrations. *Our research question then is operationalized in unpacking the possible actions for thriving urban biodiversity, urban governance and commitment to implementation within the city administration, institutional support and policy integration within the local authority and, lastly, the public participation methods that were put in place to advance these urban greening plans in both cities* (*see* Table 1).

Selection of the case study

A considerable number of studies over the last years have focused on drafting urban nature plans as a response to the biodiversity Strategy for 2030 (Costadone and Vierikko, 2023; Lazzarini *et al.*, 2024; Robuchon *et al.*, 2025). Following the exploratory work of Mahmoud *et al.* (2025) and Pierce *et al.* (2024), we select the urban nature plans of two cities for an in-depth analysis to better understand how the boundary gaps described in the introduction are addressed. Germany and Italy have been chosen as two different contexts to include the broad spectrum of cities planning responses within the EU (Piattoni and Notermans, 2021). Germany and Italy present a high number of cities that have started projects on NBS, biodiversity and urban planning (see the EU Funding and Tenders Portal – Table 1) and have positively responded to the EU request to foster biodiversity through urban planning (Arlati, 2024). Meanwhile, it is also noted that Germany and Italy are considered because of comparable planning systems (Nadin *et al.*, 2018). In particular, we selected the two urban nature/green plans of Genova and Hamburg as cities with already established urban greening strategies for at least three years (see Table 1). Indeed, we use both terminologies interchangeably in this paper because of the fact that Genova has an urban green plan, whereas Hamburg has an urban nature plan. Both capitals of their regions, Hamburg, is a city state, whereas Genova is the city capital of the Liguria Region. Both have great influence on the surrounding municipalities in terms of mobility, natural environment and morphological aspects in terms of planning practices (Canessa and Centanaro, 2024). The same criteria of analysis have been adopted on both city plans and/or strategy to guarantee a homogeneous investigation. Additional criteria consider whether each city has participated in any European projects (Horizon 2020 or Horizon Europe) related to urban biodiversity or NBS in the past 5 years.

The selection of these two cities is mainly because of the similarity in the geopolitical conditions, as cities with waterfronts and the presence of important industrial ports of international significance, which pose relevant challenges to natural landscapes in terms of waterfronts, longitudinal land use and air quality problems, see Figure 1. The plans in the two cities have different forms but equally present an in-depth analysis of the status quo, a clear strategy and an elaborate set of goals organized along a detailed time plan [cf. The guidelines of EUROCITIES and ICLEI Europe 2021 (European Commission, 2024)].

In our hypothesis, nature goes beyond confined boundaries [2] compared to the spatial planning boundaries, we note that in Genova, the boundaries of the Functional Urban areas (FUA) [3] – see Figure 1 – follow a more morphological approach with the old city center, where the main interventions/components of the green plan are mainly planned (Dijkstra *et al.*, 2019). In the city of Genova, the plan is composed of nine main municipalities as the major spatial unit of measurement. Each of the nine municipalities has its own part of the green plan with detailed NBS interventions. However, it is worth considering that the urban green plan in Italy is an obligation as an instrument established by the Urban Communal Plan (PUC) [4], which mainly focuses on the FUA, Figure 1 (top). It is noted that the green plan of Genova (updated in 2024) extends beyond the city's administrative boundaries toward the

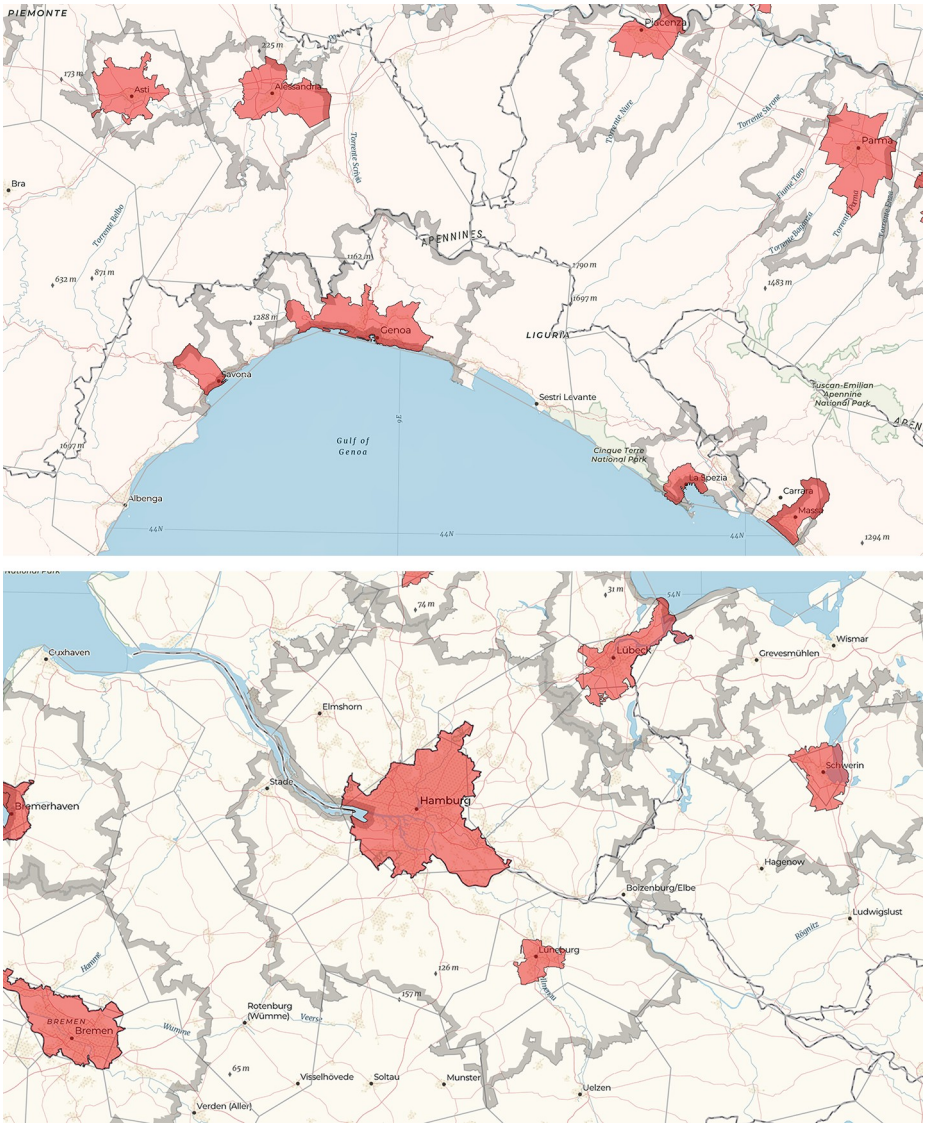

Figure 1. Spatial location of the city of Genova, Italy (top) in comparison to the city of Hamburg, Germany (bottom)

Note(s): City boundaries in red, Functional Urban Areas are in grey

Source: First Author's own work using GIS, using URAU, RG 100K_FUA_ NUTS 3 database from Eurostat (2021)

Table 1. Comparative analysis of both cities (Hamburg and Genova)

Criteria of analysis	Hamburg[a]	Genova[b]
FUA area per KM^2	758 KM^2	243 KM^2
Population	*1.910.160 (2023)*	*817.402 (2021)*
urban green/nature plan (UGP/UNP)	• *Natürlich Hamburg! Artenreiche Stadt (Urban Nature Plan in German)*	• *Green Strategy 2022* • *Genova Green plan 2024*
Establishment year of the UGP/UNP	*Dec 2021*	2022 – Updated in October 2024
Regional policy or NATIONAL plan	• *National Strategy for Biological Diversity 2030* • *Vertrag für Hamburgs Stadtgrün* • *Gründachstrategie Hamburg* • *Federal climate change act (ksg)*	• *Action Lighthouse plan 2030* • *Urban Agenda 2017–2021* • *Agenda Urbana Genova 2020* • *Natura 2000*
Thematic planning/ embedded in other plans	• *Open space development* • *Mobility (magistralen)*	• *Mobility* • *Open spaces* • *Hydrological risks*
Climate threats	• *Fragmentation of natural habitats* • *Deforestation* • *Sea water level rise* • *Unhealthy soil sealing*[#]	• *Air quality problems* • *Sea water level rise* • *Unhealthy soil sealing*[#]
Any other relevant strategy/ information	• *Qualitätsoffensive freiraum* • *Hamburger Klimaplan*	• *SECAP Genova 2030 (Sustainable Energy and Climate action plan)*
European projects on biodiversity*	• *CLEVER cities* • *RECONECT* • *FuturaMARES*	• *UNALAB* • *CLIMACTIONS*

Note(s): https://www.timanalytics.eu/TimTechPublic/main.jsp?dataset=_1713, see the original data set at the EU funding and Tenders Portal: https://knowledge4policy.ec.europa.eu/text-mining/TIM_documentation_en[#]; https://esdac.jrc.ec.europa.eu/esdacviewer/euso-dashboard/; [a]https://de.statista.com/statistik/daten/studie/155147/umfrage/entwicklung-der-bevoelkerung-von-hamburg-seit-1961/; [b]https://demo.istat.it/app/?i=DQ&lt

Source(s): Authors' own work

FUA boundaries. While in Hamburg, the presented plan also largely extends beyond the formally planned center of the city, which gives a wider perspective on the overlaps between the different regulatory urban planning and the sectoral planning in terms of urban nature and landscape planning. However, the urban nature plan of the city of Hamburg stands for the whole city state region nonetheless, it is not extending beyond the boundaries of the seven districts, exclusively following the city administrative boundaries, Figure 1 (bottom).

The selection of these two cases allows for a maximum variation type of analysis to infer differences and similarities between the two European countries (Flyvbjerg, 2011). Because they differ consistently in terms of scale and population (see Table 1), we want to elaborate on possible hindrances and advantages in those terms. It is important to note that in our hypothesis for these two cities, nature does not follow administrative boundaries but spans beyond them.

Methods

This research article has followed a three-step process for analyzing the UGP/UNPs of Hamburg and Genova using a mixed-methods approach, see Table 2 and Figure 2 for results. *The three steps are explained below.*

Table 2. Numerical values for the analysis framework resulting from third step of the methodology

Macro categories of analysis	Criteria of Analysis	Hamburg[vii]	Genova[viii]
Urban Biodiversity Goals, targets and Actions	**Established officially recognized and endorsed Urban Nature Plan** (some plans are called green Infrastructure and Biodiversity)	4	1.5
	Relationship with Multilateral environmental agreements in Europe or explicit (or implicit) reference CBD targets 12 and 14 (if any) in GBDF*	2	3
	Embeddedness of urban biodiversity (understanding of the concept, cross connections with several visions, explicit integration of urban biodiversity concerns and objectives in plan, and having a list of actions and/or objectives)	3	1.5
	Challenges addressed in the plan (ecological, social, soil health, water management, green space management, heat stress, social equity, connection to environmental education)	2.5	2.5
	Targeted areas such as urban and (peri)-urban areas: parks, semi natural areas, allotments, community gardens, urban green spaces connected to grey infrastructure)	3.5	4
	Includes a strategic plan with an overarching vision, and an operational part (financial and investment plan, actions, timelines, indicators), as well as a clear and specific budget with sources for the requisite funding identified. The delivery plan ideally should cover a period of 3-10 years. Longer term vision coupled with actions and milestones.	3.5	2
	Realistic timetable for implementation (Established short term actions within the plan)	4	0
	Includes actions related to improving Accessibility to urban green and blue areas (% of population that can reach within 10-15 min walking distance green or blue urban areas)	1.5	2.5
		24	17
Urban Governance and commitment to implementation	**Initiating Body Typology** (types of actors involved and type of policy instrument and if envisaged by collaborative governance and citizen engagement actions)	2.5	2
	Stakeholders and local actors' involvement (An increased coordination and cooperation between the interested stakeholders in order to improve the effectiveness of UB interventions)	2	3.5
	Governance models related working structure (instruments and mechanisms through which stakeholders manage the process such as i.e. managerial and working structures, internal formal or informal norms, configuration of sections and departments to better address and institutionalize aspects related to Urban Greening Plans)	2	2.5
	Multi-Actor (a diversity of stakeholders shares the responsibilities and results)	3	2
	Good practice actions oriented (effective, sustainable, locally appropriate, potentially replicable/upscaled, inclusive)	3	4
		12.5	14
Institutional support and Policy integration	**Multi-sectorial and multi-dimensional horizontal policy integration** (across policy domains and sectors, as well as including, environmental, economic and social issues)	2.5	3
	Multi-level Vertical Policy integration (a transferable policy that works well across all administrative international/national/local governance levels)	3	1.5
	Interdepartmental consultation and intraorganizational collaboration with the relevant authorities (among different municipal departments and with private actors and citizens involvement towards breaking silos in governance)	1	0
	Political will The presence of and Secure long term political commitment	3.5	1.5
		10	6
Public Participation and collaborative governance mechanisms	**A transparent and participatory co-creation approach.** The Local Planning Authority should involve the relevant actors – citizens, academics, as well as representatives of civil society and economic actors including methods and timeline)	2	2.5
	Presence of actions (workshops, information sessions, etc.) linked to the involvement of the local community (voluntary groups, associations, committees, citizens, etc.) along part or all of the planning process (co-planning, co-design, co-implementation, co-monitoring of the plan / co-creation-co-production)	2	2.5
	Presence in the plan: public education, communication and raising awareness actions (e.g. web portals, newsletters, raising awareness campaigns) of the local community on the benefits of urban biodiversity.	2.5	1
	Reference to shared governance tools/instruments (web portals, consultations, tables, framework agreements, collaboration agreements, etc.) for the implementation and monitoring of the actions envisaged by the plan.	2	0
	Reference to types of stakeholders involved in the process (PA, citizens, associations, businesses, etc.), the phase of the participatory process in which they are involved, and level of representation of citizens.	3	3.5
		11.5	9.5
	Total score for each city	58	46.5

Note(s): In green (criteria column), *GBDF refers to the Kunming-Montreal Global Biodiversity Framework, see www.cbd.int/gbf; In blue, with reference to (European Commission, 2024), in dark red, indicators suggested by Policy experts. In Orange, the total scores per category; [a]https://www.bmuv.de/download/die-nationale-strategie-zur-biologischen-vielfalt-2030-nbs-2030; [b]https://www2.comune.genova.it/content/piano-del-verde-0

Source: Authors' own work

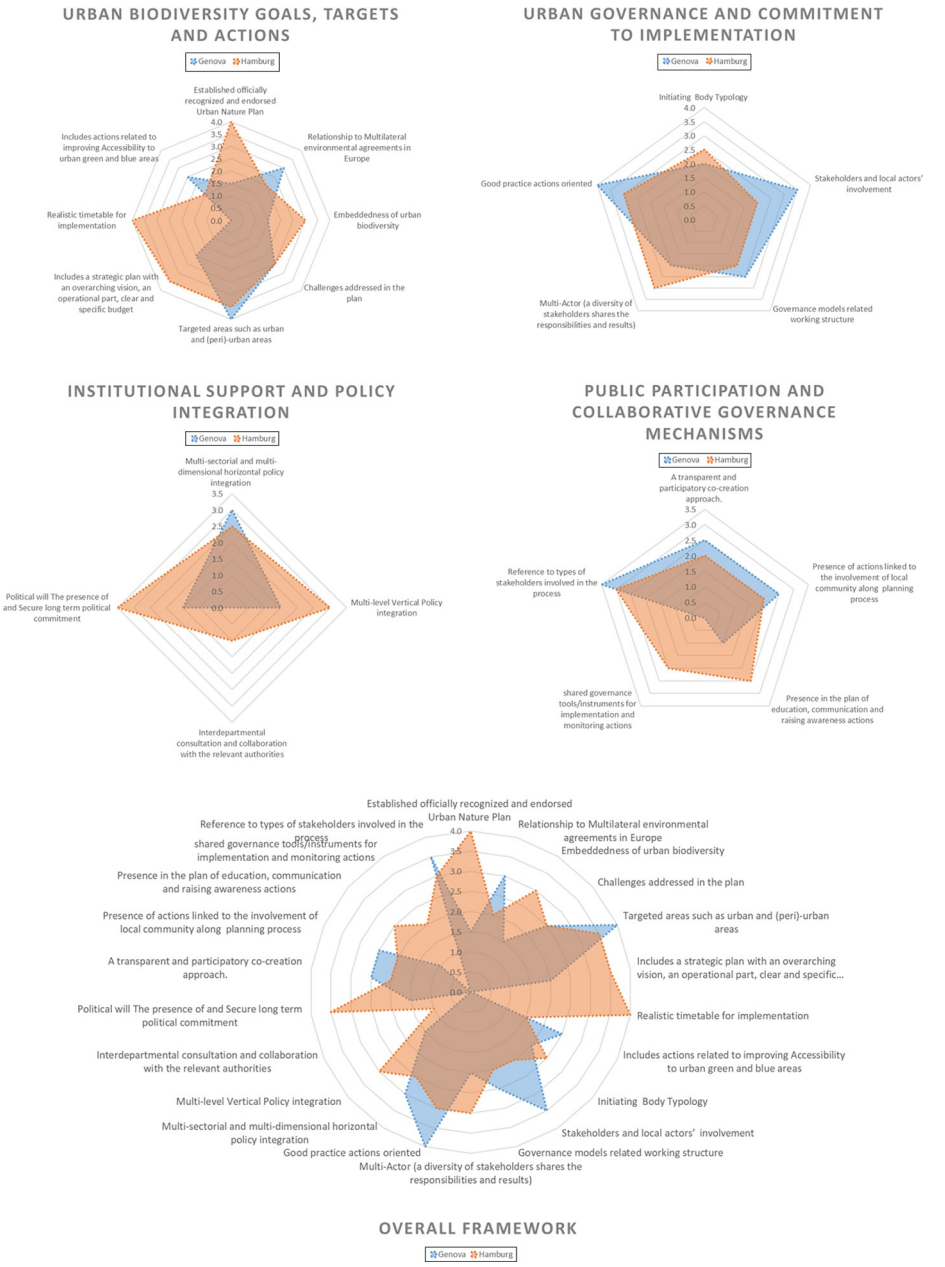

Figure 2. The results of the analysis of the Genova and Hamburg plans represented through five radar charts, four for the macro-criteria (above) and one for the overall framework (below)
Source: Authors' elaboration by the first author

1st step: overall genesis of the plan and context analysis

We conducted an evaluation of the current plans based on their design process and the implementation process. We have looked at: the use or application (if any) of urban biodiversity and NBS (interchangeably) that are mentioned in the plans; the determination of a guiding vision, to which goals, targets and actions are linked; and the specific goals, targets and actions to establish the strategic vision of the city. Importantly, we considered any reference to global multilateral environmental agreements, EU targets frameworks or explicit reference to the UP guidance. These last include the CBD targets 12 and 14 of the GBF, the EU Biodiversity Strategy for 2030 and the EU Green Deal, among others.

2nd step: evaluation framework

In this step, we further deployed the evaluation framework established by I. Mahmoud *et al.* (2025). To answer the research question proposed in this paper, we focused our analyses only on the participatory characteristics and the governance mechanisms that are used or planned to be used, we selected only the indicators belonging to the criteria on governance mechanisms, institutional support and public participation. The initial structure of the evaluation framework included in part a focus on the policies aiming at enhancing the adoption of vertical and horizontal integrated institutional support for stakeholders' engagement and public participation (Berisha *et al.*, 2023; Cotella *et al.*, 2020). An iterative review of the framework, the specific adoption of collaborative governance approaches (Mahmoud, 2024) was then prioritized as the most important aspect of good practice oriented to implement the plan in a transparent and participatory manner. The macro criteria of analysis were selected based on the iterations developed by both authors, in addition to the previous refinement of the main framework developed by one of the authors.

3rd step: in-depth analysis

It is a common practice to deploy a content analysis to assess the quality of urban plans (Berke and Godschalk, 2009; Lumbierres *et al.*, 2025; Stevens *et al.*, 2014). Content analysis allows the recognition of texts' meanings considering the historical context in which those texts are produced (Krippendorff, 2004). We are aware that other methods exist, such as the Singapore Index (Pierce *et al.*, 2024). However, such a method focuses on goals statement only and does not infer with the implications of those goals on its context. The content analysis (see (Hjortsø *et al.*, 2023)) we perform in this paper builds on the second step of our methodology where we tested through which elements the plans represent the criteria selected and if they are sufficiently represented, thus assigning to each criterion a score (Stevens *et al.*, 2014, p. 78). Both plans have been analyzed by both researchers independently and scoring was discussed successively to reach a final decision. In general, the score was assigned to each category defined in Step 2 in a range between 0 (non-satisfactory) and 4 (completely satisfactory). The final decision on the score was dictated by a simple averaging between the scores independently given by the researchers. However, to ensure a reliable process, both researchers were annotating their interpretation and comments individually on each micro criterion then a common discussion was established to ensure objectivity and consistency in the average score given, see supplementary material. Defining sufficiency for each criterion is arbitrary and left to the sensitivity of the researchers. Moreover, the independent assessment and the successive agreement are standard steps in content analysis. To help with the decision of the score, we refer to Berke and Godschalk (2009, p. 231).

Results

Our results and analysis are divided into two parts in this section, a numerical/interpretive part and an analytical part, whereas we give a detailed description of what we have identified in the plans through a content analysis as described in the methodology section. The criteria of analysis adopted derive from the research work of (Mahmoud *et al.*, 2025). In particular, the establishment of the macro categories of analysis was developed through several elaborations with diverse stakeholders and policy experts from the European commission, see table notes in supplementary material for more details.

General considerations from the analytical framework implemented in both cities: Genova and Hamburg

The following sections are based on the analysis of the plans and the four macro criteria analysis conducted.

- Analysis of the plan genesis: *the content of the plan in terms of actions and goals.*

The genesis of Natürlich Hamburg! has its references in the Masterplan *Stadtnatur* drafted in 2019, a nationwide program defined by the governing coalition for an improved management of nature in the city whereby plants, animals and insects are considered together with human health (p.3). The Federal Climate Change Act (KSG) is the official response to the EU Green Deal in Germany and sets legally binding targets related to carbon dioxide and greenhouse gas emissions reduction, whereby natural elements in the city are advocated to play an important role. The 2024 drafted National Strategy for Biological Diversity 2030 represents the most up-to-date document at the national level that strengthens biodiversity through nature protection and restoration (not only in the urban areas). Concerning the Federal State of Hamburg, the realization of Natürlich Hamburg! was primarily an idea based on a long period of negotiation between the city administration and the local initiative "preserve Hamburg's green" (Hamburgs Grün erhalten). At the end of this negotiation, the two parties agreed on a contract for Hamburg's urban greening (Vertrag für Hamburgs Stadtgrün) for which the city of Hamburg committed to protect natural areas within the urban fabrics and beyond from further urban expansion (2019). Together with this document, the city administration started a process of stakeholders' participation in 2017, the results of which have flown into the draft of the current UNP Natürlich Hamburg!

The Green Strategy of *Genova* was launched in the year 2022, by the studio *OpenFabric* with a focus on the role of architectural design and materials in regenerating public spaces of Genova while advancing its micro-scale green infrastructures. The updated plan of the municipality of Genova, launched in October 2024, confirms the genesis of the city's attention to regeneration of small-scale spaces in consideration of the city's larger urban morphology and historical structure. Both the strategy and the plan itself have given reference to the multilateral agreements the city of Genova has in terms of bilateral cooperation with global sustainability risks and plans already in action such as the Genova's Lighthouse city strategy redacted in 2018, the Genova Urban Agenda redacted in 2020, the Sustainable Energy and Climate Action Plan (SECAP 2018) as well as the Sustainable Urban Mobility Plan of 2018. The complete and comprehensive urban green plan of 2024 includes several components on microclimate enhancement and mobility impacts (such as 15 min city concept) that correlate widely to the urban greening interventions mainly focusing on improving accessibility, health and well-being and lowering heat island phenomenon. The official UGP documents as well include different sub-strategies such as soil strategies, public open spaces development and several ecosystem services. To note, the integration between a variety of urban design approaches aims at a better cross-collaboration and shared

governance between several local authorities' competencies and structures within Genova. The Genova UGP is also adopting a booklet of cartographic apparatus that has several climate risks, local micro-climate, hydrological, geological, land use, ecosystem services, urban biodiversity density, regional parks and protected areas, Natura 2000 sites, green corridors and public and private green areas:

- Urban biodiversity goals, targets and Actions: embeddedness of the objectives, meanings: how nature, urban biodiversity and greening are defined (with reference to global/EU guidance).

Hamburg's UNP is divided into two main books. The first book provides the state of the art about cultural and historical development of the city of Hamburg in relation to natural areas. To better organize the set of actions, the UNP divides the existing natural areas into seven landscape types, namely moorlands, large parks, rivers and creeks, beaches and dunes, marshes, huge axis (Magistralen) and wildlife corridors. For each type, an extensive description of the status quo, potential development and objectives is presented. It also elaborates on socio-economic data, fundamental for reflecting upon the divide between disadvantaged and advantaged neighborhoods. The UNP defines the subdivision of competences among the city-level and the seven districts and provides a synopsis about the current regulations and laws, together with reference to overarching planning documents. The document provides a holistic vision called "biodiversity-rich city", clearly stating the intent to support all forms of living beings through its interventions. The measures are then further organized into five spheres of action: ecological management and urban material streams, by which circularity is advocated as principle for the actions; connection forms, with the aim "to connect urban living areas for animals, plants, and people in an urban way", p.151; nature protection through city–nature encounter, fostering nature-experiencing actions to bring people closer to nature; advertisement work and communication, setting a particular attention on how the actions are communicated to the broader public and reduce conflictual situations; and finally the evaluation, by which set of criteria and methods are described for analyzing the development of the actions *vis-a-vis* the effort invested in implementing and managing them. These objectives described in the first booklet are deepened in booklet two through a set of measures.

The second booklet presents the measures to achieve the UNP objectives divided into measures for urban nature areas and overarching spheres of action (see above). The first group presents details of the areas to improve with a description of the status quo, objectives to achieve and the measures to perform with a cartographic support and indication of the priority level (from 1 to 2) and period of management (e.g. cyclical). The second group of measures refers to general actions that do not refer to a specific area (e.g. *Development of an Ecological Management Handbook* – 3.1.2). For each action, the names of actors to be involved, the timeframe, the costs and a description of the measures and objectives are presented. Additionally, there are a series of attached documents including detailed descriptions of all measures as presented in book two; the socio-economic analysis; and a map with an overview of all measures and areas.

The UGP of *Genova* is divided into four separate booklets that analyze the general layout of the action plan of urban greening *(Relazione Generale-142 pp)*, the actions related to adaptation and mitigation *(Componenti di Progetto-215 pp)*, Maps of the interventions *(Allegati Cartografici-52 pp)* and Technical components of the greening projects *(Municipi schede intervento-75 pp)*. With specific reference to global and EU legislation, the municipality of Genova adhered to the Green City Network in 2020 [5], through which seven specific objectives related to urban regeneration. One of the main aspects in the plan is to

increase the green infrastructure, which contributes to reducing air pollution, mitigating climate change and conserving the biodiversity in the urban environment. It is worth noting that the plan is also a showcase for all the city of Genova in terms of morphological types of urban NBS (Green, Grey and Blue). It includes several types of re-naturalization interventions that prioritize urban forestation, sustainable urban drainage systems and increase of green public spaces. With reference to *three main specific objectives* (P.9), mitigation and adaptation to climate change, health and well-being of life, conservation of Biodiversity and ecosystem services; the plan aims to reinforce the green, blue and grey solutions in the urban areas that can be replicated in several parts of the city, so it addresses spatially its nine different municipalities, however, no timetable is planned for the specific actions to be implemented.

With specific reference to the nine municipalities in Genova, the plan articulates the prioritized green or blue actions in each municipal area with consideration to the typology of NBS such as parking lots depaving, rain gardens, vertical greening or several parks integration with water systems to enhance the city's run-off resilience. One specific study by Rosasco and Perini (2018) focuses on the longer-term economic sustainability of vertical greening in Genova as a pilot for Mediterranean climate zone conditions, especially when integrated with energy monitoring systems. This specific typology was found effective to reduce air temperature and absorb solar radiation was also considered effective in the Genovese greening strategy introduced by *OpenFabric* in 2022 (P. 84). Finally, the topic of accessibility to green parks and areas (P23) is considered an important aspect of the municipal greening plan since it looks at the pedestrianization of several areas in Genova city center while focusing on NBS in public spaces.

- Governance mechanisms and commitment to implementation: cross collaboration between departments and types of biodiversity actions in place.

An important part of the evaluation framework is looking at the governance layout in the establishment of the UGPs of both cities; particularly focusing on stakeholders' engagement in initiatives as well as focusing on the policy instruments that envisage the commitment to implementation.

Concerning the usage and nomenclature of biodiversity in the text of the *Hamburg* plan, Natürlich Hamburg! defines in the preface the city of Hamburg as a "green metropole on the water" (p.7). This definition derives from the number of green and blue areas present in Hamburg. Despite the abundance of such areas, the UNP argues for a cultural shift among public and private actors in dealing with natural elements within the city through a biodiversity-led management of open spaces. This refers to the capacity of such spaces to provide services for the people and for nature simultaneously, where ecological approaches are as important as aesthetics. Throughout the text, it is possible to read different concepts. First, the open spaces that the plan aims to manage are defined with the wording "living spaces" (Lebenräume), featuring cultural, social and ecological characteristics (p.12). Second, greening in the city is driven by the understanding of creating spaces with "close to nature green" (naturnahes Grün), going thus beyond the mere aesthetic of highly curated spaces (p.7). Third, the management of such areas should occur respecting ecological standards, what is defined as "ecological care" (ökologische Pflege). Finally, the wording "biodiversity" (Biodiversität) and "biological diversity" (Biologische Vielfalt) are used generally in the text, but with less intensity compared to the others. In fact, biodiversity is a rather scientific term that is difficult to grasp by experts who do not rely on biology, probably making the use of this term not useful in terms of communication to a broader public, see (Arlati and Nagel, 2025).

In the case of *Genova*, the part of the green plan relating to stakeholders' engagement is mainly described in how the pilot projects may be implemented within the timeline from 2024 approval onwards. In the Genova Action Plan, as a lighthouse city redacted in 2018, a specific section was dedicated to the participation of stakeholders and their inclusion in the implementation in ownership and leadership for the multi-level governance of the action plan. Drawing upon continuous dialogue between 93 stakeholders and a co-planning approach, the plan identified six focus areas as to be interested by innovative partnership between the public administration and local stakeholders in a transparent and fair collaboration (P.21). The GREEN asset of the plan had a specific target toward the management and enhancement of urban green areas through planting of 15,000 trees in the FUA of Genova. In collaboration with two European projects (*UNALAB and CLIMACTIONS*, see Table 1), the plan had several greening actions, especially related to NBS, in the redevelopment of *San Benigno and Gavoglio* areas.

The lengthy green plan of *Genova* developed in 2024 has a noticeable approach to biodiversity (as a nomination) actions in relation to the adaptation, mitigation and security of urban forestation interventions. Specifically, an elaboration of the rule of thumb 10–20 – 30 (P.50) of Santamour (1990), which states that municipal forests should comprise no more than 10% of any particular species, 20% of any one genus or 30% of any single family of species. In the case of Genova, this strategy is clearly aiming at increasing soil permeability and water drainage control systems, which then decreases its exposure to hydrological risks associated with the disastrous flooding events from the year 2014. In the specific cartographic part, the map of urban biodiversity per area is classified based on the density of species of birds, tree species and blue retention areas. This is, however, an unprecedented analysis of ecological values that relate to the composition of the Genovese urban morphology that could be used toward identifying areas of high values of biodiversity in which the greenery would be potentially conserved.

- *Institutional support and policy integration.*

In this section, we refer to the plans by levels of governance (centralized, bottom up, top down, shared, collaborative or multisectoral); we clearly concentrate on how the several policies work across several vertical and horizontal governance levels.

Concerning the drafting process of the plan, Natürlich *Hamburg*! reports that the most important stakeholders in Hamburg – namely, associations, clubs, institutions, chambers, etc. – were involved in the definition of the plan through discussions and workshops (p.125). Successively, the results of this process were summarized and distributed through an online questionnaire for feedback to the same stakeholder groups. The results of this questionnaire were further discussed in successive workshops, based on which the spheres of action described previously were created. Again, it is important to mention that Hamburg's UNP is based on the contract between the city of Hamburg and the citizens' initiative "Hamburg Grün erhalten". Interestingly, citizens seem not to be part of the process just described. However, as shown in the next section (Point 3), the district assemblies, which represent the public interest, are part of the process. Notably, the UNP presents the main challenges and obstacles identified through the online questionnaires (p.127–129). In general, respondents agree on the fact that the new ecological management of the area needs more effort than the current practice; low acceptance of the new ecological management among the public workers because of few personnel and knowledge; middle acceptance of the new ecological management among the public, although it is increasing; challenges for the implementation of the new ecological management are related to the low qualification of the personnel, and to the difficulties in assuring the long-lasting

application of such new form of management; and the awareness that collaboration of different types of urban stakeholders can support the implementation.

The *Genovese* green plan has a specific booklet that elaborates on the technical projects of each of the nine municipalities blue and green interventions (*Municipi schede intervento)*. This document sets the scene to the cross collaboration between the municipalities and their institutions, since its complexity relating several types and the diversity of interventions across the mobility, housing, public services, hydrological basins and climate conditions, etc. Nonetheless, the document does not elaborate on the correlation between the policies in place, especially the ones related to the crossover between the municipalities' physical boundaries and their governance responsibilities. The UNP clearly states that the public green maintenance in historical parks and urban areas, green areas in schools and green areas in cemeteries refer to the municipal centralized governance structure. The same logic in reference to the integration of territorial competences and their relative supporting policies are in the *Relazione Generale* document (*Monitoraggio del piano*- P97), there is a lack of a clear entity of responsibility on the plan horizontal integration with other effective policies. There is, however, a clear mention of a vertical top-down level of governance concentrated at the municipal level and its' authoritarian responsibility:

- Public participation and collaborative governance mechanisms.

In this section we refer to the plan elaboration and definition of specific aspects of public participation; especially the reference to stakeholders' typologies, means and tools of communication and raising awareness actions related to urban greening initiatives.

The main actor driving the draft of the UNP is the local authority of the city of *Hamburg*, with primary engagement of the Ministry of the Environment, Climate, Energy and Agriculture (BUKEA) [6]. As the name suggests, the competences of this particular ministry range in different policies. In particular, the Federal Climate Protection Act is a reference in Germany to link climate actions to greening actions. Hamburg has a Climate Plan (Hamburger Klimaplan) according to which Hamburg poses the target to become climate neutral by 2045 tackling different sectors, such as building, industry and mobility (for an overview, see the updated version of the plan from the city of Hamburg [7]). Among the various measures, vertical and horizontal greening is deemed important to reduce the CO_2 emissions in the building sectors. In this way, urban green buildings contribute to making cities greener and more resilient to climate-related challenges, as per (Bibri *et al.*, 2025). It is important to mention that being a city state, the ministries and the city administration are positioned at the same governance level. This actor represents the leading role of the plan and the main reference point for the local administrations of the seven districts by which Hamburg is divided. At this level, the Department of Economy, Building and Environment, together with the managers of public spaces in each district, represents the direct link between the city and the local level. This reflects the necessity of the actors to create a plan of the open spaces and explains clearly the link to the Open Space Quality Initiative (Qualitätsoffensive Freiraum) [8]. Finally, the citizens are represented in this process through the democratically elected district assemblies of each district. The plan stresses the participation of this actor, especially concerning its characteristic of being a political body, thereby including the political dimension of urban greening actions in the city (p.125). While for the draft of the UNP, the public participation is somewhat reduced in Hamburg, for some of the measures, this is instead foreseen with a detailed timeline, including who is supposed to be engaged and when.

The *Consulta del verde [9]*, (which is an instrument for consultation with stakeholders) established in 2012 in the city of Genova, represents a fundamental governing organ in the plan monitoring and commitment to implementation as cited in the plan itself (P.107). Composed of

technicians, local associations, professional syndicates, experts and neighborhood representatives, the *Consulta del verde* has the responsibility for monitoring the environmental aspects of the built environment cited in the plan. During the past two years, the plan states the development of 98 collaboration pacts with citizens and the municipalities in the areas of the central west and Valpolcevera neighborhoods. The plan elaborates on medium- and longer-term management of its interventions in relation to citizens' residual and residential relationship with the Genova context; hence, the plan develops an independent communication guideline that constitutes a permanent working group at the directorate of Urban planning in 2024 *(Piano di Comunicazione)*. One important aspect of the communication guideline refers to the University of Genova (UNIGE) and the high schools' involvement in the raising awareness campaign about the best practices of green and blue interventions in public spaces as a response to climate change. Additionally, the plan elaborates on the role of the national urban institute, *(INU- Istituto Nazionale di Urbanistica)* Genova section on collaboration with citizens, associations, external stakeholders and Genova Street Lab (a local living lab) on updating and receiving the citizens' feedback on the plan implementation and requests. The Genova Street Lab has set up a co-creation process that involved citizens, local administrators, associations and researchers in 2024. During which, the municipality distributed 1,000 questionnaires to analyze the city's fabric and needs to develop green public spaces using tactical urbanism with school students and local citizens.

In the general relation document (P109), the plan states that five main meetings with the nine municipalities stakeholders have been held in 2024 to integrate the green plan with the municipal urban plan *(PUC)* to particularly address the incentives related to climate mitigation, urban heat island challenges, maintenance and environmental education as the main axes of possible public participation from the citizens. However, the summary also clearly states that it was problematic to discuss the aspects of green share social justice, equity and accessibility between the nine different municipalities: in addition to the challenging land use availability for greening interventions versus the provision of mobility services in some areas.

Discussion

In this research article, we have identified several hindrances that could be captured from the implementation of the analytical framework as well as the content analysis for both plans. We identified critical points from the analysis based on key barriers and opportunities to leverage the collaboration for a better understanding of both plans (see Table 3).

We identify two main scales of findings: *on a small scale*, mainly referring to the analytical framework *per se*, and the other on *a large scale*, referring to the spanning across boundaries of the nature of the plans themselves. To note that in the Plan of *Genova*, the connotation is always referring to the green (and the blue) infrastructure, while generally referring to the green plan, while the plan of *Hamburg* refers to the plan of nature with a specific connotation to the open spaces (Freiraum) [10].

The initial thought is about the analytical framework that clearly put in – unwanted – comparison both plans in terms of collective sets of indicators, see Figure 2. This is, however, non-exhaustive in terms of evaluation, since we identify some gaps in the integration of plans with and (in-between) departments across the same municipal authorities, which is quite challenging. In other words, *breaking the silos* between the business-as-usual on how cities and their authorities do develop urban green/nature plans needs to change (Di Marino *et al.*, 2023). Few empirical observations can be made from the numerical visualizations of both cities confirming the spanning of the city of Hamburg across all macro-categories resulting from the analysis of data in the plan. Meanwhile, the city of Genova shows major shortcomings in terms of realistic timetable of plan implementation, lack of interdepartmental collaboration between authorities and stakeholders and, finally,

Table 3. Summary table for key barriers (in red) and leverage points (in green) for both cities according to the analytical framework

Macro category	Hamburg	Genova
Urban Biodiversity Goals, targets and Actions	**24** • Reference to all relevant (local and supralocal) instruments in the realization of the UNP's vision • Detailed identification of biological species and landscape for the entire communal surface	**17** • From a policy perspective, the boundaries of the UGP of Genova spanning across to the UNESCO heritage areas and the regional authorities make the financing rather problematic from an implementation point of view.
Urban Governance and commitment to implementation	**12.5** • The UNP does not transcend administrative boundaries, no dialogue with neighboring cities and regions in the interventions/measures proposed	**14** • Adoption of multi-governance levels in designing, implementing and monitoring the interventions in the plan.
Institutional support and Policy integration	**10** • The UNP is nested in the overarching set of rules, strategies and plans, whereby it is unclear which influence the plan has • Although the geographical vicinity of the public administration sectors, there is little communication between various ministries, limiting the impact of the plan	**6** • The plan (even if adopted by the municipality) has still not been fully operational since its inception in 2022.
Public Participation and collaborative governance mechanisms	**11.5** • Abundancy of participation mechanisms targeted to different projects goals, geographical areas • Presence of diverse local citizens' initiatives with great relevance in decision-making	**9.5** • Several public participation mechanisms and consultation with citizens to ensure local awareness and increasing sense of belonging

Source(s): Authors' own work

hindrances in shared governance instrumentalization for implementation and monitoring urban biodiversity actions across the plan. In the overall framework graph in Figure 2, Genova has less *boundrification* expectations in terms of collaborative governance aspects and institutional support and policy integrations; however, it demonstrates more punctual actions to improve and increase accessibility to green and blue areas. Hamburg controversially demonstrates a larger span in target-based actions to improve urban biodiversity; however, it has fewer boundaries with shared governance mechanisms across multi-sectoral and multi-dimensional vertical policy integration in the plan.

At the small scale, one missing opportunity is how the plan can generate economic value that could become a source of funding mechanism, an element which cities tend to generally overlook in their plans. Moreover, the proposed interventions/measures and their maintenance are clearly an argument that spans across several authorities and responsibilities within the same areas, hence the integration of some directorates of green, mobility, public spaces, hydrological and geological competences should be dialoguing and widening their perspectives of collaboration. While this is somewhat consciously embedded (e.g. in the sections about connected planning tools in the Hamburg case), this integration is rarely addressed practically in the description of the interventions/measures. Additionally, there is

also a debate on the effectiveness of several proximity aspects of urban greening, such as the variety of species (Kendal *et al.*, 2014), or with respect to the increment of green spaces. One specific successful component of both plans is their visual structure, whether in terms of maps and technical sheets of NBS interventions as in the case of Genova specifically. A detailed aspect of both plans focused on communication of the strategies with a larger number of stakeholders; it is noticeable that the bottom-up approach needs to be integrated within a more structured larger scale of communities and through organized initiatives that may be financially supported by the municipality.

On the large scale, there is a clear mismatch with the European biodiversity strategy for 2030 (European Commission, 2020) on how cities with certain scales and spatial boundaries are adhering to the UNP establishment according to their local regulations and within their territorial competences. From the cartographic apparatus of both plans, it becomes apparent that nature is still confined within the municipal administrative boundaries, giving rise to plans immersed in a blank void. However, this apparent isolation from the surroundings is not reflected in the measures described in the plans (see the Magistralen of Hamburg or the hint to Natura 2000 areas). A one size-fit all strategy such as the one introduced by the European Commission (2024) is not, however, a successful approach when it comes to cities with larger metropolitan scale such as Hamburg since the metropolitan scale has a more strategic approach in boundaries spanning in terms of competences and maintenance responsibilities. Also, the inclusion of actors belonging to different urban scales (from neighboring associations to ministries and NGOs) can represent a good premise for the management of knowledge spillovers that account for different boundaries of nature.

Thus, we argue that the plans of the two cities investigated feature two types of boundaries when it comes to planning nature in the urban context, namely, administrative and knowledge boundaries. The former reflects the relevance of the plan to cover and act within and beyond administrative boundaries, in the understanding that nature cannot be confined within this regulative category. The latter refers to the importance of thinking of nature spanning beyond nomenclatures defined within the plans as green "areas" and the work of communication and monitoring of that. Thus, the UNP could represent an opportunity to break these boundaries by embracing a planning that works within and between different scales (metropolitan, city, neighborhood) and with different tools (vision, measures, participation), systematically integrating targets 1, 12, 14 and 22 of the GBF.

The paper presents two limitations. First, we acknowledge that our lenses through which the analysis of UNPs are the ones of governance, as the research scope and interest lies within the mechanisms that both plans can deploy to govern and implement nature in the urban context with a focus on participation. Thus, further research could explore the topics of financing, hence recognizing which actors and which economic tools can support (or hinder) the realization and implementation of the plans, and of monitoring, going more in detail about which kind of measurements can be used to evaluate the development of the plans. Second, we decided on a two-case studies comparison to allow a deeper analysis of the UNPs and related documents in a more vertical manner. An alternative path could engage with more quantitative evaluation of such plans and include natural sciences methods to show evidence of the importance of considering knowledge and administrative boundaries.

Conclusions

This research article has questioned the matter of a fundamental mismatch between the instrumental "boundrification" of urban biodiversity benefits in planning and implementation and stakeholders' involvement in this process. In the two plans analyzed, we have observed a general tendency to remain confined within both spatial and administrative boundaries.

While nature has started to be considered in the definition of any interventions within the built environment and beyond in the field of climate adaptation and mitigation, whether the awareness of creating a functional green network for biodiversity purposes first and for human well-being consequently is still to be seen in the evaluation of the implemented measures composing the plans analyzed. We can state that the new generation of UNP should consider the spillover of local knowledge in combination with nature going beyond administrative boundaries. This combination can be achieved through a type of plan that considers the "right" of nature as a pillar of its constitution from the bottom, and the use of local citizen engagement mechanisms for mainstreaming its impact from the top-down. Accordingly, both plans are an exemplary case with their extensive list of participatory methods and tools, and the conspicuous presence of active local initiatives able to mobilize local knowledge. Additionally, the UNPs are providing an excellent starting point for new approaches to nature within the built environment which goes beyond the protection of natural areas and instead pursue an increase of such areas, both in quantitative and qualitative terms. However, an important limitation for urban planning is that its instruments are still bound to legal requirements and shared responsibilities within administrative boundaries (Pastore *et al.*, 2025). It is therefore questionable whether urban planning of nature and biodiversity should enlarge its scope to be able to capture the environmental, social and economic benefits of the implementation of natural solutions, such as NBS. One strong policy recommendation would suggest that deploying shared governance approaches can be useful to set up collaborations beyond sectorial responsibilities, thereby overcoming the identified mismatch between administrative and knowledge boundaries. Future research could look at cross analysis between a multiplicity of cities with similar urban morphologies and conceptually allow a web-based or offline platform to learn from each other by replicating the analytical framework proposed as well as a possible translation from these findings of replication into actionable EU policies such as FUA boundaries planning instead of cities or municipalities planning current regulation. As an example, the latest UNP+ project develops a specific portfolio of indicators for cities to identify tools of common evaluation for enhancing their training and capacity building programs (Jelliman *et al.*, 2024).

Authorship Credits

IM:Methodology, conceptualization, visualization of maps and graphics, resources, Genova Case study; research funding and AA: Hamburg case study, review, editing. Both authors agreed on the final submitted version.

Notes

[1.] www.cbd.int/gbf/targets/12

[2.] Title partly inspired by https://news.climate.columbia.edu/2017/08/30/nature-has-no-boundaries/; www.undp.org/kyrgyzstan/press-releases/nature-knows-no-borders

[3.] We use the FUA as a unit of measure in this research, as they are being composed of a city and its commuting zone. FUAs encompass the economic and functional extent of cities based on people's daily movements.

[4.] Urban communal plan (Piano Urbano Comunale) is the legal instrument for city and town planning in Italian legislation.

[5.] www.fondazionesviluppososteniBile.org/conclusa-la-3-conferenza-nazionale-delle-green-city/

[6.] www.hamburg.de/politik-und-verwaltung/behoerden/bukea/themen/klimaschutz/klimaplan-und-klimaschutzgesetz/eckpunkteklimaplan-169020

[7.] www.hamburg.de/resource/blob/169140/4c902bd7090a09f16a600091cfc7a110/d-zweite-fortschreibung-hamburger-klimaplan-data.pdf

[8.] www.hamburg.de/politik-und-verwaltung/behoerden/bukea/themen/hamburgs-gruen/qualitaetsoffensive-freiraum-282122

[9.] https://smart.comune.genova.it/system/files/regolamenti/reg_consulta_del_verde.pdf

[10.] www.hamburg.de/politik-und-verwaltung/behoerden/bukea/themen/hamburgs-gruen/gruendach-und-gruene-fassaden/gruendachstrategie-hamburg-281226;www.gesetze-im-internet.de/englisch_ksg/index.html

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