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Towards More Equitable Urban Greening: A Framework for Monitoring and Evaluating Co-Governance

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Abstract

Urban greening has grown in significance in Europe and worldwide as a presumed "public good" initiative, delivering a range of benefits for human health and wellbeing. To redress inequalities in the distribution of such benefits, attention has turned to the potential of collaborative governance. Indicator-based frameworks have also begun to receive attention for their ability to monitor and evaluate not only the performance of greening interventions, but also the policies, practices, and norms that influence their planning and implementation, with a view to transforming governance arrangements. Extensive sets of indicators have been proposed in the literature; however, few studies have addressed the process of adapting monitoring frameworks to the limited resources and highly specific conditions of local government. We address this gap by providing an account of an early phase in developing and contextualising a framework to assess governance of urban greening in seven European cities. Following review of existing indicator sets and literature related to co-governing urban green space, we compiled a set of 126 indicators and clustered these according to normative principles underpinning successful co-governance. We then worked with city representatives to contextualise a subset of 80 indicators and link them to relevant objectives. We found that organising indicators according to principles and applying the criteria of relevance and feasibility was useful to make an abstract concept operational and to promote strategic thinking. However, we also found evidence of likely barriers to using indicators in practice, chief among them the limited agency of responsible staff, with implications for the potential to politicise indicators and thereby guide transformative change.

Keywords

collaborative governance; evaluation; indicators; justice; monitoring; transformation; urban greening

1. Introduction

In the face of growing threats to quality of life in cities worldwide—among them global warming, pandemics, and societal fragmentation—urban greening has captured the attention of urban planners and managers for its potential to deliver a range of benefits (Thompson, 2002). Green spaces have a key role to play in mitigating heat (Rahman et al., 2020) and regulating stormwater disposal (Zölch et al., 2017), while access to nature contributes to better mental and physical health (Tzoulas et al., 2007). However, as urban greening has gained momentum, attention has increasingly turned to the recipients of these benefits, and related questions of social and environmental justice (Anguelovski et al., 2020; Bauer, 2023; Connolly, 2019; Rutt & Gulsrud, 2016).

To make sense of the different dimensions of justice, many scholars have applied a tri-partite concept, composed of distribution, recognition, and procedure (Fraser, 1998; Schlosberg, 2007). Distribution concerns uneven impacts from environmental burdens and availability of environmental goods (Liotta et al., 2020). Similarly, the formal and informal procedures for making decisions related to urban greening are not readily accessible to everyone, such that decisions inevitably privilege certain interests, while neglecting others (Anguelovski et al., 2019; Baasch, 2020). Recognition justice supports the other dimensions in that neither equitable processes nor outcomes are possible without targeting differences in resources, capacities, and needs among individuals (Fraser, 1998; Young, 1990). More recently, Anguelovski et al. (2020) have pointed to the failure of the tri-dimensional framework to adequately reflect the lived experience of injustice. They propose an analytical approach based on principles of emancipation, anti-subordination, intersectionality, and (feminist) relationality, which they argue must fundamentally underpin urban greening in order to achieve justice. Their criticism appears to stem at least in part from a tendency for previous research to focus on one or the other dimension, commonly distribution, rather than recognise the three as interdependent (Bauer, 2023; Bennett et al., 2019) as well as failing to address power relations. We maintain that the dimensions of recognition, procedure, and distribution, when considered together, remain a useful lens through which to characterise an otherwise abstract concept, particularly in the context of practice-engaged research. Evidence suggests that all three dimensions are rarely reflected in the criteria that municipal decision-makers use to determine priorities for urban greening (Fisher et al., 2021; Hansen et al., 2022; Hoover et al., 2021).

2. Theoretical Background

Training a justice lens on urban greening projects demands that we move beyond technical requirements and recognise their fundamentally political nature, paying attention to the governance arrangements that underpin their planning, design, and stewardship (Hansen et al., 2022; Patterson et al., 2017; Pauleit et al., 2017). The concept of governance inherently recognises that formal government is not solely responsible for managing affairs, but engages with a range of institutions (Healey, 2006) and non-state actors (Emerson & Nabatchi, 2015). For our analysis, we take collaborative governance (Ansell & Gash, 2008; Emerson et al., 2011) as our framing concept, in response to the deficits in collaboration identified as key barriers to delivering urban greening (Frantzeskaki, 2019; Mekala & MacDonald, 2018). We define collaborative governance as a process of actors across the public, civil society, and private domains working together towards shared objectives for positively and equitably transforming the urban environment through the planning, design, implementation, and management of a nature-based intervention (Lim et al., 2023, after Ansell & Gash, 2008; Biermann et al., 2009; Emerson et al., 2011; Patterson et al., 2017). The emphasis on

equity is important, since, while collaborative governance is sometimes assumed to translate to equitable outcomes, empirical evidence is limited (Dobbin & Lubell, 2021; Toxopeus et al., 2020). To move towards making this definition operational, we rely on five normative principles (see Table 1), defined through a systematic, qualitative literature review (Lim et al., 2023).

In Europe, a number of practice-based research projects have sought to guide collaboration on urban greening interventions, often framed as nature-based solutions (NbS), a concept that has benefited from substantial European Commission research funding (Bradley et al., 2022; Collier et al., 2023; DeLosRíos-White et al., 2020; Hölscher et al., 2024). As part of such studies, indicators have typically been deployed to assess the benefits of greening (Dumitru & Wendling, 2021). Just like quantifiable impacts, e.g., a reduction in temperature or air pollutants, indicators are capable of demonstrating a shift to a more collaborative way of governing, allowing targets to be set and progress tracked (Bennett & Satterfield, 2018; da Cruz & Marques, 2017), as a basis to redirect resources where most needed (Dumitru & Wendling, 2021; Morgan et al., 2022; van der Jagt et al., 2022). Indicators can also radically simplify complex information for diverse audiences: a powerful tool for policymaking (Keirstead & Leach, 2008) and demonstrating success

Table 1. Normative principles underpinning successful collaborative governance of urban greening (Lim et al., 2023) and links with dimensions of justice.

Principle	Definition	Justice dimensions
Collaborative	Seeking out and mobilising governmental and non-governmental actors from multiple disciplines, departments, and levels; coordinating individual efforts to solve common problems adequately and at an agreeable cost (Börzel & Panke, 2007; Frantzeskaki & Rok, 2018).	Not explicit
Legitimate	Trust in and acceptance of decisions is ensured by adhering to democratic norms: i.e., equal participation of those affected; fair, transparent, and accessible decision-making processes; and accountability (Buizer & Van Herzele, 2012; Secco et al., 2011).	Participation and outcomes based on democratic norms (procedure; distribution)
Adaptive	Planning and implementation are strategic, open-ended, and iterative, involving continuous reflection, and learning from feedback loops to improve processes and outcomes (Martin et al., 2021; Mok et al., 2021; Morgan et al., 2022).	Efforts to continuously improve participation and outcomes (procedure; distribution)
Empowering	Equipping less powerful actors with the agency to assert their interests, based on a dynamic, evolving process of deliberation in which public, private, and civil society actors are afforded meaningful opportunities to create and share knowledge, challenge existing ideas, and proportionally influence outcomes (Barletti et al., 2020; Morgan et al., 2022).	Inequalities in resources recognised (recognition; distribution); targeted efforts to support participation (procedure)
Responsive	Actively recognising and analysing the specifics of local context at the outset of decision-making, with attention to differences in needs, interests, and values between and within communities; identifying pressing local challenges, understanding locally-specific institutional arrangements, and enabling local and indigenous knowledge to enter the process (Baasch, 2020; Graham, 2015).	Difference and plural, local knowledges recognised (recognition); participation actively enabled (procedure)

(Astleithner et al., 2004; Emerson & Nabatchi, 2015). However, to deliver on this potential, the indicator set must be fit for its intended purpose. Da Cruz and Marques (2017) assert that indicator sets for evaluating municipal governance should be concise, as simple as possible, and clearly related to an objective. The set should also be exhaustive, while free from redundancy, discretionary indicators, or any factors that cannot be influenced by local government. In practice, meeting these conditions involves trade-offs, e.g., exhaustiveness will likely compromise concision and simplicity. Deciding which trade-offs are acceptable depends on the purpose. While many studies have looked at ways to create indicator sets that are optimal for the purpose of delivering robust scientific data, our study aligns rather with scholarship on their potential to build capacity and open up new discussions and modes of working (Bennett & Satterfield, 2018; Holman, 2009; Zafra-Calvo et al., 2017).

Evaluating collaborative governance faces several challenges, as highlighted by Emerson and Nabatchi (2015) who cite definitional inconsistency, difficulties observing change over time, and divergent perceptions of success. Further, indicator sets recently in use to evaluate greening interventions are often dominated by technical, performance-based indicators, with governance receiving scant attention (van der Jagt & Buijs, 2021). Another challenge is to define indicators that are specific, observable, and measurable (Dumitru & Wendling, 2021), without necessarily being quantifiable, since qualities of governance are often perception-based (da Cruz & Marques, 2017). Perhaps the most crucial limitation of indicator frameworks developed specifically for urban greening is their lack of uptake by municipal staff. Obstacles include lack of expertise or resources to collect and evaluate data; data being unavailable, inaccessible, or dispersed across different agencies; difficulties identifying causal links in complex systems (especially when people and their behaviour are the subject); complex and detailed monitoring requirements; insufficient alignment with local policy agendas; and incompatibility with the realities of working environments (Dumitru & Wendling, 2021; van der Jagt et al., 2022). Uptake of indicators in decision-making may also depend on political will, established working practices, and the values and interpretations of individuals (Astleithner et al., 2004; Holman, 2009; Rydin et al., 2003). Aside from the question of uptake, which indicators and analytical scale are chosen can influence their potential to help transform governance practices (Astleithner et al., 2004; Beck et al., 2021; van der Jagt et al., 2022). Indicators that demonstrate progress only for a localised site or time-limited project are unlikely to drive change at a broader, city-wide scale; a problem often observed in urban greening projects seeking to stimulate public participation (e.g., Willems et al., 2020). Turnhout et al. (2020) point out that this failure to engage with the wider context beyond the limits of a project and its inherent power structures, what they call "depoliticisation," is a key barrier to societal transformation. Van der Jagt et al. (2022) argue accordingly for greater attention to the way indicator-based assessment frameworks are created, inclusion of indicators related to environmental justice, and efforts to both locally contextualise and politicise the framework, i.e., to establish clear links with local policies and practices. In sum, indicators clearly have potential for monitoring and evaluating shifts in governance, but more empirical work is needed to understand how an indicator-based monitoring framework can be adapted to the limited resources and institutional context of local government, such that it is actually put into practice. We address this gap in the literature by reporting on our experience of developing an indicator-based assessment framework for use in seven European cities. We sought to answer the following questions:

- To what extent are proposed indicators for assessing co-governance viewed as relevant and feasible by local city teams?
- What challenges are inherent in contextualising and politicising a framework for assessment?

3. Method

This study took place as part of the practice-based research project JUSTNature, aiming to foster a just, low-carbon transition in European cities. Six city administrations and one city-owned company are involved, with their representatives working with researchers to design and implement nature-based interventions. The cities vary in size, represent a range of biogeographical and socio-economic profiles, and face different challenges related to collaboration, offering highly diverse settings from which to examine transformative urban greening (see Figure 1). Our focus is not just the technical design and delivery of interventions, but also experimentation with different approaches to engaging stakeholders in their design, implementation, and stewardship. An indicator-based framework offers a means to monitor and reflect on these efforts, with a view to fostering a culture of collaborative governance in the longer term.

We built on a key review of existing assessment frameworks and guidance on participatory indicator selection (van der Jagt et al., 2022) to define a framework for evaluating governance of urban greening. Our starting point was a compilation of existing key relevant indicator sets (Dumitru & Wendling, 2021), as well as additional indicators defined by van der Jagt and Buijs (2021). To these, we added indicators from empirical and theoretical studies (Kabisch et al., 2016; Morgan et al., 2022; Secco et al., 2011), resulting in a list of 51 indicators. We reviewed each indicator for relevance in the context of what could be measured through the project, discovering some shortcomings. Several indicators insufficiently described what was to be measured and how; very few indicators related to digital technology (n = 2), despite its growing role in shaping governance interactions; and a direct link with justice could be observed for less than half (n = 19). For example, indicators for participation were often phrased in terms of generic citizens or community, without distinguishing between groups (absence of recognition justice). In light of these deficiencies, we saw scope to enrich this list by further characterising several indicators, and defining new indicators, derived from literature review (Lim et al., 2023). All indicators were then reviewed for their relationship with our five normative principles for good co-governance and assigned to one or more principles. In this way, we arrived at a set of 126 indicators capable of demonstrating progress towards co-governance according to the principles.

To translate our set into a reduced and meaningful number of indicators for each city, we drew on insights into participatory indicator selection from van der Jagt et al. (2022) who highlight the importance of seeking input from representatives of the contexts where monitoring should take place. We had laid groundwork through earlier engagement with the city partners during two online discussions—firstly introducing the concept of co-governance and secondly exploring its relevance to individual working environments—and a working session in person to discuss the principles in relation to local challenges (see Figure 1). We then reduced the list of indicators—an important step to lower the burden of participation, given that an overly lengthy list risked respondents disengaging from the content. Rather than maximise the number of indicators under consideration, our intention was to promote commitment within the lifespan of the project to working with a focused set of selected indicators, grounded in all five normative principles. Our primary exclusion criterion concerned indicators where data would already be collected through the project via established mechanisms (e.g., surveys developed to evaluate local workshops), and whose ranking was thereby redundant (n = 46), while ensuring that all principles continued to be represented. We then developed an online survey (see Figure 2) asking city partners to review each of the remaining 80 indicators for relevance and feasibility—found by van der Jagt and Buijs (2021) to be key criteria for local government

	Intervention Role (department) of city representative(s)	Key challenges for collaborative governance
Bolzano (Italy)	**Greening of existing rooftop.** Project manager (Department of Geology, Energy and Civil Protection)	Strict regulations (provincial/regional/national level) limit how citizens can be engaged. Not typical to engage citizens early in planning process. City has limited decision-making power. Intervention site not publicly accessible.
Chania (Greece)	**Greening of existing carpark façade; greening of adjacent sealed open space.** Project manager (city-owned company Kydon)	Higher levels of government can overrule municipal decisions. No legal requirement to engage with local communities. Limited communication between government levels, and with citizens. Private actors (e.g. tourist bus companies) able to bend rules in their own interest.
Gzira (Malta)	**Greening of existing façade; greening of an existing verge and bus stop.** Project manager (municipal research unit)	Citizen interactions with municipality mostly characterised by complaints. National government can overrule municipal decisions. Disproportionate power over land use held by property owners and developers.
Leuven (Belgium)	**Temporary conversion of street parking to green space; greening of an open space inside a prison.** Project manager (Department of Public Works)	Community engagement typically dominated by a limited number of loud voices. Hard to engage vulnerable and under-represented groups.
Merano (Italy)	**Conversion of an existing open space to a multifunctional 'garden for all'.** Project manager (externally contracted by the Department for Parks and Gardens)	Lack of community consensus on future environmental goals; self-interest dominates. Limited municipal culture of collaboration. Hard to engage vulnerable and under-represented groups. Reluctance of city administration to share power. Results from successful participatory processes can still be overruled by decision-makers. Unclear content and coordination of existing policies and processes for urban greening.
Munich (Germany)	**Temporary schoolyard greening; greening of a courtyard in community/residential centre for refugees.** Project manager (Department of Planning)	Limited municipal culture of collaboration. Relatively low level of citizen engagement. Mostly white, older educated people participate—other groups less engaged.
Szombathely (Hungary)	**Schoolyard greening; micro-park.** Project manager (Legal Services Department, Mayor's Office) Local councillor	Limited municipal culture of collaboration. Lack of resources to sustain continuous stakeholder involvement. "Non-expert" knowledge undervalued, by both municipality and community. Reluctance of city administration to share power. Citizens generally distrust government.

Figure 1. Overview of the cities, their representatives, urban greening projects, and key challenges for collaborative governance identified to date.

Ranking the indicators

To select indicators that are suitable to your context, we invite you to consider two ranking criteria:

Relevance: Indicators are relevant if they are linked to the local objectives defined by your City Practice Lab, to the interests of one or more stakeholder group, and/or to an existing policy or legal framework, and if they are suitable for monitoring change over time.

Feasibility: Indicators are feasible if there are adequate time and resources available to carry out the assessment and monitoring process. This also means data of an adequate quality is available, and no specialist criteria is required to collect it.

After selecting the ranking level (3 = very, 2 = a little, or 1 = not at all), please explain your choice, referring to your local context, challenges and objectives.

Indicator: Participation: Degree of Participation

Description: Following Arnstein's ladder of participation (ranging from manipulation to citizen control), participatory processes (e.g. workshops) are planned and evaluated by both participants and municipality

How can you measure it? Survey, Interview, Focus Group

Relevance: How relevant is this indicator to your local objectives? Please explain why

Feasibility: How easy is it to collect this data? Please explain why

Figure 2. Excerpt of ranking survey.

staff (after van Oudenhoven et al., 2018). Following an explanatory online session, the survey was filled out by 1–2 representatives of each city who were actively participating in the project (see Figure 1 for their roles and departments), supported by a local research partner. In three cities, the contributing local research partner had also been involved in compiling the indicators.

4. Results

The distribution of rankings across cities varied greatly (see Figure 3). Of the 80 indicators, 76 were ranked *very relevant* by representatives of at least one city, irrespective of feasibility. Seventy were ranked *very relevant* and *very feasible*, while 62 were ranked *very relevant*, but only *a little feasible* or *not at all feasible*. Considering potential transferability of the indicators between different local contexts, it is important to look at trends across the cities. No single indicator was ranked *very relevant* and/or *very feasible* by respondents from all seven cities, while only one indicator was ranked *very relevant* and *very feasible* by five cities. Seven indicators were seen as *very relevant* and *very feasible* by respondents from four cities, and 20 from at least three cities. This demonstrates significant variation in perceived relevance and feasibility across the cities, highlighting the importance of context. When only relevance is considered, the number of common indicators increases significantly. Three indicators were selected by six cities, 23 by five cities, 37 by four cities, and 57 by three cities. Table 2 provides a snapshot of commonalities, outlining the 37 indicators ranked very relevant by respondents from at least four cities.

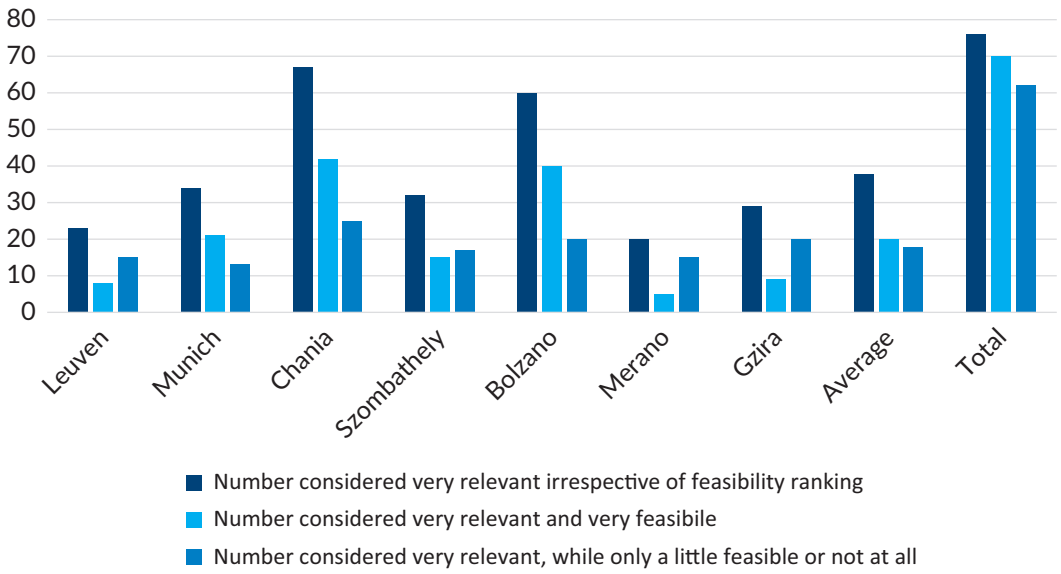

Figure 3. Results of the ranking exercise.

Respondents were asked to explain the reasoning behind their rankings. Their reflections provide useful insights into attitudes to relevance and feasibility (see Table 3 for an illustrative snapshot). Table 3 reveals at times divergent attitudes to the same indicator. Concerning cooperation with other departments, one respondent reflects on the need for more diverse departmental representation at future workshops; another hints at a disconnect between project-based activities and "business as usual" beyond; while another dismisses the possibility of engaging other departments on a more intensive or ongoing basis (Rows 6, 8). Similarly, in relation to workshop participation, two respondents signal an intent to persist in trying to reach absentees, but raise questions about the value of monitoring diversity (Rows 1, 2). Some responses focus squarely on a lack of resources (Rows 5, 6). Others indicate a readiness to explore different modes of collaboration that certain indicators imply, reflect on practical considerations about how to collect data, or self-identify capacity needs (Rows 3, 7, 8). Several responses point to perceived limited influence over an indicator, due to e.g., constraints imposed by regulations or absence of a mandate (Rows 4, 7). Responses to indicators targeting vulnerable groups reveal an absence of perceived common ground between the green space intervention and group interests (Row 2). Although work had been done earlier in the project to actively consider injustices when mapping stakeholders, the responses suggest gaps persist in knowing which groups are relevant, let alone how to effectively engage them.

While the reflections above provide insight into respondents' attitudes to working with the indicators, we found few clear explanations of why certain indicators were very relevant, although we had asked that each indicator be considered in relation to local objectives (Rows 3 and 7 hint at possible aims, but remain at a general level). In fact, the survey responses made clear that local objectives had typically either not been clearly defined, or were related to technical or environmental outcomes, such as enhanced biodiversity or cooling effect. We addressed this gap by reviewing internal project documentation gathered to date (stakeholder mapping, presentations, workshop reports, and discussions with city partners about perceived obstacles to collaboration on urban greening) to inductively define possible objectives linked to co-governance for each city, at both the scale of the intervention sites and more broadly at city level. We then reviewed the indicators each city had ranked very relevant and feasible for coverage of our five

Table 2. Indicators ranked *very relevant* (disregarding feasibility) by respondents from 4+ cities, and corresponding principles. Dark grey highlights indicate a subset of indicators also perceived as *very feasible* by 4 cities.

Indicator	Number of cities	Key principles				
		Collaborative	Empowering	Responsive	Adaptive	Legitimate
Empowering through co-creation process	6					
Fair treatment of people across time without bias and favouritism	6					
Bottom-up initiatives: volume	6					
Strategic stakeholder cooperation	5					
Ensuring equitable access to NbS (barriers)	5					
Accountability	5					
Different municipal departments are represented in workshops	5					
Accessibility to workshop	5					
Dissemination of workshops results to participants	5					
Active community engagement	5					
Objectives sharedness among stakeholders	5					
Inclusiveness	5					
Inclusion of direct day-to-day-management of green spaces in planning process	5					
Knowledge brokers	5					
Organisational structure	5					
Results and experiences from maintenance and management	5					
Openness about uncertainties	5					
Attention for local conditions	5					
Evaluation of group dynamics and power imbalances	5					
Governance ICT maturity: knowledge representation	5					
Participation volume	5					
Representativeness of participants	5					
Different knowledge bases, levels of expertise, and roles are recognised in knowledge creation	5					
Advocate representation for vulnerable groups	4					
Needs assessment of residents	4					
Knowledge acquisition and sharing—Access to relevant expertise	4					
Ensuring equitable access to NbS (distribution)	4					
Acceptance and uptake	4					
Exclusion	4					
Knowledge sharing: environmental education	4					
Integration of environmental and social agendas at all levels	4					
Response to the emergence of active citizenship	4					
Use of intermediate-level plans to link local small-scale initiatives with strategic plans	4					
Process-oriented approach	4					
Support of long-term cyclical processes	4					
Identification and involvement of diverse and vulnerable groups	4					
Instruments of consent	4					
Total occurrence of principle		**7**	**14**	**17**	**8**	**8**

Table 3. Selected reflections on the ranked indicators from respondents in five cities.

Indicator	Relevance	Feasibility	Comment
(1) Inclusiveness: Participants not being able to participate in the beginning are able or are invited to participate in future activities.	Very	A little	"Yes, we will reach out to everyone that could not attend the first workshop but was interested in it. This should be obvious and there is no need to make it an indicator." (City 3)
	Very	Very	"Participants that were excluded or were not able to participate at the first workshop are very relevant. We have been keeping track of those that were invited but not able to participate. They were noted for future activities." (City 1)
(2) Identification and involvement of vulnerable groups and actors representing different sectors: A comprehensive stakeholder map is developed and revisited periodically, with input sought from different departments. High-interest/low-influence stakeholders identified as a priority for engagement.	Not at all	Very	"More is not automatically better. We're talking about a public green space. E.g., LBGTQ+ organisations did not even answer the workshop invitation, as it is not about their issues. We must focus on who is affected with the project, not theoretical quotas that make no sense." (City 3)
	A little	No answer	"In a small town like ours, it is impossible to have stakeholders representing particular groups." (City 1)
(3) Bottom-up initiatives—volume: Number of citizen initiatives, proposals.	Very	Very	"Active participation and initiatives from the citizens would be very interesting and beneficial. We would be building towards a better relationship with the community and to their understanding of governmental policies. There is no system in place for citizens to propose green space initiatives and not yet any successful project examples." (City 1)
(4) Understandability—Coherence of existing policies: NbS policies and information are coherent and understandable for community members; information, concepts, and terminologies about NbS are clearly defined and easy to understand.	A little	Not at all	"Policies are decided upon on a national level and not at a local council level. As far as we know there are no current policies based upon NbS only." (City 1)
(5) Availability—Ease of data accessibility: Existence of accessible online platform with all relevant information concerning governance of NbS clearly structured, regularly updated, and special focus on newly established policies.	A little	A little	"As this project has no budget for such a commission, it is out of reach to reorganise the institutional homepage." (City 1)

Table 3. (Cont.) Selected reflections on the ranked indicators from respondents in five cities.

Indicator	Relevance	Feasibility	Comment
(6) Integrated governance: Strategic collaborative working relationship between different municipal departments, e.g., through a multidisciplinary hub, and between stakeholders from different sectors, e.g., participants representing different sectors attend the workshops.	Not at all	Not at all	"It exceeds the project time and budget limit to force other departments to collaborate actively in this project. Installing a multidisciplinary hub or jour fixe right now is not possible due to a serious personnel shortage." (City 3)
	Very	A little	"Participation is defined in the legal and regulatory framework." (City 2)
(7) Accountability: Public acceptance of planning choices.	A little	Very	"We implement temporary solutions and hope to create a basis for permanent solutions. Responsibility for permanent solutions lies with the building department, so planning choices are only partly within our reach." (City 4)
	Very	A little	"Although we didn't have enough citizens during our first workshop, it is important that we receive the required feedback of the public. We could collect this data through surveys or by in-person scouting." (City 1)
(8) Different municipal departments are represented in workshops: Staff from departments representing not just planning and environment, but also social services, are represented at local stakeholder workshops.	Very	Not at all	"We can only measure this in the project, meaning we will not get a realistic picture of the situation in general. Such workshops only happen in international projects, where they are mandatory. We would be interested to have guidelines for how to hold workshops efficiently and justly in the future—because there is little experience, but an openness to doing more." (City 5)
	Very	A little	"The council doesn't have different departments but these exist at a national level. So far, we had several stakeholders representing the environmental protection segment but need more representation from different departments. It is very relevant to have these stakeholders on board to represent these different interests." (City 1)

normative principles. In most cases, further indicators were excluded after defining an objective, while the "principles check" entailed some additions (e.g., for Gzira, an indicator related to the principle "adaptive" was missing; three selected indicators could not be directly linked to an objective and were excluded; while two new indicators were suggested in their place). Proposed objectives and corresponding indicators were presented to each city partner for review and adjustment (see example in Figure 4).

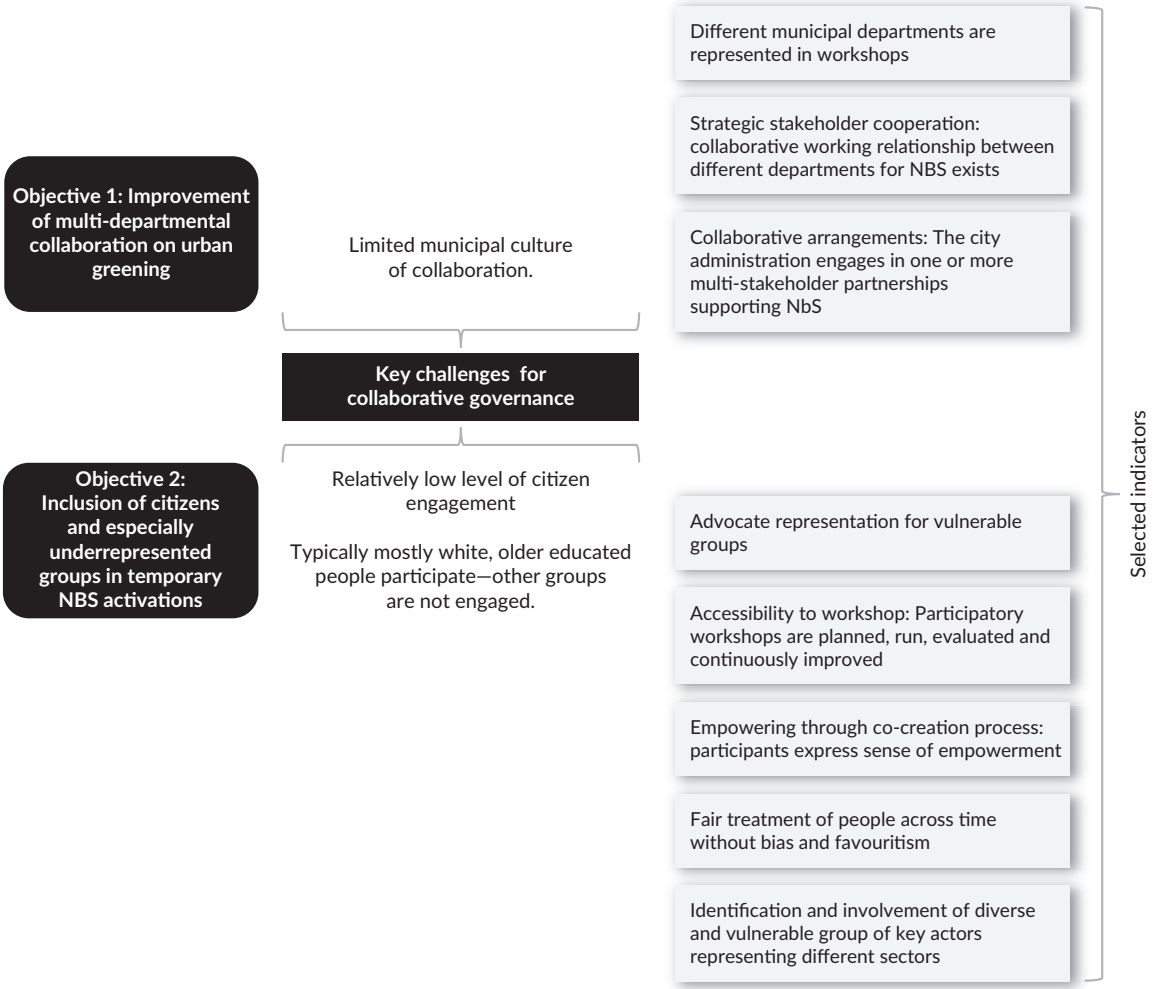

Figure 4. Sample of two local objectives (as proposed by authors) and corresponding indicators for one city.

Aiming for simplicity and concision (da Cruz & Marques, 2017), and mindful of resource constraints (Dumitru & Wendling, 2021), we further reduced the number of indicators by merging those that were deemed too similar to one another, taking into account feedback from respondents. This resulted in a total number of 48 indicators (see Supplementary File), with each city-specific set between 8 and 28. The wide variation is explained by the varied results of the ranking exercise. Our final city-selected indicator set ($n = 48$) was made up of 16 from existing sets of indicators (Dumitru & Wendling, 2021; Kabisch et al., 2016; Morgan et al., 2022; Secco et al., 2011; van der Jagt & Buijs, 2021), and 32 derived from literature review. The relatively high proportion derived from literature review suggests that expanding on existing indicator sets was useful to improve perceived relevance and feasibility, while the presence of a slight majority of indicators capable of monitoring dimensions of justice ($n = 26$, or 54%) is a significant proportional increase on the 51 indicators we started with ($n = 19$, or 37%). Figure 5 outlines the process and a quantitative overview of results.

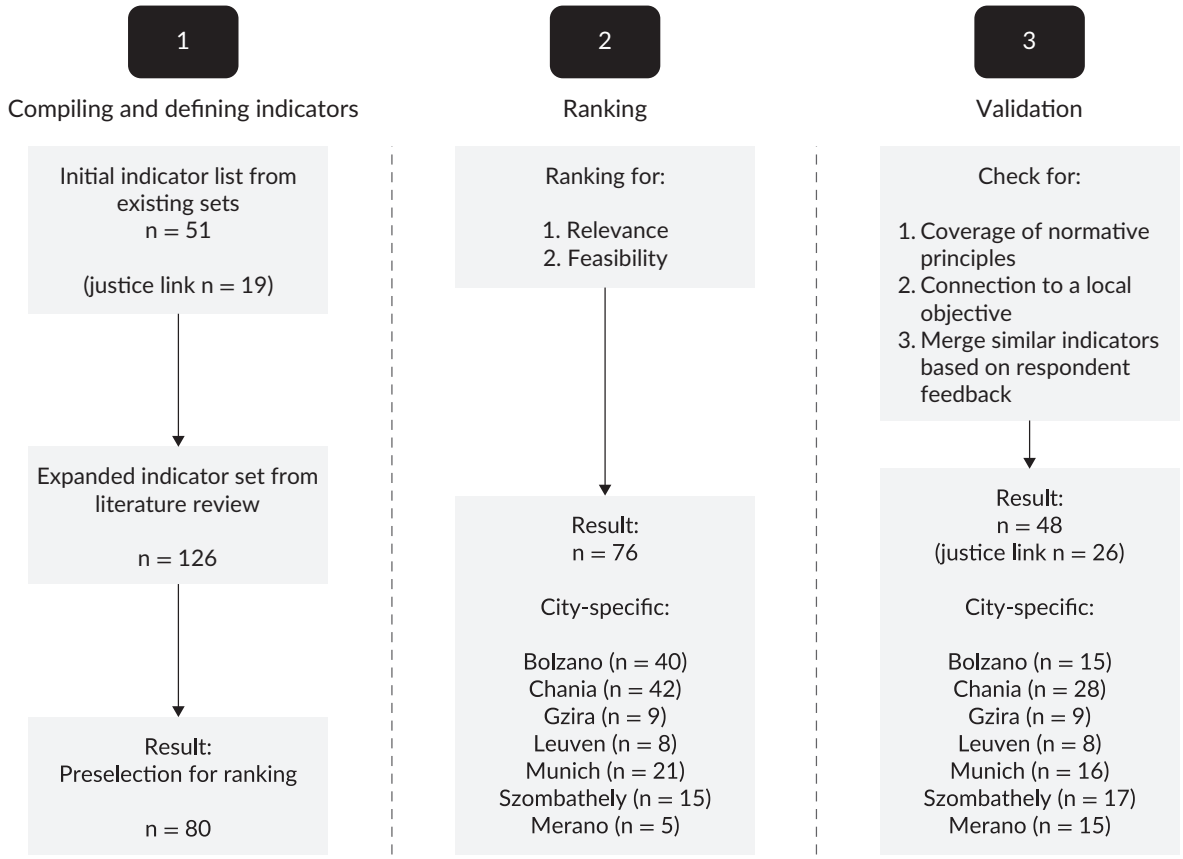

Figure 5. Overview of developing city-specific indicator sets.

5. Discussion

5.1. Perceived Relevance and Feasibility

We set out to define city-specific indicator sets seen as relevant and feasible by the people responsible for working with them. A majority of indicators were perceived as relevant in at least one city, with only four out of 80 indicators not ranked *very relevant* at least once. However, when results are averaged across all cities, only about half the indicators were viewed as relevant, and not a single indicator seen as *very relevant* by respondents from all seven cities. Although indicators are necessarily locally specific, such a low level of commonality is nonetheless remarkable. Feasibility also came to the fore as a key barrier to using the indicators, with on average only 25% of all indicators seen as both relevant and feasible. In studies where comparability between cities is critical, a productive avenue may be to explore the specific reasons behind difficulties collecting data and work out strategies to overcome these.

Respondents questioned how certain indicators could be measured, meaning feasibility may have been ranked lower where there was doubt about what data to collect or how. They also raised concerns about the workload and skills associated with collecting data, suggesting that feasibility may also have been ranked low as an expression of a respondent's concern that this burden would fall to them. Crucially, several indicators were flagged as not within the respondent's capacity to influence. This suggests that relevance and feasibility may not sufficiently characterise the local validity of an indicator, where agency (real or perceived) of the individuals

responsible for monitoring is lacking. While van der Jagt et al. (2023) have identified agency as a key category for monitoring co-governance of urban greening, our findings rather relate to "meta-level" agency, i.e., less so an indicator that measures availability of institutional support and resources (although this is important), but rather that the individuals responsible perceive that they can influence all indicators.

5.2. Challenges in Contextualising and Politicising an Indicator-Based Framework

Having concluded a key phase in setting up a context-specific framework for monitoring and evaluating co-governance, we can identify some early achievements. First, we have brought together indicators on co-governance of urban greening from dispersed sources, and structured these according to five principles, ensuring that individual indicator sets reflect a range of normative underpinnings of successful co-governance. Second, the process of ranking indicators for relevance revealed a cognitive gap between the research team's ambitions for steering a governance shift and the perspectives of city partners, demonstrated most significantly by difficulties linking indicators with clear local objectives. Exposing this gap has made it possible to bring a more structured and strategic basis to future monitoring, by defining local objectives for collaborative governance at site and city level and thereby enabling scrutiny of progress; much like environmental or technical benchmarks would typically be evaluated (Bennett & Satterfield, 2018; da Cruz & Marques, 2017). Related discussions and other engagement activities with the city partners on indicators before and since the ranking exercise also provided key lessons for our research design. For example, comments about lack of clarity and perceptions of similarities between indicators prompted us to reformulate some indicator descriptions, as well as to elaborate guiding questions and stepwise checklists clarifying how data can be collected.

Our experience also points to challenges engaging participants in contextualising indicators. First, although we align with scholars who have identified a need to expand existing indicator sets related to governance of urban greening (van der Jagt et al., 2023), we found a large number of indicators makes participatory selection difficult. Our reduced list of 80 was still perceived as overwhelming, and subtle differences between certain indicators dismissed as trivial. We support the view of van der Jagt et al. (2023) that comprehensiveness must be balanced with concision. Second, the generalised wording of some indicators offered substantial room for interpretation. As noted by van Oudenhoven et al. (2018), a problem with seeking to develop transferable indicators is that indicators often need to reflect very specific policy issues to guarantee relevance. Some indicators may have been rejected where relevance needed to be made clearer, e.g., through examples of what the indicator could mean in practice. The impact on our results we consider insignificant, given that we aimed to promote commitment to a focused set of selected indicators rather than maximise the number of indicators in use. However, there is scope for future studies to improve accessibility of existing lists, e.g., clustering related indicators, providing (concise) guidance on how to adapt a generalised indicator description to a local situation, and further distinguishing between indicators with higher and lower demands for data collection.

A future challenge is to politicise this framework, i.e., to ensure that the monitoring process integrates entry points for broader change beyond the project scale (Turnhout et al., 2020)—a frequent shortcoming of practice-based research projects engaged in experimentation (von Wirth et al., 2019; Voytenko et al., 2016). It is likely that this will play out less at the level of the indicators themselves, but rather through their corresponding objectives. In this regard, we have advocated for both site-level and city-level objectives, and provided guidance to the city partners on how to engage colleagues in structured discussions about their

own objectives, with a view to anchoring the project activities in a shared strategic context with longevity. Our results so far suggest that underscoring the agency of individuals within the project will be critical so as to ground ambition in practical, achievable actions, without losing sight of potential for broader change. Further analysis could build on studies that have explored the specific capacities needed to foster longer-term shifts to collaborative governance, and the extent to which these manifest over the course of the project (Hölscher et al., 2024; Wolfram et al., 2019).

5.3. Limitations and Future Research Directions

A limitation of our study is that we have not yet determined exactly how suitable our indicator sets are to evaluate equitable co-governance of the greening projects. Such an analysis could deploy certain key requirements of a sound indicator set (feasibility, relevance, avoidance of redundancy, coverage of principles) to analyse and score each city's set of indicators, as well as checking that dimensions of justice are sufficiently represented. This latter aspect lies at present primarily latent in those indicators aligned with normative principles with links to dimensions of justice. Another possibility would be to weight individual indicators for their explanatory potential in connection with each principle, as a means of further reducing the indicator sets to only the most relevant, and in turn reducing the evaluation workload. Such analysis would benefit significantly from our city partners' input, based on their initial experience working with the indicator sets—not yet available at the time of writing.

Our findings are not without bias, since we have worked predominantly with only one or two individuals from each city. The survey responses, documentation from which we defined local objectives, and resulting city-specific indicator sets represent a small group and how they perceive their local realities, and in turn how we have interpreted them. Perceived relevance, feasibility, and agency with respect to indicators depend on several factors, including the degree of support available from local research partners; disciplinary background; role, department, and length of time in each; seniority; and resources available to influence strategic decision-making. Encountering capacity limits is a typical situation in practice-based research, where often only one or two people are resourced by the project, typically in technical or managerial roles rather than political ones, and in some cases engaged as contractors external to the city administration. Involving a wider range of respondents in future monitoring (Hansen et al., 2022) may well enable richer insights, and indeed be crucial to their explanatory power, since individuals within the same group may disagree on whether a collaboration was indeed successful (Emerson & Nabatchi, 2015).

The real test of our indicator framework lies in its future implementation. We are already alert to concerns raised by city partners about the workload of data collection, and recognise that perceived feasibility to collect data for one indicator cannot necessarily be extrapolated to a whole set. Our work ahead includes developing guidance on data collection through surveys and interviews, as well as a mechanism to periodically self-reflect on progress towards objectives. Our experience to date suggests that this needs to be accompanied by support from the local research institutions in each city, along with continued efforts to demonstrate the value of monitoring and evaluating co-governance and to illustrate the agency of city partners.

6. Conclusion

Our experience working with city partners to define a framework for monitoring and evaluating co-governance of urban greening has generated some key observations that will guide our further work and may be useful to other research teams. A key achievement has been to develop an expanded set of 126 indicators, structured according to five normative principles for collaborative governance, and to test 80 of these for their relevance and feasibility in local contexts. We found that organising indicators according to normative principles and applying the lenses of relevance and feasibility was helpful to make a complex concept operational. While the indicator ranking exercise was primarily intended to contextualise the indicators and define city-specific indicator sets for further use, the results were pivotal in providing a basis to concretely define objectives for local collaborative governance. These findings add support to the case by others for more participatory approaches to creating assessment frameworks for urban greening (van der Jagt et al., 2023).

The ranking exercise also brought to light some reasons that existing indicators for monitoring co-governance of urban greening might not support transformative change in practice. Some barriers can be observed through our ranking criteria of relevance and feasibility, e.g., difficulty interpreting a generalised indicator as relevant to local conditions, and expected difficulties collecting data. We also found evidence of a varied sense of agency to influence the measures of progress among those responsible for monitoring it—particularly concerning potential change beyond the project boundaries. While relevance and feasibility are sound preconditions for a contextualised indicator set, if engagement with the political landscape beyond the project is sought, then capacity-building efforts are also needed to communicate the value of monitoring collaborative governance, and foster awareness of individual agency among those responsible.

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Conflict of Interests

The authors declare no conflict of interests.

Supplementary Material

Supplementary material for this article is available online in the format provided by the authors (unedited). It lists the set of 48 city-specific indicators and their corresponding principles, as deemed very relevant and very feasible by the city partners, and validated by the authors. The full set of indicators can be provided upon request to the authors.

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