



D2.1 Landscape report on policy processes & opportunities for inclusive participation



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Acronyms

CS	Citizen Science
IoT	Internet of Things

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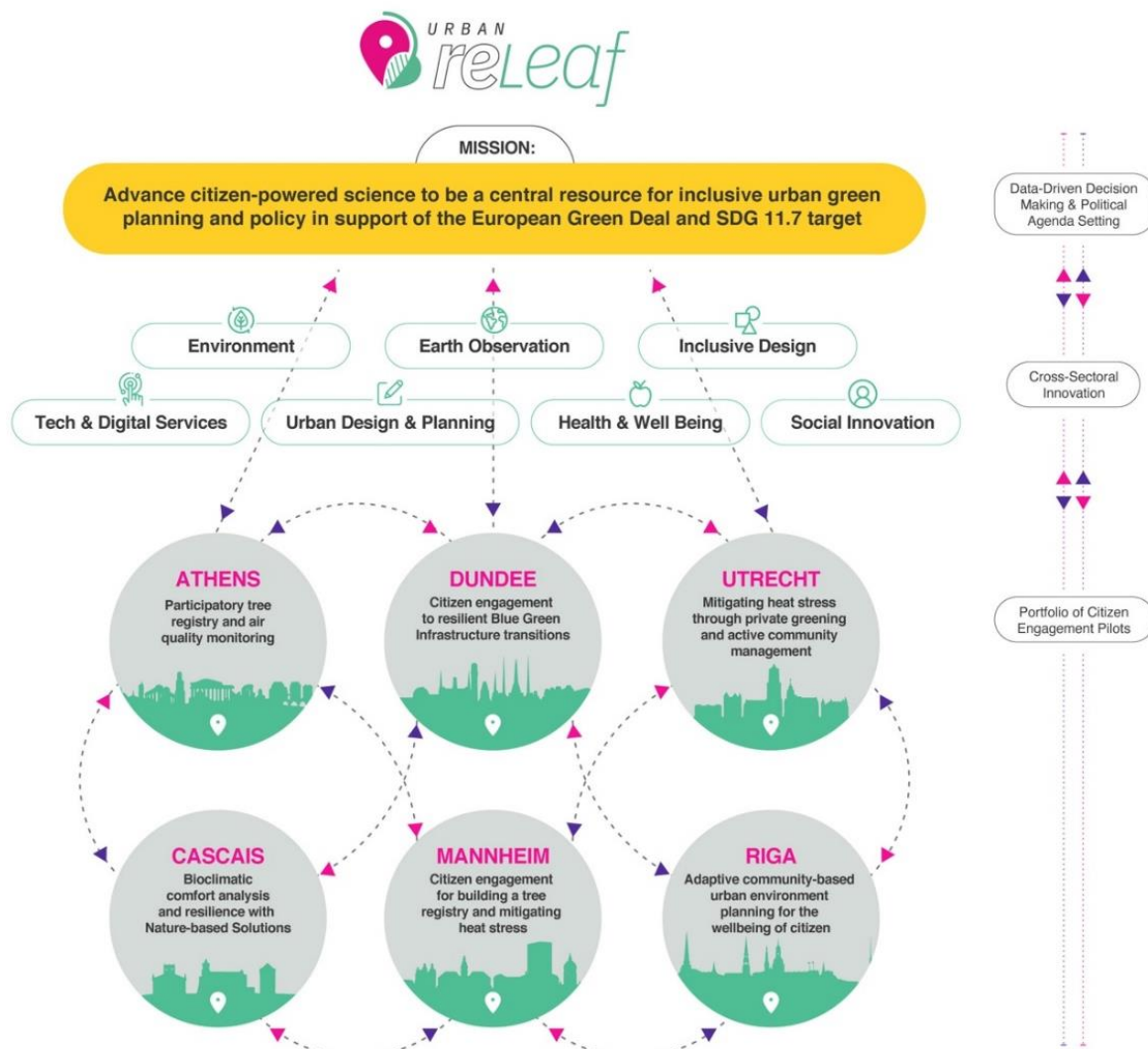
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Project Summary

Urban ReLeaf delivers citizen-powered data ecosystems to support cross-sectoral innovation and political agenda setting for climate change adaptation and green infrastructure planning in urban environments. At the heart of Urban ReLeaf’s action- and mission-oriented approach to innovation are public authorities, established communities and citizen groups in six pioneering Urban ReLeaf cities: Athens, Dundee, Utrecht, Cascais, Mannheim and Riga. Public sector innovation will be underpinned by co-creation efforts and inclusive citizen participation, cutting-edge technologies to support citizen observations, as well as robust and quality-assured workflows for the integration and visualization of the data in authoritative data streams and platforms. The solutions will be piloted through civic engagement campaigns with established volunteer communities, focusing on the inclusion of minority and marginalized groups. Urban ReLeaf will showcase the democratization of urban greenspace monitoring and the wider policy-making process for cities in pursuit of urban climate resilience. Ultimately, the Urban ReLeaf data ecosystem and associated governance models will deliver new, inclusive pathways for data-driven decision making in support of the European Green Deal and the Sustainable Development Goals (SDGs) keeping cities resilient, livable, and accessible for all.



Executive Summary

This document is the first deliverable of **Work Package 2 “Stakeholder dialogue and inclusive citizen participation”** reporting on the results from **T2.1 “Assess urban greening policy processes: current gaps and identification of citizen engagement opportunities”** and represent a steppingstone for the rest of the activities of the Urban ReLeaf project. Through mixed method research, combining the review of different policy texts on urban greening and participation with expert interviews, this deliverable identifies for each pilot city (i.e., Athens, Cascais, Dundee, Mannheim, Riga, and Utrecht): (1) the current general situation in each pilot in regard to urban greening/climate and participation; (2) the future vision of the city; (3) the envisioned role of citizens within greening activities and whether considerations for inclusive participation and justice were taken; (4) the current barriers and gaps to urban greening; (5) relevant stakeholders; (6) relevant initiatives; and tools and platforms.

By taking into consideration the foreseen sensing technology to be developed within Urban ReLeaf, this deliverable also identified opportunities for inclusive citizen-generated data within each pilot by linking them with current gaps and finding synergies with existing initiatives and tools and platforms.

This report demonstrates that all pilot cities are working to apply climate adaptation strategies and actions, translating their awareness of the necessity of policymaking on the subject. The policy review indicates that all cities are, to some extent, lacking data to efficiently conduct these activities, which represents an opportunity for Urban ReLeaf to emphasize the relevance of citizen-generated data. The extent to which the pilot cities are implementing citizen participation mechanisms varies greatly, but all display a willingness to increase their involvement with citizens. The use of “citizen-generated data” or associated terms (e.g., “citizen science”) within the reviewed documents is rare, suggesting a current lack of consideration for this source of information. The expert interviews, on the other hand, paint a more positive picture, as many identify initiatives involving citizen-generated data as opportunities for their own activities.

Overall, Urban ReLeaf’s foreseen activities are in line with the visions of the future of each city and address clear gaps in and needs for inclusive data. Urban ReLeaf’s activities are also in line with ongoing initiatives and platform and tools with which the project can find fruitful synergies. Going forward, the engagement strategies of Urban ReLeaf have to consider different key elements of social justice such as **recognition justice** in the recognition of different target groups and their differing lived realities in terms of, e.g., time capital, digital literacy and capacity, or physical capacity. From there stems the consideration for **procedural justice** in development inclusive participation mechanisms that take into consideration the predefined target groups and their associated characteristic(s), and that allows for appropriate mechanisms of participation (e.g., data collection) for all. Finally, consideration for **distribution justice** leads Urban ReLeaf to recognise the impact that the subject of research has on the participants (i.e., environmental injustice in the access of greening, and the associated benefits and burdens), but also the impact of the CS activities themselves (e.g., geographical representativeness of the data which will serve as basis for decision-making, representativeness of the perception of heat within the population, etc.) on different target groups.

1 Introduction

This document is the first deliverable of **Work Package (WP) 2 “Stakeholder dialogue and inclusive citizen participation”** reporting on the results from **T2.1 “Assess urban greening policy processes: current gaps and identification of citizen engagement opportunities”** and represent a steppingstone for the rest of the activities of the Urban ReLeaf project. The activities and results of **T2.1** reported in this document directly contribute to the activities of **T2.2 “Co-create inclusive strategies for the Urban ReLeaf pilots”** by providing a landscape report for each pilot city, i.e., Athens, Cascais, Dundee, Mannheim, Riga, and Utrecht. These landscape reports describe for each pilot the status of citizen-generated data for green infrastructure planning and decision-making and identifies gaps as well as future engagement opportunities. **As such, it provides an overview of the essential features of each city, which will be leveraged to co-create inclusive engagement strategies in T2.2.**

The work carried out in T2.1 consists therefore of a preliminary study on the potential contribution of citizen-generated data for green infrastructure planning and decision-making supporting climate change adaptation in each of the pilot cities. As such, the work carried out in this task consists of two main research activities (a) a policy-document analysis reviewing the relevant policies on climate change, climate adaptation, and urban greening, together with policies on citizen participation in each pilot city; (b) expert interviews with local authorities of each pilot city. The result of this analysis consists of the identification of (1) the general current situation in each pilot in regard to urban greening/climate and participation; (2) the future vision of the city; (3) the envisioned role of citizens within urban greening activities and whether considerations for justice were taken (consideration of the existence of different groups – recognition justice; inclusion of different groups – access/procedural justice; consideration for the differential impact of policies on different groups – distributional justice); (4) the current barriers and gaps to urban greening; (5) relevant stakeholders constituting the ecosystem of each pilot; (6) relevant initiatives and tools/platforms.

We begin this deliverable by providing in Chapter 2 an overview of the literature on the interlink between citizen-generated data, citizen science for policymaking, and question of inclusive participation, with a specific focus on case studies from urban greening.

Chapter 3 details the mixed method approach of T2.1, namely the policy-document analysis and expert interviews. The research activities, their goal, and the methods implemented are described.

Chapter 4 details the results of the research activities in a unified account of the landscape of each pilot city. Each pilot city’s landscape is presented in three phases: (1) synthesis of the current general situation of each pilot regarding urban greening, climate, and participation, their visions for the future, and the envisioned role of citizens in the process with consideration for justice components (recognition, procedural, distribution); (2) pilots’ ecosystem mapping; (3) synopsis of opportunities for inclusive citizen participation.

Chapter 5 concludes this deliverable, providing a comprehensive summary and insightful remarks that encapsulate the key findings and implications discovered throughout the document.

2 Literature review

2.1 Citizen-generated data, Citizen Science, and citizens

Public authorities are currently challenged with finite resources to collect suitable data to inform their policymaking processes. **Citizen-generated data**, as produced within Citizen Observatories and Citizen Science (CS) initiatives, **are seen as providing a source of information for evidence-based policymaking** (Göbel et al., 2019). Citizen-generated data can fill in knowledge gaps and provide evidence for regulatory compliance (Haklay, 2015; Nascimento et al., 2018), while reducing costs related to data collection, validation, and verification at the same time (Fernández-Álvarez & Gutiérrez Ladrón de Guevara, 2022; Nascimento et al., 2018). A recent study from Fraisl and colleagues (2020) demonstrated that CS can contribute to the monitoring of all 17 of the Sustainable Development Goals (SDGs) by providing a primary source of information to measure the progress of at least one indicator per SDG. More specifically, the contribution of CS resides in its ability to provide granular data – therefore filling in temporal and spatial gaps – to inform local decision-making processes (ibid.).

Before going further in this reflection, it is important to clarify some elements of vocabulary. As terms such as ‘Citizen Science’, ‘Citizen Observatories’, ‘citizen-generated data’, and even ‘citizen’ may have different meaning depending on the domain of research, we provide here a clarification for the remaining of this document. While we acknowledge the richness of the debate surrounding the definition of CS, as reported in Haklay et al. (2021), we designate by **Citizen Science** an initiative that “involves scientific research conducted in whole or in part by non-scientists (citizens), often in collaboration with, or under the guidance of professional scientists.” (Veeckman et al., 2021, p. 7). Because they involve citizen participation, CS initiatives can be placed on a continuum ranging from very low participation, i.e., ‘contributory’ or ‘crowdsourcing’ projects where citizens contribute solely as collectors of data, to a very high level of participation, i.e., ‘co-created’ or ‘extreme citizen science’ projects where citizens take part in the problem definition, data collection, and analysis (Bonney et al., 2009; Haklay, 2013). The principal element of interest within this document is the data generated by the participation of the citizen in this process, hereafter referred to as ‘citizen-generated data’. We understand **citizen-generated data** as the data produced by citizens involved in: activities related to collecting observations; measuring or reporting particular variables; or analysing existing data. **Citizen Observatories** can be seen as the concrete link between CS initiatives and citizen-generated data as they provide an open standardised software platform, i.e., a shared ICT infrastructure, enabling the collection, management, and publishing of data (O’Grady et al., 2021). Finally, while we acknowledge that citizenship can be broadly interpreted, we align with Eitzel and colleagues (2017) in defining ‘**citizen**’ as a member of a broadly construed community.

2.2 Citizen science and the policy cycle

CS understood as a source of information can contribute in various ways to policymaking, and as such as been connected to different phases of the policy cycle. In their Technical Report for the European Commission, Schade and colleagues (2017) present the “Cyclic value chain

of Citizen Science” in relation to policymaking, which comprises six phases (Figure 1). Each phase has associated benefits and challenges, which we summarise in Table 1.

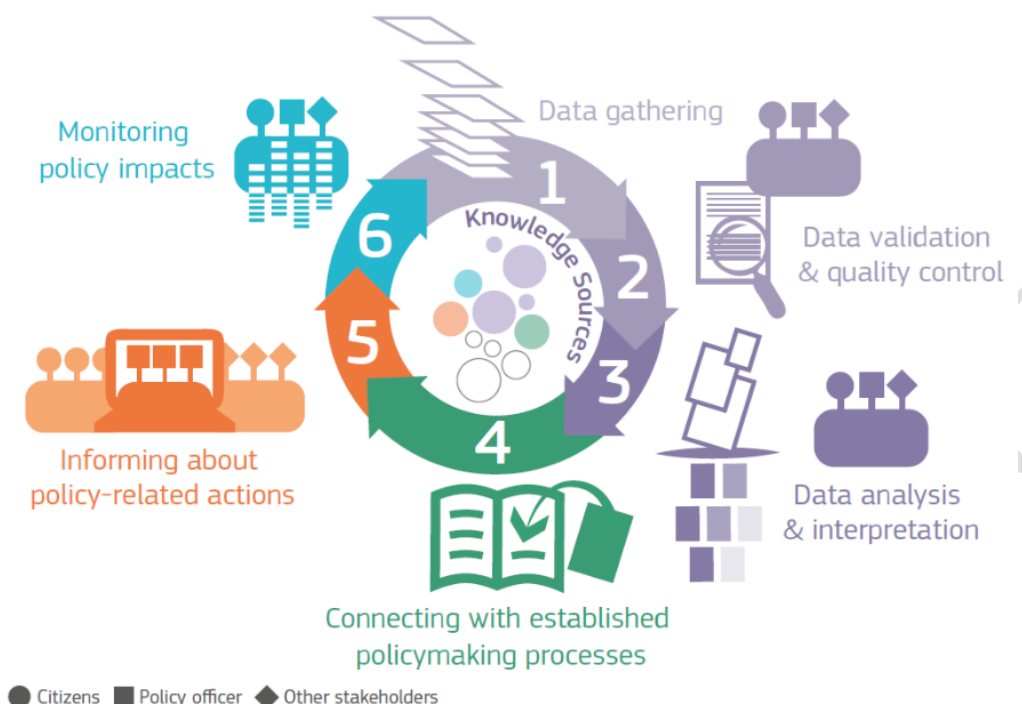


Figure 1: Cyclic value chain of Citizen Science, reproduced from Schade et al. (2017, p.18)

Schade and colleagues (2017) view the integration of CS in policymaking as an **opportunity** to enlarge the evidence base with contributions from citizens, making it more inclusive, robust, and complete. In their view, CS also allows for the consideration of the cyclic nature of policymaking. Contributions from citizens would not only benefit the development of policies but would also provide data to monitor and evaluate the impacts of policies, which can provide new inputs for their revisions and adoption. However, the authors point to the different **challenges** that can make the integration of CS in policymaking difficult. First, there is not a one-size-fit-all process, and solutions for data mobilisation and utilisation need to be tailored to the policy under consideration. Second, integrating different methods and tools, especially when building on existing CS initiatives, is challenging. Third, CS works best with hands-on problems as opposed to abstract ones: over-relying on CS creates the risk of only focusing on obvious, “easy-to-observe” issues and leaving behind more complicated or wicked issues. Finally, although framed as a benefit, there is a current lack of example on how to make use of citizen-generated data for the revisions and adoptions of policies.

Table 1: Benefits and challenges of the six phases of the Cyclic value chain of Citizen Science, selected and summarised from Schade et al. (2017, pp. 19–29) based on alignment with Urban ReLeaf’s interests. Considerations for inclusive participation are indicated in bold font.

Phase	Benefits	Challenges
Data gathering	<ul style="list-style-type: none"> Generation of additional datasets that cover a wider geographic scale and a specific timeframe, while providing more in-depth information about a specific topic 	<ul style="list-style-type: none"> Participants need to be motivated to participate. Harmonised engagement strategies are near to impossible to define in large and diverse territories.

	<ul style="list-style-type: none"> • By providing hands-on tasks, CS creates a first opportunity of interaction with citizens. • The involvement of citizens in data collection can increase the awareness on the specific topic 	<ul style="list-style-type: none"> • Data use from existing initiatives might be restricted. • The quality of the data collected is not assured. • Feedback to citizens is required. • Technical implication might exclude some groups of citizens.
Data validation and quality control	<ul style="list-style-type: none"> • A large amount of data can be processed. • Participants can build experience and learn over time. • Participants can become more interested in decision-making. • Combined approaches with professionals are possible. 	<ul style="list-style-type: none"> • Not all data can be controlled by citizens. • Professionals and authorities do not always recognize the value of quality control by citizens. • When it comes to data for policy, legal requirements do not allow for quality control by citizens only.
Data analysis and interpretation	<ul style="list-style-type: none"> • A large amount of data can be analysed. • Human reasoning can complement automated processes. • Leads to deeper engagement of participants by 'understanding the data'. • Inclusion of diverse viewpoints. • Deeper interaction between citizens and scientists. 	<ul style="list-style-type: none"> • Not all analysis can be conducted by citizens, and sufficient training needs to be provided. • Scientists or experts in the field still need to be involved to complement the analysis and interpretation of the data • It may only be possible to motivate a limited number of participants, depending on the complexity and time requirements of the analysis. • Interpretation can vary, and it can be difficult to process all inputs needed. • Language issues must be considered.
Connecting with established policymaking processes	<ul style="list-style-type: none"> • Benefit from the extended evidence base, that also considers multiple contributions from citizen and is therefore more complete. • Scientific contribution to policy is strengthened. • Participants get the feeling of contributing to "something bigger". • Policies can be better understood by citizens. • Policymakers can provide a bottom-up rationale for their decision. • Policy can be further tailored to the local context based on the contributions from the citizens 	<ul style="list-style-type: none"> • Policy requirements and citizen science offers do not always coincide. • Not all data flows can account for citizen's contributions. • Scientific evidence is only one part of the decision-making process, and expectations of citizens might need to be lowered. • Diverse approaches from different Member States, regional and local frameworks may make it difficult to consider all contributions equally.
Informing about policy-related actions	<ul style="list-style-type: none"> • Helps to motivate and retain participants. • Helps to trace decision-making. • Alternative, unforeseen solutions stemming from contributions need to be considered. • Can lead to more active citizenship. 	<ul style="list-style-type: none"> • The temporal gap between the contribution and the political decision may lead to "lose" the connection with citizens. • Tailored communication channels need to be set-up. • It may be impossible to trace a contribution through the full decision-making process.

<p>Monitoring impact policies</p>	<p>of</p> <ul style="list-style-type: none"> • Citizens become co-owners of the policy. • Closer and more timely monitoring. • Better and faster implementation of the policy at local level due to citizens' interest. • Increased trust in policies. 	<ul style="list-style-type: none"> • The difference between monitoring a phenomenon and a policy may be a source of confusion because of the level of abstraction. • The time required to cause a change may demotivate citizens. • Citizens might feel they are "policing" their neighbourhood.
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2.3 Inclusive participation and considerations for social justice

Although not pointed out by Schade and colleagues (2017) themselves, some of the benefits and challenges identified by the authors are **linked to the inclusivity of the participatory process of the activities**. As indicated in bold in Table 1, CS can: foster the inclusion of diverse points of view; include multiple contributions of citizens, making as such databases more complete; and foster the consideration of alternative solutions stemming from citizens' contributions. At the same time, the exact motivation(s) of citizens to participate can impact the quality of the data collected; tailored engagement strategies, communication campaigns, and language need to be implemented depending on the target groups; and technical elements, complexities, and time requirements might exclude some groups of citizens.

However, while there is growing discussion around the potential of CS to include new social groups, raising awareness and interest in scientific endeavours, somewhat ironically barriers to participation are often too high for many social groups, including vulnerable social groups, making CS subject to the same exclusionary processes that are reflected on a wider societal level (Varga et al., 2023). The current demographics of such initiatives demonstrate that without targeted efforts, the potential benefits of CS are unlikely to be realized (Haklay, 2015). Indeed, CS initiatives have historically failed to realise inclusive participation strategies, with an overrepresentation of the same profile in CS activities: white middle-aged man from a higher education and higher socioeconomic background (Cooper et al., 2021; Haklay, 2015; National Academies of Sciences, Engineering, and Medicine, 2018; Pateman et al., 2021; Vasiliades et al., 2021). Likewise, CS initiatives have so far disproportionately involved citizens who already have the resources (i.e., time and capital) to engage with policy in the first place (Nascimento et al., 2018).

This lack of inclusive participation in CS initiatives echoes other debates within the environmental and climate domain. More specifically the social justice scholarship has been concerned with questions of environmental, climate change, energy, and urban justice. Hughes and Hoffman (2020) synthesise these strands of literature highlighting the imperative consideration for not only the distributions of the costs and benefits associated with climate change but also those of the actions proposed to face it, together with the importance of inclusive planning and decision-making at the earliest stage. As pointed out by the authors, principles of distributive justice, procedural justice, and recognition justice are central to remedy wrong and improve decision-making. These elements, also referred to as the triumvirate of tenets of justice (McCauley et al., 2013), hereafter designated as the **'three key tenets of justice'**, offer a comprehensive understanding of how the consideration of different elements of social justice ties back to inclusive participation.

Procedural justice directly refers to **inclusive participation**. It consists of to the equitable involvement of all stakeholders in a non-discriminatory fashion (Walker, 2009). It states that

all groups of society ought to be able to access and take part in decision-making processes, and that inclusive participation should be enhanced for transparent decision-making (Jenkins et al., 2016). Therefore, it requires appropriate engagement mechanisms that are sensitive to the lived experience of the different groups of citizens to be involved (McCauley et al., 2013). Unlike more common forms of citizen participation in policymaking, such as public opinion polling and public consultation, the procedural justice perspective recognises that meaningful participation is more than a matter of simply asking people for their opinions (Joshee & Goldberg, 2005). Procedural justice promotes just outcomes through three mechanisms: local knowledge mobilisation, greater information disclosure, and better institutional representation (Jenkins et al., 2016). *Within CS, this implies recognising the need for inclusive engagement strategies that take into consideration the predefined target groups and their associated characteristic(s), and that allows for appropriate mechanisms of participation (e.g., data collection) for all.*

As procedural justice requires the consideration of the different groups of citizens constituting society, it is tightly connected to recognition justice. **Recognition justice** is the recognition of the rights of all individuals in society. It calls for the acknowledgement of the divergent perspectives, which are rooted in social, cultural, ethnic, racial, and gender differences among individuals (Fraser, 2009; Schlosberg, 2003). A lack of recognition for different groups of citizens can lead to the misrepresentation and misinterpretation of people's views (McCauley et al., 2013). *In the context of CS, this implies recognising the different target groups that are to be engaged and their differing lived realities in terms of, e.g., time capital, digital literacy and capacity, or physical capacity.*

Distribution justice identifies the uneven allocation of benefits and burdens and their associated responsibilities (Walker, 2009). This tenet has a spatial and a temporal focus, meaning that the consequences of a specific element are being analysed through their distribution both in geographic terms and over time (Wood & Roelich, 2020). *For CS, this implies recognising not only the current impact that the subject of research has on the participants (i.e., environmental injustice in the access of greening, and the associated benefits and burdens), but also the impact of the CS activities themselves (e.g., geographical representativeness of the data which will serve as basis for decision-making, representativeness of the perception of heat within the population, etc.).*

2.4 Scoping review: the role of citizen science in urban greening policies and considerations for social justice

CS has received increased attention from a policy perspective and is closely linked to environmental monitoring. That said, the integration of citizen science and citizen-generated data within the field of urban greening policies is only nascent. To assess the current state of knowledge on citizen-generated data for inclusive urban greening policies, we conducted a scoping review on the subject. Our choice of methodology is supported by the fact that scoping reviews are helpful in identifying and mapping the available evidence, examining how research is conducted, and identify knowledge gaps in a given field (Munn et al., 2018). We searched the databases *Scopus* and *Web of Science* with the following string:

("citizen science" OR "citizen generated" OR "citizen observations") AND ("urban green")
AND polic**

Scopus retrieved 11 articles, Web of Science 14, and after deleting duplicates and irrelevant articles, the total sample of articles was 13. The articles were scoped to provide a better understanding of: (1) the type of urban greening activities citizen science has been applied to, with an aim to contribute to policymaking; (2) the phase of the policymaking process on which the CS initiatives is having an impact; (3) whether specific attention has been paid to the key tenets of justice. We offer a short analysis below, which is also reported in a table in Appendix A.

The articles focus on various urban greening initiatives, such as those related to the restoration of vacant built spaces into green spaces; urban forestry; domestic gardens as contributors to the city's green infrastructure; the composition of domestic gardens; impacts of urbanisation on urban green spaces; public perceptions of environmental quality, exposure to green spaces, and the effect of green space exposure on health; environmental factors influencing access to, and use of blue spaces; use of green spaces; urban green and blue spaces and their effect on health; biodiversity; distribution of allergenic plants and their impact on health. **Overall, the studies focus on mapping green spaces and their quality, and on linking green and blue spaces with health-related impacts.**

The impact of the citizen-generated data of these initiatives is broadly portrayed: citizen-generated data is seen as having a strong potential influence to support **agenda setting and policy formulation** (9/13) and, to a lesser extent, to support **policy evaluation** (5/13). These are however claims made by the authors and have not been demonstrated in the articles themselves.

Consideration for the three key tenets of justice is scarce within the articles. Some articles mention a representative sample of participants (Baker et al., 2018; Grazuleviciene et al., 2020; Hunter et al., 2022), while others are concerned with questions of representation and possible bias in the data collected (Mishra et al., 2020). Others simply do not address the subject (Callaghan et al., 2019; Cambria et al., 2021; Cavan et al., 2021; Dujardin et al., 2022; Rossi et al., 2022; Wang et al., 2020). **Overall, there is currently a clear lack of the integration of question of social justice (all three key tenets) within the literature on the use of citizen-generated data for urban greening.**

From the 13 articles reviewed, it is worthwhile mentioning the work carried out by Fernández-Álvarez & Gutiérrez Ladrón de Guevara (2022). In their study, the authors point out that while sociodemographic variables such as marginalisation levels, race, and gender have been extensively investigated in distributional environmental justice studies, they have never been studied in the context of the distribution of citizen science observations. To bridge this gap, the authors present an analysis of two variables associated with citizens' observations: their surrounding built environment and their socio-demographic characteristics. The authors report interesting results: first, municipalities without natural protected areas have reported more observations on the iNaturalist platform – municipalities with natural protected areas reported dissimilar results amongst themselves. Second, the majority of observations are concentrated in municipalities with medium socio-economic status, while the highly marginalized areas do not receive much less than affluent areas. Contrary to expectations, this study showcases that citizen science participation can be concentrated in municipalities with middle, high, and very high marginalization levels. As the authors state, **this represent promising initial findings pointing out that municipalities with a high level of marginalization, which have historically been underserved and under-monitored because of a lack of resources, can**

greatly benefit from participating in environmental monitoring campaigns. However, while the findings are encouraging for the field of urban environmental monitoring and the use of more inclusive data for policymaking, it must be emphasised that their study focused on geographical coverage of the observations and not on the inclusive participation of diverse groups of citizens.

The results of this quick scoping review reflect the relative novelty of Urban ReLeaf's activities. To date, there has been a limited number of studies on the link of citizen-generated data for inclusive urban greening policymaking, and within those, even less have been concerned by the question of inclusive participation, or justice more broadly.

Future activities, such as the ones carried out within Urban ReLeaf, should pay specific attention to the three key tenets of justice (recognition, procedural, distributional), especially if the observations collected are to be compared with perceptions, attitudes, and behaviours of the citizens involved.

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3 Methodology

The activities and results of **T2.1** reported in this document directly contribute to the activities of **T2.2 “Co-create inclusive strategies for the Urban ReLeaf pilots”** and are connected through the PAR4P methodology. The PAR4P methodology is a specific Participatory Action Research (PAR) approach with a focus on policy development developed by the VUB (imec-SMIT, VUB). PAR is an approach based on the active participation of the individuals directly concerned by the subject of study in the definition of the problem(s) and formulating of solution(s) (Baldwin, 2012). The PAR4P approach aims to go a step further and adopt a more pragmatic approach through an intensive collaboration with policymakers, increasing the possibility that recommendations will be effectively translated into public policies (Laenens et al., 2019). The PAR4P methodology contains five steps:

- (1) **problem definition**, where the general issue that needs to be solved is defined;
- (2) **participants identification**, where individuals affected by the issues are identified;
- (3) **problem re-definition**: where participants have the possibility to re-define the problem if needed;
- (4) **solutions identification**, where desirable and achievable solutions are identified, together with the actor that can carry on the activity;
- (5) **solution formulation**, where a concrete scenario is drafted.

Within WP2, the PAR4P methodology will be implemented as illustrated in **Error! Reference source not found.**: the activities of T2.1, which results are reported in this document, will focus on step (1) and (2), working towards a definition of the ‘problem’ to be solved in each pilot city, and identifying the relevant actors that constitute the ecosystem around it. T2.2, reported in D2.2, will focus on re-defining the previously identified problem, generating solutions, and concretising those solutions (i.e., in the form of inclusive strategies of engagement).

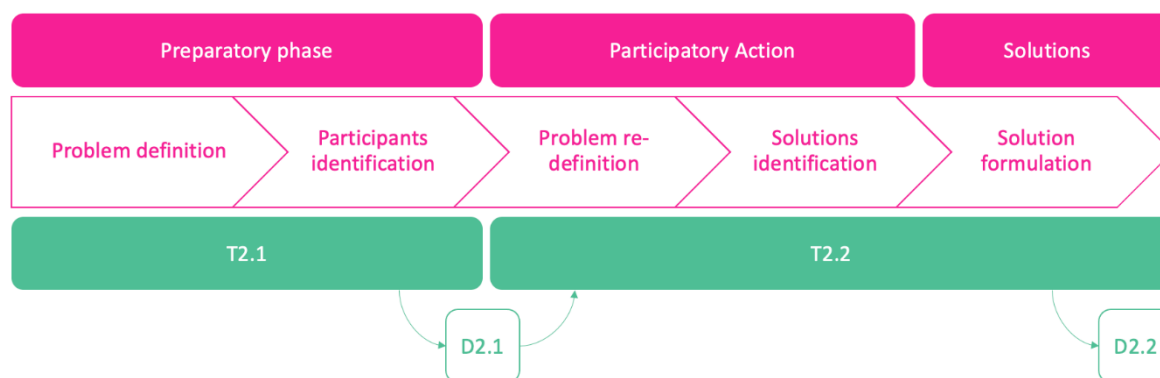


Figure 2: PAR4P within WP2

To establish the ‘problem’, as formulated within the PAR4P methodology, this deliverable assesses the current landscape of citizen-generated data for urban greening planning and decision-making in the six pilot cities of the Urban ReLeaf project (Athens, Cascais, Dundee, Mannheim, Riga, and Utrecht). To do so, two subsequent research activities were conducted in each city: (1) a policy review and (2) expert interviews.

In the next sub-chapters, we describe the research activities, their goals, and the methods implemented. In Chapter 4, the results of the research activities are integrated and presented as a unified account of the landscape of each pilot city.

3.1 Policy review

First, we conducted a **review of existing policy documents** on (1) environmental policies (e.g., those related to climate action, environmental protection, and urban greening); and (2) participatory policies (e.g., those related to participatory governance, citizen engagement, and participatory budgeting) in each pilot city. The pilot cities of the Urban ReLeaf project provided a wide variety of policy documents including action plans, regulations, guidelines, development programs, and strategy documents, which we detail for each city in Chapter 4. Policy documents that were not provided in the English language were translated using the online translation system DeepL Translator.

For the analysis of the documents, we used the methods of “quick scanning” and “close reading”. The quick scan analysis is a fast and systematic way of identifying a set of relevant elements within a large body of text (Lordache et al., 2017). To do so, we identified four relevant categories of indicators to investigate, based on the scope of the project: (1) participation; (2) greening; (3) citizen-generated data; (4) vulnerable groups. Through an iterative process, key search terms were defined in each category, as described in Table 2. The Quick Scan analysis was conducted through the “Text Search & Autocode” function on the MaxQDA software. Each retrieved sentence was auto-coded according to the categories to which the key search term belonged.

Table 2: Key search term used to conduct the Quick Scan analysis.

Participation	Greening	Citizen-generated data	Vulnerable groups
Particip* Collaborat* Volunteer* Monitor* Citizen*science Civic*science Community*science Open*science Crowdsourcing Contribut* Co*creation Co*produc* Co*design*	Green* Tree* Vegeta* Park* Forest* Wood* Flower* nature	Data gap Sensor Record observation	at risk marginal* vulenrabl* minorit* wom*n youth young* elder* old* refugee* immigrant* migrant* poor* homeless* disable* low* socio-economic depriv* disadvantage*

In a second step, a close reading was conducted on each retrieved text segment. The method of close reading is useful for capturing underlying meanings (Schur, 1998). Each retrieved segment, after having been assessed for relevance, was then analysed to provide an overview of the situation in each pilot regarding greening and citizen participation. More specifically, the analysis of the documents focused on:

- (1) identifying the general current situation in each pilot in regards to greening/climate and participation;

- (2) identifying the future visions of the city;
- (3) understanding the envisioned role of citizen within greening activities and whether considerations for inclusive participation and justice were taken (consideration of the existence of different groups – recognition justice, inclusion of different groups – access/procedural justice, consideration for the differential impact of policies on different groups – distributional justice);
- (4) highlighting the current barriers and gaps to greening;
- (5) identifying relevant stakeholders;
- (6) identifying relevant initiatives;
- (7) identifying relevant tools and platforms

3.2 Expert interviews with local authorities

After reviewing the policy texts, expert interviews were organised by each pilot city with relevant members of their local authorities. Each pilot partner selected the experts at their own discretion based on their knowledge of the different departments and services in their administration, and whether they had pertinent expertise to share regarding the pilots' foreseen activities. The experts were civil servants working in climate associated departments and services within the cities, or in participation related departments and services. A more detailed description of the profile of the experts can be found in each sub-chapter under "Ecosystem mapping" in Chapter 4.

Each pilot city received a tailored guiding template from the VUB team to conduct the expert interviews (see Appendix B). The templates were based on the results gathered during the previous policy analysis. More specifically, we were interested in leveraging interviewees' expertise in:

- (1) Identifying whether Urban ReLeaf's scope is relevant to their agenda;
- (2) Identifying instances where citizen-generated data was used in their city;
- (3) Validating the completeness of the list of policy documents reviewed;
- (4) Based on the policy review, identifying the most pressing gaps and barriers, and adding any if necessary;
- (5) Based on the policy review, identifying the most pressing citizen groups to target, and adding any if necessary;
- (6) Based on the policy review, identifying the relevant stakeholders, and adding any if necessary;
- (7) Based on the policy review, identifying the relevant initiatives, and adding any if necessary;
- (8) Based on the policy review, identifying the relevant tools and platforms, and adding any if necessary.

4 Results: landscape reports of the Urban ReLeaf pilots

In this chapter, the results of the research activities are integrated and presented as a unified account of the landscape of each pilot city. Each pilot city's landscape is presented in three parts. First, a **synthesis of the current general situation** of each pilot regarding greening and climate, participation, their **visions for the future**, as well as the envisioned **role of citizens** in the process.

Second, a **visual overview** is presented with the city's **ecosystem** of potential quadruple helix stakeholders (i.e., public, private, academia, and civil society). This is a preliminary identification and mainly serves as a repository of relevant stakeholders to involve in the future activities of the project (cf. WP4 and WP6), and as such, we do not provide a detailed description of each entity. We provide however a more detailed description of the experts that participated in the interviews, and which are considered as an integral part of the ecosystem.

Finally, we provide a **synopsis of opportunities for inclusive citizen participation** processes in environmental data-collection, in which we explain how Urban ReLeaf's foreseen tools are anticipated to address the gaps and barriers identified in the research activities and identify potential synergies with existing tools and initiatives.

4.1 Athens' landscape report

4.1.1 Current situation, future visions, and the role of citizens

According to the *Athens Resilience Strategy for 2030*, Athens currently lacks climate protection: new public works and building construction disregard climate conditions, there is insufficient legislation on energy and environmental protection, and the city's infrastructure is ageing, leading to an increased heat island effect. The city also has a fragmented governmental structure and overlapping jurisdictions. It also experiences earthquakes. Athens also the recent years has faced a difficult socio-economic situation, with high levels of unemployment, poverty, homelessness, a large influx of refugees, and demonstrations of violence and civil unrest. The analysis that took place for the formulation of the Athens Resilience Strategy identified the City Centre of Athens as being in economic and social decline and noted instances of energy poverty. Critically, one of the major challenges identified by Athens is the level of mistrust between citizens and public services.

The visions of Athens as described in the *Athens Resilience Strategy for 2030* is framed by four pillars: an open city; a green city; a proactive city; and a vibrant city. The **open city** pillar clearly states the intention of Athens to better collaborate with its residents by fostering **data-driven policymaking** and accountability, to "win back the trust of its people" (p. 48). The use of digital tools is portrayed as playing a central role in this process by allowing Athens to become a more transparent and accountable city. Technologies such as Internet of Things (IoT) are presented as an opportunity for Athens to rely on in the future, as the city currently employs "obsolete technologies" (p.51) and faces the challenge of insufficient human resources.

The **green city** pillar reflects the intention of the city to integrate natural systems into the urban fabric, meeting the human need for proximity to nature, and enabling Athens to withstand climate change and environmental challenges.

The **proactive city** pillar contains the specific goal of "[e]mpower[ing] the municipal representatives as well as the voice of the local community", which would target the gap between the city and its residents. With it, Athens recognises the importance of the collective intelligence of its citizens: "The goal is for the municipal authorities to help address the citizens daily challenges as well as to capitalize on the opportunities that different individuals and groups of people bring to the city" (p.147).

Finally, the **vibrant city** pillar exposes the city's intention to be more inclusive, promoting well-being, creativity, and entrepreneurship. Goal A, "Enhance the city: identify and promote new type of belonging", with the action "Green and Culture Urban Corridors", embodies the will of Athens to create green corridors throughout the city. Overall, the Urban ReLeaf project is well in line with the city's goals and ambitions.

"By 2030 Athens strives to be a responsive, embracing and inspirational city, that is proud, green and citizen-led" (Athens Resilience Strategy for 2030, p. 19)

Citizens are envisioned as having an active role in this resilience strategy, specifically in supporting the most vulnerable groups of the population. Specific groups are also being recognised as distinct entities which are portrayed as representing a "vital opportunity" (p.12) for the city. However, the framework also indicates that currently, a vast majority of the population believes that there is no participatory decision-making in Athens, and that citizens are unaware of what is happening in the city. In this narrative, the citizens are still portrayed as passive subjects to which "the dynamic status and performance of the city" must be "demonstrated" (p.51), which does not align with Athens's intention to undertake more citizen participatory process. Although this gap persists, a set of initiatives that are put into place by Athens such as 'SynAthina', 'Adopt-a-tree', or 'Adopt-your-City', as further described in chapter 4.1.3 of this deliverable.

Overall, the resilience strategy recognizes the role of diverse groups of stakeholders, such as university students and migrant women, in investigating as many opportunities as possible for a holistic, long-term, and realistic resilience-building plan for the city. **The document ends by an open call to join their effort, which could be aligned with the Urban ReLeaf's objectives.** This open call is reiterated during the expert interviews, where expectations regarding the results of Urban ReLeaf have been shared: "*We expect Urban ReLeaf to develop it [a participatory tool]*" (A2 - Department of Resilience and Sustainability); "*We propose that the project will develop new digital tools that could have application in Athens and could enhance our administrative work and action on the trees' maintenance. We are not aware of such tools*" (A3 - Department of Greening and Urban Fauna).

The program is based on the belief that public space belongs to everyone and its upgrade and sustainable development should be a priority of every healthy and productive group of the city. (Athens Partnership, 2021)

While the city aims to develop a capacity building program for participatory governance, there is currently no standalone vision for citizen participation. This topic was also discussed during the *expert interviews*: some experts pointed out that citizen participation is included in the plans of the city, mainly through online deliberations (A2 – Department of Resilience and Sustainability). Others indicated that they rather viewed citizens in a passive role as visitors or consumers of the city assets (A4 – National Garden), or that citizen participation was not (currently) relevant for their activities – although they mention in the same answer that they were lacking tools and solutions for the monitoring and administration of green areas that could reduce their workload, which could imply that they see citizen participation as a potential solution (A3 – Department of Greening and Urban Fauna). Likewise, there is almost no instance of processing and integration of citizen-generated data in Athens: a survey was disseminated during the preparation of the Climate Action Plan (A1), and it appears citizens can map trees outside their home (A4), but these appear to be the only instances.

The expert interviews and the policy review present a common story: Athens is willing to open up to more citizen participation, as demonstrated by the SynAthena platform and Adopt your City initiative. However, their current level of maturity and experience with it can be considered as low, as attested by the lack of specific policies on the subject. Local authorities and actors are starting to realize the potential of citizen-generated data to efficiently enhance their activities and decision-making.

4.1.2 Ecosystem mapping

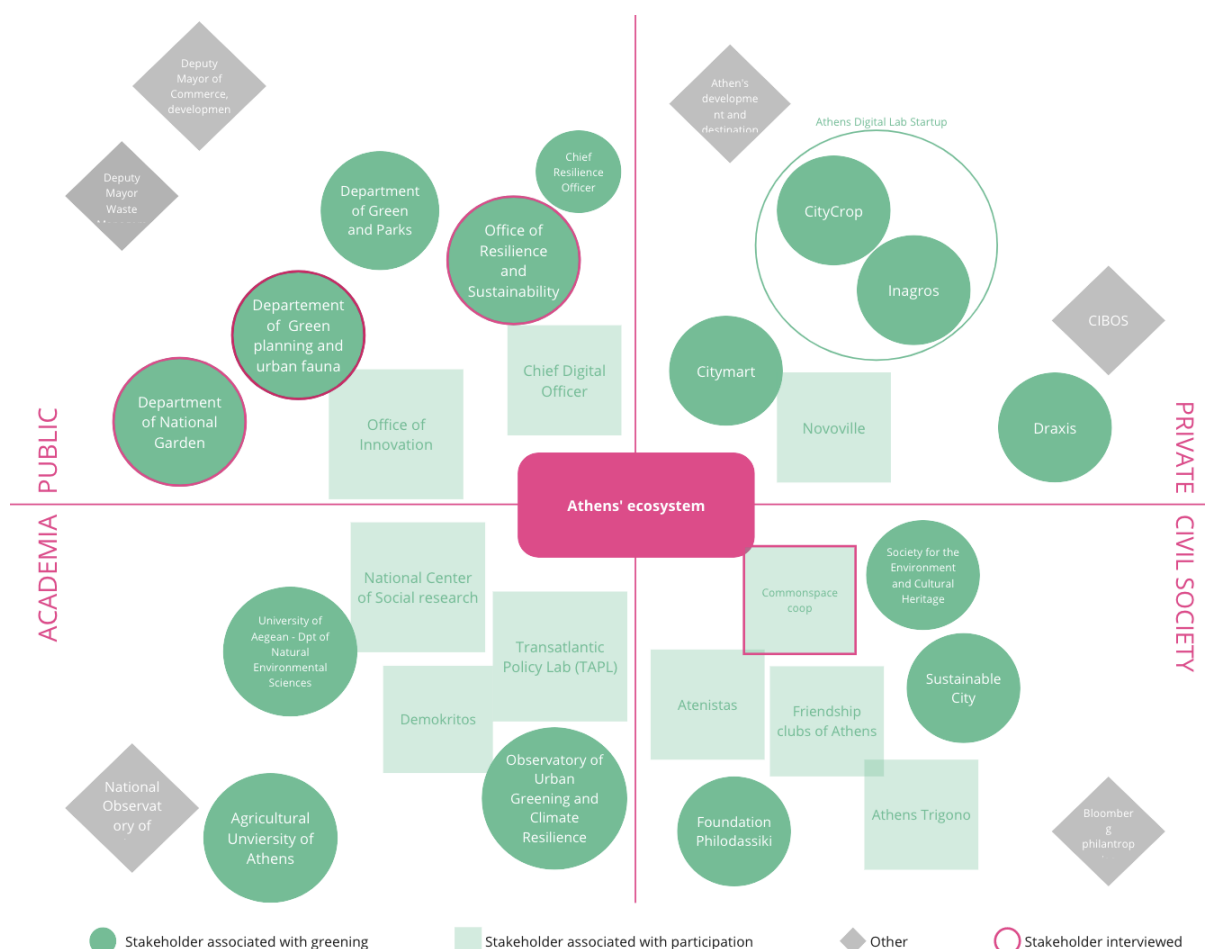


Figure 3: Athens' ecosystem mapping

A broad ecosystem was identified for the pilot of Athens, with stakeholders from the public sector, private sector, academia, and civil society equally represented. The **experts** interviewed were from following entities (also displayed in pink circle on Figure 3):

- A1: “Participatory Lab for Climate Change Adaptation” of Commonsense Coop
- A2: Department of Resilience and Sustainability
- A3: Green and Urban Fauna Department
- A4: National Garden Agency

4.1.3 Identification of opportunities for inclusive citizen participation in data-collection

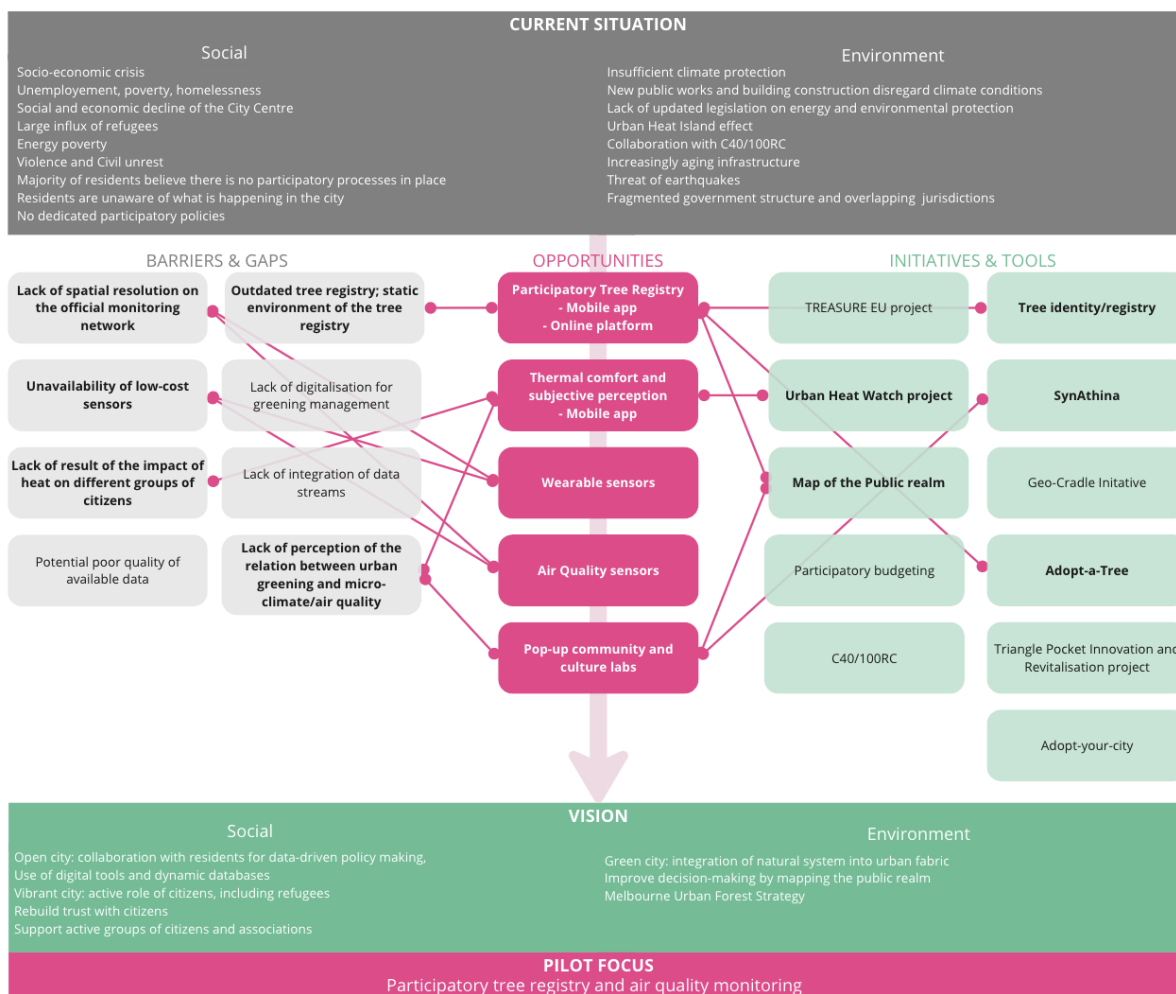


Figure 4: Athens's identification of opportunities

Different goals and supporting actions of the *Athens Resilience Strategy for 2030* represent opportunities for Urban ReLeaf’s activities. First, the supporting action I.A.1 “Open Data” of the framework clearly puts forward the use of **digital tools** to become a more transparent and accountable city: digital and dynamic maps (GIS maps), dynamic databases on monitoring indicators, sensors and other technologies such as IoT (Internet of Things) are presented as an opportunity for Athens. This **represents an entry point for Urban ReLeaf to showcase the value of inclusive citizen-generated data for the decision-making processes of Athens**. As example, a “Tree Identity” (I.A.1.5) project is described which will create a registry of the existing trees in Athens (e.g., position, type, occupancy, age, classification, and canopy), which does not currently exist on the city-scale. The document however does not mention the potential use of citizen-generated data to complete this registry but informs that the city services are working on it with the Agricultural University of Athens. This project would represent a perfect opportunity for Urban ReLeaf’s activities. The expert interview (A4) inform that such mapping would be especially relevant for trees situated in streets, rather than for trees situated in parks.

Second, the supporting action **I.B.4 “Map the public realm”** informs us that the City of Athens will map all the public open space areas across the city to create a dynamic registry. Although the goal of the city, which is to identify any obstacles that make the city less walkable and appealing, doesn't directly focus on urban greening, an integration with Urban ReLeaf could be offered. This is especially interesting from an inclusive participation perspective as the city aims to use this data to understand how these spaces can be improved. Currently, the strategy appears to be rather “top-down”, with “city architects and urban planners (...) assembled in order to advise the Mayor and propose solutions for public space design and usage” (p.67). **Consideration for the perception of the open public (green) spaces by various groups of citizens, such as through the collection of citizen-generated data, could be beneficial for the improvement of the City of Athens.**

Finally, the supporting action **I.C.2 “synAthina platform”**, focusing on the goal of fostering collaboration and engagement, was launched in July 2013 and aims to support citizens' groups engaged in improving the quality of life in the city, and enables the city to listen to the needs of its people. The website platform was funded by Bloomberg Philanthropies after being one of the five winners of the 2014 Mayor Challenge. The original goal of the platform was to rebuild trust and encourage collaboration between citizens and the municipality, and to support the vibrant civil society that had emerged following the financial crisis and that was working to improve local neighbourhoods (Innovation Unit, n.d.).

The report *Lessons Learned from SynAthina (How can local government work productively with citizens to promote the wellbeing of the city?)* describes that “[c]itizens who submit ideas (on the platform) are then connected to the relevant local government representatives, nongovernmental organizations, and private businesses that can help make their ideas a reality” (p.5). Although not specifically related to urban greening, **the synAthina platform can represent an opportunity for Urban ReLeaf to network and connect with local NGOs and other grassroots groups**, allowing the project to involve diverse groups of citizens in its activities. Second, one of the key methods of the platform is to work with open calls: any organization can invite proposals from citizens or other organizations to respond to a particular need or challenge (Innovation Unit, n.d., p. 21). Although until recently, the authors of open calls were mainly groups of citizens, municipal services and departments have started to use open calls to ask the city's creative forces to submit ideas and solutions for the city's problems. **Urban ReLeaf could make use of these open calls to create engagement around its activities.** However, specific attention should be paid to a non-digital avenue for recruitment in parallel to the SynAthina platform.

The City of Athens has also implemented the “**Adopt your city**” program, which is a “platform that brings together the City of Athens and the private sector. The program includes city interventions of all scales throughout Athens. Interested parties are invited to contribute to the work of the Municipality of Athens with ideas, infrastructure, and funds” (Athens Partnership, 2021). The program is addressed to citizens, but also to any other party interested in “adopting” a street, a sidewalk, a park, a square, a playground, a stadium, or a neighbourhood and making them “brighter, greener, more friendly to residents and visitors”. The program encompasses different initiatives, amongst them a specific focus on **Pocket parks**, as underlined during the experts' interview (A3 - Department of Resilience and Sustainability). Participants can register through a form on the website. **Urban ReLeaf could align with this initiative's objectives by providing citizen-generated data-driven to support decision**

making for urban greening. Similarly, the City of Athens also has a partnership with the tech start-up Novoville with which they are operating the “**Adopt-A-Tree**” initiative.

4.2 Cascais’s landscape report

4.2.1 Current situation, future visions, and the role of citizens

The City of Cascais is described in the *Climate Change Adaptation Action Plan* as subject to high climate change impacts, such as an increased temperature of 1.2 to 3°C in the summer by 2100, a decrease in average annual precipitation but an increase in extreme precipitation events, and rising sea levels. Cascais’s participatory process is well-established and its participatory budget places Cascais among the outstanding municipalities in Europe. 70% of its residents believe climate change is a threat to their livelihoods, but only 34,3% believe it is “a priority for political action” (p.28).

The *Climate Change Adaptation Action Plan* of Cascais frames the impact of climate change on the daily lives of its citizens as a main concern. Citizens are central in this plan, which aims to strengthen community resilience, enhance opportunities for sustainable development, and support the active participation of people in environmental policies.

“We want to mobilise society because only then can we create symbiotic relationships and be efficient in the management of resources. We want to act, because only in this way will we be able to prepare Cascais and its citizens for the future.” (Climate Change Adaptation Action Plan of Cascais, p. 7)

The process of planning and prioritisation of adaptation measures involved the participation of citizens and residents through technical training workshops, seminars on climate change, and a survey on climate change. This participatory process, that counted also with the participation of multi-disciplinary experts, produced the basis for the 13 measures that are part of the Action Plan. The survey specifically allowed for the identification of the main barriers and opportunities for adaptation in the municipality and an assessment of the extent to which citizens value the need for the municipality to invest in making the city more resilient. On top of recognising the importance of citizen involvement in the co-creation of the measures, the Plan also underlines the importance of local communities in their implementation. A rating of the 13 measures in terms of efficiency and effectiveness is based on a number of different criteria, including a specific focus on social elements such as social equity, inclusion of vulnerable communities, side effects for society, and equitable distribution of the positive impact on different communities.

The summary document of the *Green spaces and tree protection regulation* reiterates the importance of citizen involvement by envisioning the possibility of citizen-led management of green spaces through the signing of a cooperation protocols (p.8).

The publication of “*A city starts with people*”, the dedicated document on Cascais’s participatory budget, points out to a total of 15.8 million €, 88 projects selected by citizens, and over 219,000 votes over the six editions. In the domains covered by the projects selected by the citizens, the projects focusing on the creation and/or qualification of green spaces were in second place. For Cascais, the emphasis on participatory budget is fundamentally a way to deepen their participatory democracy process, bringing to the core of the decision-making process all citizens who have been marginalized by consecutive breaches of trust.

“[The participatory budget] is an exercise that decentralizes decision-making power from politicians to people, involving citizens in the process and dramatically increasing scrutiny over executive and bureaucratic power” (A city starts with people, p. 5)

The participatory budget has acted as a steppingstone for the participatory processes in Cascais with the creation of the municipality’s Citizenship and Participation Division and the progressive introduction of new citizen engagement tools. The city decided to integrate these tools into a systemic vision: the *Municipal Participatory System (Cascais Participa)*. The citizens are at the centre of this system, where they decide the type of action and the type of participatory practices, they want to take part in, depending on their availability and interests. The system presents the opportunity to citizens to take part in six phases: consult; co-create; collaborate; co-decide; co-plan; and co-manage. Citizens are viewed as strategic partners and not only as public policies’ beneficiaries. The municipal participatory system has a strong inclusion component and is designed with the intention of being accessible, “leaving no one behind”. The document specifies that the system intends to achieve the 17 Sustainable Development Goals, recognising that the complexity of their implementation requires the participation of everyone, including citizens:

“In order to ensure the universality of the System, City Hall assumes the need of different practices, guaranteeing access conditions to all social profiles, with particular concern for under-represented groups.” (Cascais participatory system, p. 10)

The *expert interviews* corroborate the strong presence of participatory processes in Cascais. The municipal agenda has given more emphasis on the need to listen to its citizens and include contributions and perspectives in government action (C3 - Department of Citizenship) and may become even more prominent if the participatory processes go towards the integration of participation within the design phases of projects, and not only in consultation phase (C2 - Department of Communication and Citizen Service).

The experts inform us that while projects like CoastSnap (monitoring of beaches) have taken place in the past, and other initiatives such as Data4All and FixCascais are collecting data from citizens, there are no ongoing monitoring or citizen science initiatives (C2, C3, C5). This represents a clear opportunity for Urban ReLeaf to fill the gaps and demonstrate the relevance of citizen-generated data as an addition to the participation mechanisms in place in Cascais, and as a source of data on subjects relevant for the city, such as for measure 12 of the Climate Change adaptation Action Plan, that is more representative of local realities.

Cascais has a well-established participation strategy that also considers multiple dimensions of justice (access, participation mechanisms, distributional consequences). This lays fertile ground for the activities of Urban ReLeaf, which can leverage the city’s expertise on its participatory activities and tools. At the same time, the integration of citizen-generated data is still relatively novel in the city.

4.2.2 Ecosystem mapping

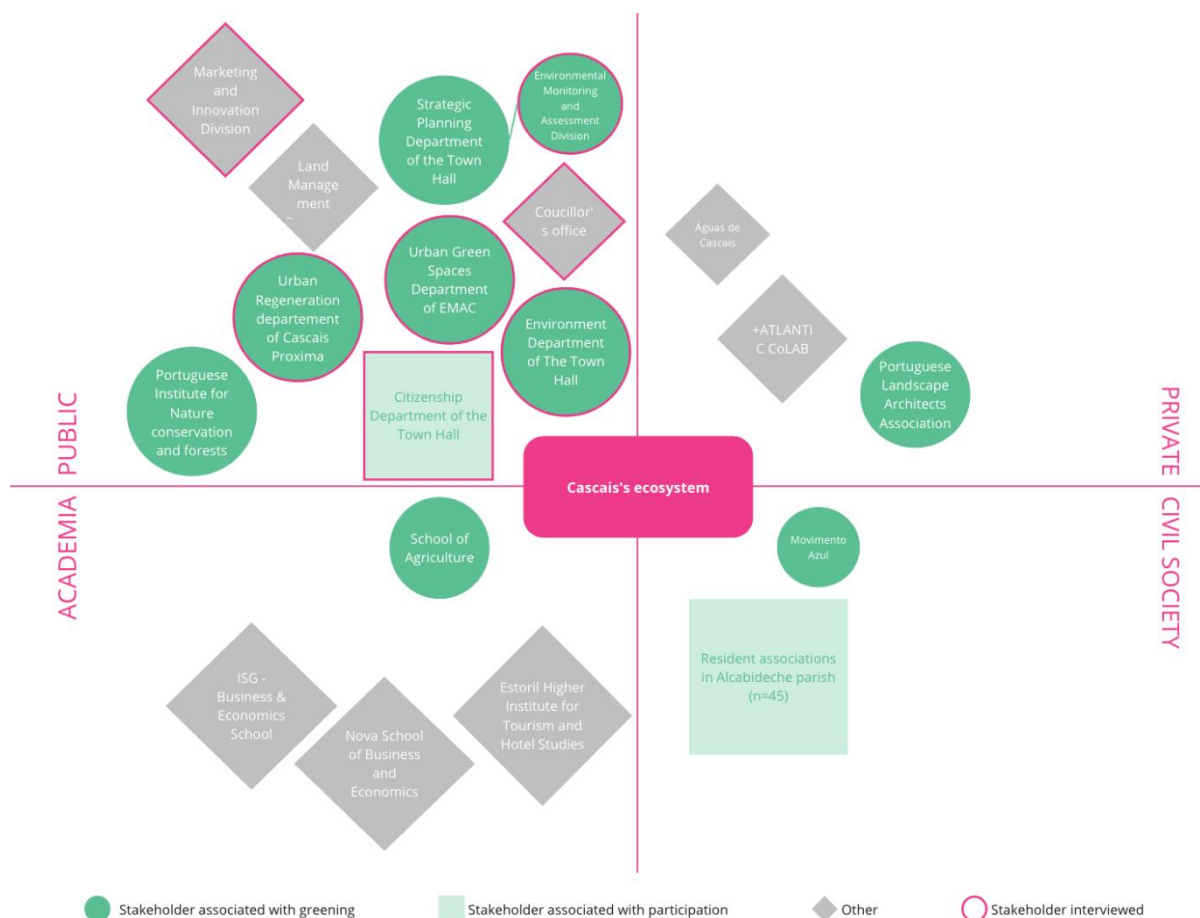


Figure 5: Cascais ecosystem mapping

The ecosystem identified for the pilot of Cascais is primarily composed of public entities, with a strong identification of relevant departments and services within Cascais's administration.

The **experts** interviewed were from the following entities (also displayed in pink circle on Figure 5):

- C1: Environmental Department of the Town hall, division of Green Infrastructure Management (management, construction, and maintenance of municipal green spaces)
- C2: Department of Communication and Citizen Service, division of Marketing and Innovation (support in data collection, including feedback of citizens).
- C3: Department of Citizenship (promote participation and involvement of citizens in municipal action)
- C4: Department of Strategic Planning, division of Environmental Monitoring and Assessment Division
- C5: Department of Urban Regeneration
- C6: Department of Urban Green Spaces
- C7: Councillor's Office for the Environment and Citizenship

4.2.3 Identification of opportunities for inclusive citizen participation in data-collection

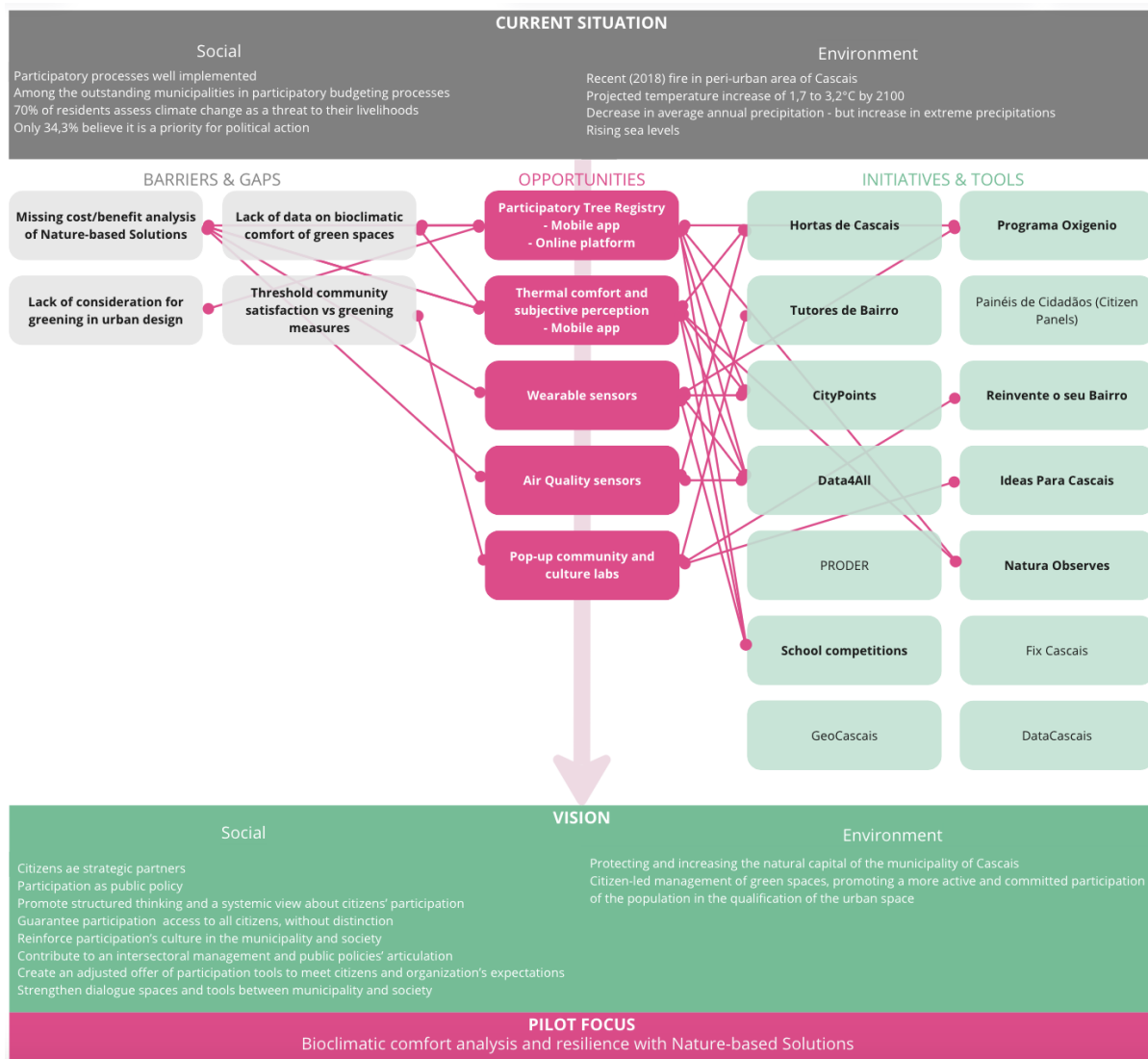


Figure 6: Cascais identification of opportunities

Several key actions of the 13 measures of the *Climate Change Adaptation Action Plan* have been identified as opportunities for Urban ReLeaf’s activities:

- **1.2 Interactive online platform:** although there is little description of said platform, Urban ReLeaf may be able to make use of the platform to engage with the local community.
- **3.4 School competition on sustainability:** such activities can represent an easy way in for Urban ReLeaf activities, where monitoring and mapping could be organised as a competition between schools.
- **5.3 and 5.4 Greening of Caparide Valley and Vinhas streams:** these projects open up these green corridors for recreational activities and for smooth mobility. These streams cross urban areas creating the opportunity to develop data collection campaigns within these neighbourhoods.
- **5.2 Campaigns to monitor the biological communities of the creeks and combat biological invasion:** such organised campaigns represent a synergy opportunity in terms of monitoring, with the opportunity to coordinate efforts for data collection.

- **7.2. Renaturalisation PRODER II Plantation and Monitoring Control in areas under PRODER CMC - Management of Forest:** opportunity to coordinate efforts for data collection.
- **7.5 Programme of Environmental Volunteering of Cascais (OXIGENIO):** opportunity for Urban ReLeaf to leverage an existing community of engaged and motivated volunteers.
- **7.6 Programme of Youth Volunteering NATURA OBSERVES:** opportunity for Urban ReLeaf to leverage an existing community of engaged and motivated young volunteers.
- **12. New urban parks and seepage areas (all actions):** Urban ReLeaf has the opportunity to contribute to all actions by providing relevant data on existing green areas. While Cascais is recognised for its participatory budget, the city has also implemented other participatory initiatives and tools, as described in *Municipal Participatory System* (Cascais Participa), such as the **City Points** initiative, which is a system that “encourage and reward the participatory actions developed by the residents within the other tools available at Cascais Participa” (p.10). Cascais provides an electronic platform on which, for every activity carried out, users will receive “points”, which can be used to access services of the Municipality itself. **The City Points initiative could be leveraged by Urban ReLeaf to gamify the data collection process with citizens, e.g., by rewarding points to citizens having a wearable sensor, mapping the trees in Cascais or taking part in the thermal comfort and subjective perception campaigns.**

Ideas for Cascais (Ideias para Cascais) is another tool based on the “Cascais Participa” website and creates a formal space for the submission of projects “whose characteristics or types of intervention do not fit the criteria or the dynamics of the Participatory Budget” (p.10). **This tool could be leveraged within Urban ReLeaf’s activities to follow-up on participant’s ideas regarding urban greening, e.g., as developed during the pop-up community and culture labs.**

4.3 Dundee’s landscape report

4.3.1 Current situation, future visions, and the role of citizens

Dundee is committed to achieving climate neutrality by 2045 and participate in initiatives such as the EU Covenant of Mayors to support this ambition. Dundee is on its way to decarbonising their energy generation and has put a Low Emission Zone in place. The city has also implemented measures to promote biodiversity, such as by introducing wildlife corridors. The city faces socio-economic challenges, with 43,8% of children living in deprived zones. The city also reports a high rate of drug use. However, Dundee has implemented a “Community resilience Plan”, and has seen residents’ reported satisfaction with their quality-of-life increase following the implementation of the city’s Capital Plan.

“Communities that are strong and well connected are not only more likely to respond better to the challenges of climate change but are able to build on their assets and capabilities to help transform and adapt their surroundings for the benefit of the whole community, including those most vulnerable.” (Dundee Climate Action Plan, p.15)

The *Dundee Climate Action Plan* highlights the role of citizens and communities in helping Dundee reach its climate goals. The Plan itself was co-designed with public, private, and community organisations. The Plan has four main objective areas: energy; transport; waste; and **resilience**. The latter is particularly interesting for Urban ReLeaf as it aims to ensure that the “communities, green networks and infrastructure are adaptable to a changing climate and

reduce the risks and vulnerability to unavoidable impacts” (p.15). The plan describes the willingness of Dundee to adopt a holistic approach by “designing urban areas with the people who use it, to creating a place with a strong identity, engaging successfully with its surrounding buildings, nature and activities” (p. 49).

“Community-based adaptation empowers people to use their own knowledge and decision-making processes to take action.” (Dundee Climate Action Plan, p. 52)

The *Cleaner Air for Scotland 2 (Towards a Better Place for Everyone)* appears as relevant for Urban ReLeaf’s activities, as it is shaped around 10 general themes, including 4. Data and 5. Public Engagement and Behaviour Change. In “4. Data”, the document recognises the existing gaps both in terms of quality and coverage of air quality and human health data and **identifies the utilisation of low-cost sensors and citizen science initiatives as a way to bridge these gaps**. The document translates an awareness of the benefits and shortcomings of low-cost sensors within and beyond citizen science. In “5. Public Engagement and Behaviour Change”, the plan recognises the importance of citizens’ lived experiences and encourages targeting vulnerable groups, the consideration for inclusive engagement approaches with the affected communities, and the co-creation of solutions, amongst other measures. Furthermore, the plan puts **Nature-based Solutions** as a way to address “a variety of environmental, social and economic challenges in sustainable ways” (p.34).

The *Dundee City Council Plan 2022-2027* envisions Dundee as “the first local authority in Scotland using a community choices model to identify and have citizens decide on local climate change” (p.31). Within this vision, the **Dundee Climate Fund** is an important tool to enable communities to have an impact and facilitate capacity building within the local ecosystem of actors. There are five themes included in the fund, including “Resilience” and “Community Engagement”. Different actions are listed in the plans, amongst which one could be particularly interesting for Urban ReLeaf’s activities: **Provide opportunities for pocket-parks and support empowered communities to be partners and leaders on local plans and initiatives to develop biodiversity, local food growing and community spaces**.

“Dundee will be a greener city, made up of strong communities where people feel empowered, safe and proud to live.” (Dundee City Council Plan, p.5)

The Plan also describes how it will implement community participation, e.g., through the use of participatory budgeting, also called **Community Choices**. This is seen as “the enabler for active participation of citizens in local decision making. The process typically involved communities voting on the preferred spend from range of choices developed in the community” (p.36).

The Biodiversity Action Plan of Dundee identifies different initiatives that citizens can join to nurture Dundee’s biodiversity. These groups represent opportunities for Urban ReLeaf to connect with the local community. Amongst them, we will note: Dighty Connect, which comprise a citizen science group; Community Gardens; and Dundee Conservation Volunteers. The document also lists example of current successful partnership:

- Green Health Partnership
- ‘Friends of’ groups working with Dundee City Council and each other
- Scottish Wildlife Trust and Dundee City Council- The Miley, Red Squirrel Project, Conservation Volunteers

- Dundee Naturalists and Dundee City Council- support for Bioblitz events
- Tayside Biodiversity Partnership and various groups which also cover Dundee
- Tay Estuary Forum
- Woodland Trust, Dundee City Council and local groups- Free tree packs, tree of the year competition and species champions
- Scottish Forestry and Dundee City Council – Funding, Woods4Yew Marque at Dundee Food and Flower Festival
- British Dragonfly Society and Dundee City Council- promoting Trottick Ponds as a Dragon Hotspot
- Dundee City Council and Bonnie Dundee
- Butterfly Conservation urban butterfly survey
- Bumblebee Conservation Trust urban transect surveys
- Citizen science projects

Dundee has also produced different *Locality Community Plans* (2022-2027) for each of its Wards. Each plan has a similar structure and shares some of the same focus points, such as the need for quality green and open spaces that people can access in their own communities, and establishes different actions for each Ward:

- Develop structures which allow for community involvement in identifying, developing, and taking part in greenspace enhancements; Increase and develop the number of growing spaces. (The Ferry)
- Community involvement in managing (Coldside)
- Take collective action to develop and increase usage of public and green spaces; Increase local opportunities for community growing (East End)
- Improve green spaces in the central Lochee area focussed on: Play improvements; Improve green spaces and develop green trails for walking and cycling. (Lochee)
- Explicitly link the work of groups, walkabouts, Community Choices, and the Regeneration Forum to improve local spaces. (Maryfield)
- Take collective action to develop green spaces and playparks identified as most in need of improvement. (North East)
- Develop a network of community growing spaces and community gardens. (Strathmartine)
- Develop structures which allow for community involvement in identifying, developing, and taking part in greenspace enhancements. (West End)

While citizen science has been discussed in some instance, i.e., air quality and biodiversity, citizen-generated data are not yet well implemented and used for decision-making. Some platforms are championed as possibilities, such as i-Record and i-Tree, translating the willingness and openness of the city towards such processes, but the *expert interviews* reinforce the idea that is not yet making use of such data. For example, an expert from the Team Environment Service (D2) explains that Dundee naturalists collect data (e.g., on butterflies and bees), but that this data is held by countryside rangers and is not shared. The experts also shares that there is a need for data coming from the i-Tree survey as it would enable to make policy and strategy on non-outdated data, but the budget is currently missing.

Dundee has developed several policies on urban greening and has clearly identified the relevance of Nature-based Solution within its strategy, offering Urban ReLeaf an entry door within the city's activities. Participatory processes are taking place in Dundee, although there is no formal regulation of it, as attested by the absence of a policy on citizen participation. The city does have a Participatory Budget, which represent a great opportunity for Urban ReLeaf to link up to. Although some citizen-generated data are collected by

diverse initiatives, they are not currently integrated into the policymaking processes of Dundee.

4.3.2 Ecosystem mapping

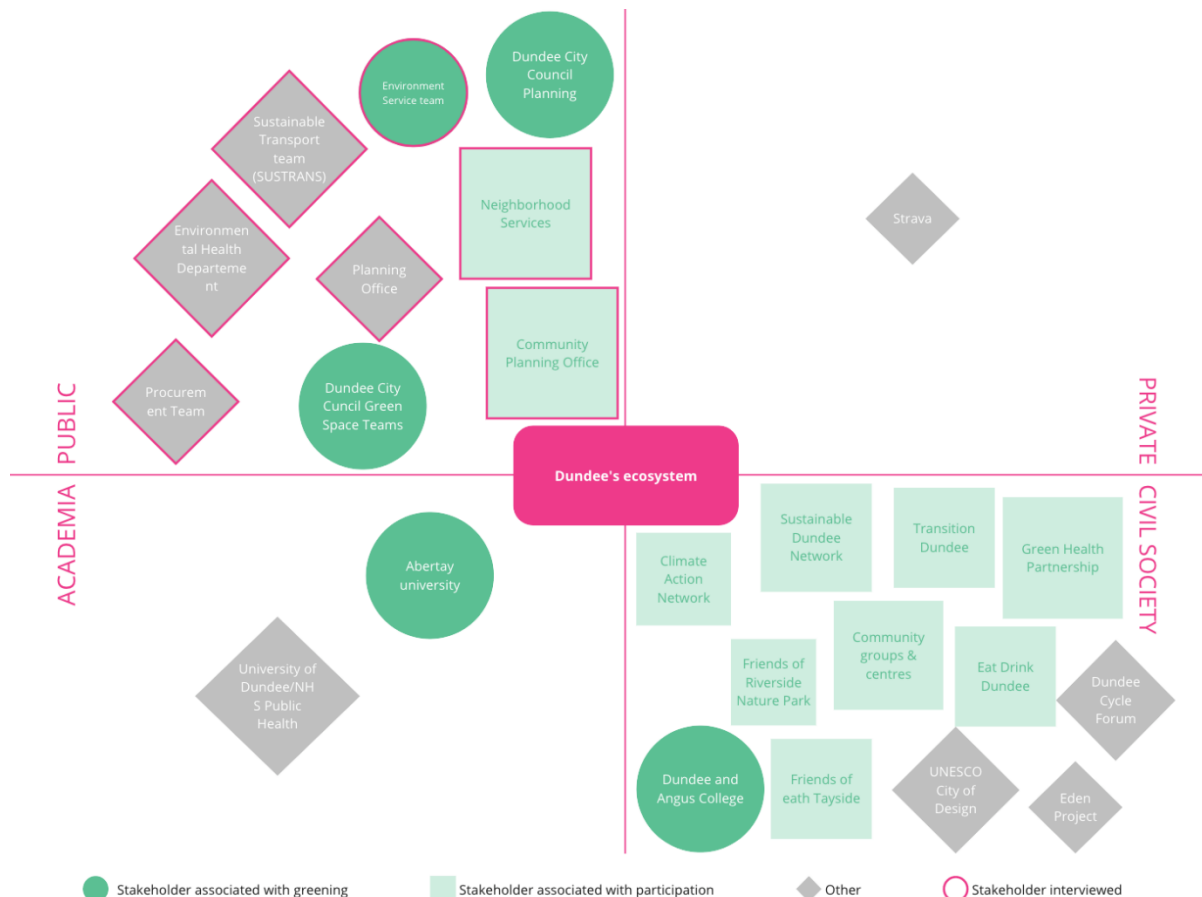


Figure 7: Dundee ecosystem mapping

The ecosystem identified for the pilot of Dundee, is primarily composed of public entities and a large number of civil society stakeholders.

The **experts** interviewed were from the following entities (also displayed in pink circle on Figure 7):

- D1: Environmental Health
- D2: Green Space/Team Environment Service
- D3: Community Benefits / Procurement Team
- D4: Planning Office
- D5: Sustainable Transport Team (Sustrans)
- D6: Community Planning Office
- D7: Neighbourhood Services

4.3.3 Identification of opportunities for inclusive citizen participation in data-collection

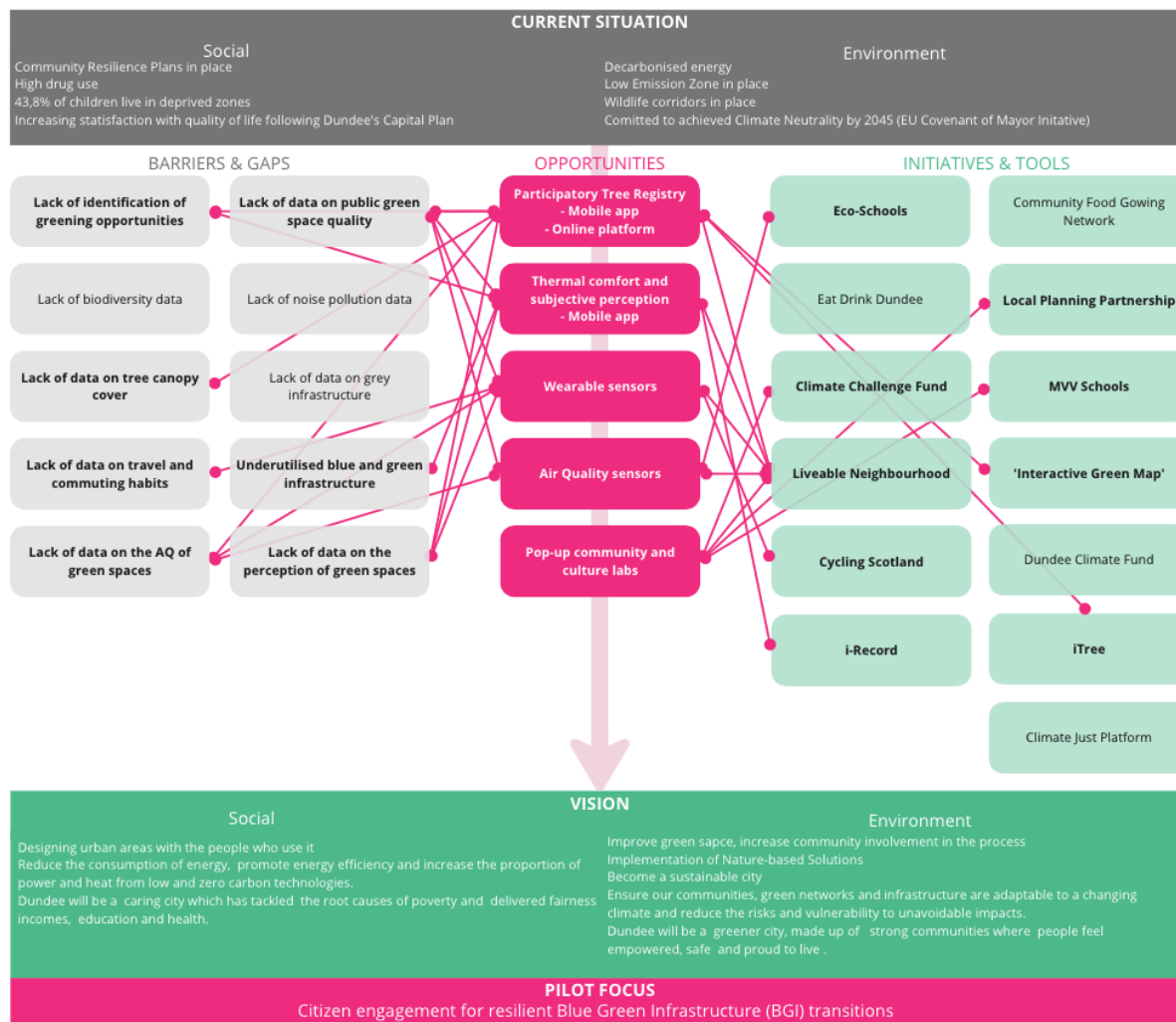


Figure 8: Dundee identification of opportunities

The *Dundee Climate Action Plan* describes several Resilience Actions to be taken, amongst them several that would be relevant for Urban ReLeaf’s activities:

- **R.8 links health care and greenspace initiatives**, which represents an opportunity for Urban ReLeaf to collect and deliver data on the use and perception of green space by citizens with an illness or disability.
- **R.9 aims to develop an interactive green map** to identify sustainable options for recreation and resource use. Urban ReLeaf has the opportunity to contribute to this action by providing citizen-generated data on green spaces.
- **R.12 develop adaptation engagement tools to support community capacity building**, reflects the openness of Dundee to solutions as envisioned by Urban ReLeaf.
- **R.15 increase participation in the Eco-schools’ programme**, represents an opportunity for Urban ReLeaf to leverage motivated and engaged schools and pupils.
- **R.16 co-design blue/green infrastructure**, which will address the heat island effect and guide appropriate planting in urban areas. By providing data on the perception of green spaces, Urban ReLeaf has the opportunity to provide citizen-generated data that supports more inclusive decision-making.

- **R.17 produce an Open Space strategy**, although the action refers to the outcomes of specific workshops, Urban ReLeaf could produce complementary citizen-generated data that is relevant for the development of Dundee's green infrastructure.
- **R.20 monitor and review the Urban Tree Policy**, which aims to identify suitable areas for tree planting with consideration of how planting interacts with surroundings e.g., in terms of air quality, active transport, or biodiversity. This represents a clear opportunity for Urban ReLeaf in providing citizen-generated data.

Furthermore, the plan identifies the relevant role of SMART technology, such as the online tool **Climate Just**, in reaching its climate objectives. Furthermore, to ensure successful implementation of these activities, the plan has identified several Governance Actions:

- **G4 develop the Sustainable Dundee communication strategy**, which represents an opportunity for the dissemination for the Urban ReLeaf's activities.
- **G.5 Friends of the Earth Tayside will raise public awareness**, which represents an opportunity for Urban ReLeaf to leverage their network.

Cleaner Air for Scotland 2 (Towards a Better Place for Everyone) identifies different programmes that are not directly linked to air quality, but which deliver co-benefits, such as **Cycling Scotland**, **Sustrans**, and **Living Streets**, which all represent opportunities for Urban ReLeaf to link up to.

The Biodiversity Action Plan of Dundee describes the importance of biological records and recording in providing easily accessible and reliable data to ensure that effects on biodiversity are considered in all decision making and management. The digital recording app **i-Record** is mentioned as a potential platform, with which Urban ReLeaf could find a synergy. In the same line, the plan sets out the action of investigating "the possibility of an **iTree** project to assess the forestry canopy cover in Dundee and use this to set new targets" (p.48), which is a clear overlap with Urban ReLeaf's intended activities. The plan expresses its inclusive intention by setting the action of working "with volunteers, including those with physical and mental health issues in biodiversity projects across Dundee" (p.65).

4.4 Mannheim's landscape report

4.4.1 Current situation, future visions, and the role of citizens

The City of Mannheim is active on the subject of climate change, as demonstrated by the existence of the Adaptation to Climate Change in Mannheim concept note, the Climate Action Plan 2030, the Heat Action Plan, the Mission Statement 2030, the Local Green Deal, and the Mannheim Message. Mannheim is also one of the 112 cities selected as part of the EU's 100 Climate Neutral and Smart Cities" Mission. Mannheim recognised the importance of Green Spaces and has implemented several initiatives to improve green space, such as a system to designate tree protection status and a support programme for the greening of roofs and facades. Mannheim is also a frontrunner in terms of participatory process, and in some projects, public participation is prescribed by law.

Through *The Mannheim Message*, the City of Mannheim express its ambition to tackle the climate crisis in an inclusive way.

“We will build urban and regional communities on principles of participation, transparency, inclusion and non-discrimination that make our cities and regions attractive, safe and healthy homes for all residents.” (The Mannheim Message, p. 2)

With its *Mission Statement*, Mannheim positions itself as a green and open city, which offers numerous, innovative, and low-threshold participation opportunities for its citizens.

“The Mission Statement is (...) something to tackle; a tool to enable the urban community to participate meaningfully in the future of the city” (Mannheim Mission statement 2030, p. 6)

The *Adaptation to Climate Change in Mannheim concept* describes the clear consideration for, and involvement of, citizen participation within its development. Through the participation of local actors, including citizens, areas affected by climate change have been identified and possible adaptation mechanisms have been described, along with monitoring measures. Citizen participation had a central role in this process as measures developed through the participation of associations, citizen’s initiatives, companies, and the professional public were then “further concretised and supplemented within the framework of a random selection of citizens through youth participation by the Mannheim student council and through the citizens’ dialogue on the ‘Mannheim 2030 Mission Statement’” (p. 13). This included wide digital participation via the **“Shaping Mannheim Together”** online platform.

“The interdisciplinary development by the various departments, municipal enterprises and companies of the city as well as the participation of Mannheim’s citizens, politics, economy and science as well as the associations and organisations with their diverse experiences and competences were of particular importance - because successful climate adaptation requires joint action at all levels.” – Felicitas Kubala, Mayor of the City of Mannheim (Climate adaptation plan, p. 11)

The *Climate Action Plan 2030* of Mannheim has the ambition to make the City of Mannheim climate neutral by 2030. Its development was realised through, among other processes, public participation; is embedded in the city’s Local Green Deal Process; and follows the city’s successful application to the EU’s call for support for “100 Climate Neutral Cities”. Citizen participation was an integrative part of its development process, with various formats implemented such as “on-site events, online participation options and, for the first time in Mannheim, a citizens’ council” (p. 29), with a specific attention given to the participation of children and young people.

“Mannheim is a climate-friendly - and in the future climate-neutral - and resilient city that is a role model for environmentally conscious living and acting. In order to achieve this goal, it is necessary to involve the entire city society with all actors who live, work and move in Mannheim (...)” (Climate Action Plan, p. 18)

The *Heat Action Plan* has identified and characterised, through a participatory process, **eight so-called “heat-vulnerable, helpless groups”** (translated from the German “hitzevulnerable, hilflose gruppen” p.24). The ‘helpless’ component is described as groups that are not considered as capable of “recognising hazards and implementing self-protection measures” (p. 29). The eight groups are:

- (1) Elderly people and people in need of care

- (2) Babies and toddlers
- (3) People with chronic illnesses
- (4) People with mental illnesses
- (5) People with physical disabilities
- (6) People with intellectual disabilities
- (7) Unhoused people
- (8) People struggling with an addiction¹

As can be observed from the above-mentioned document, citizen participation has a clear place in the City of Mannheim. Indeed, **formal Citizen Participation** is regulated by the local constitution, including the participation of children and young people. According to the **Rulebook of Participation**, the municipality “should involve children and must involve young people in planning and projects that affect their interests in an appropriate manner and develop suitable participation procedures for this purpose” (p.6), in particular through the establishment of a Youth Municipal Council.

“Through informal citizen participation, the City of Mannheim creates opportunities for citizens to participate that go far beyond the minimum legal requirements.” (Rulebook participation, p. 8)

Next to this legal obligation, **Informal Citizen Participation** also represents an integrative part of Mannheim strategy, translating the city’s clear willingness to engage with its citizens. This process is viewed as a way to increase trust between citizens, the administration, and politics, and as a way to strengthen representative democracy. Such process gives “all citizens - regardless of nationality, social status and age - the opportunity to contribute with their views, comments and competences to municipal planning and decision-making processes” (p.8). This type of participation usually takes place early in the planning process, and the different methods, timing, and content are not fixed. However, the results are never binding: the municipal council remains the decisive body.

The Rulebook participation describes the six phases of citizen participation: (1) Introduction; (2) Preparation; (3) Execution; (4) Decision; (5) Implementation; (6) Evaluation. The Rulebook participation also describes the strengths and limit of such processes, which translates the expertise and experience held at the City of Mannheim. Further, a specific attention is paid to make the process of citizen participation just: (1) citizen participation should be accessible to all citizens: Target groups that are particularly difficult to reach must be addressed in a way that is appropriate to them; and (2) citizen participation should be fair: the process should include factual and argument-oriented discussions, which above all do not insult or discredit other participants and enable an equal exchange (p.11).

The City of Mannheim is a frontrunner both in the field of climate protection and climate adaptation, but also in the field of citizen participation. The city has set clear goals and activities that represent several opportunities for Urban ReLeaf’s activities. Interestingly, **there is no mention of citizen science nor of the opportunity of citizen-generated data in these documents.** The same insights were collected through the expert interviews who indicated that the contributions of citizens in data collection was only marginal at this stage

¹ Translated from the German: 1. Ältere und pflegebedürftige Menschen 2. Säuglinge und Kleinkinder 3. Chronisch kranke Menschen 4. Psychisch kranke Menschen 5. Menschen mit körperlicher Behinderung 6. Menschen mit geistiger Behinderung 7. Wohnungslose Menschen 8. Suchtkranke Menschen (p. 24)

(M2, M4), and that when open data exist, citizens are rather 'users' of the data, i.e., on the open data portal (M1).

4.4.2 Ecosystem mapping

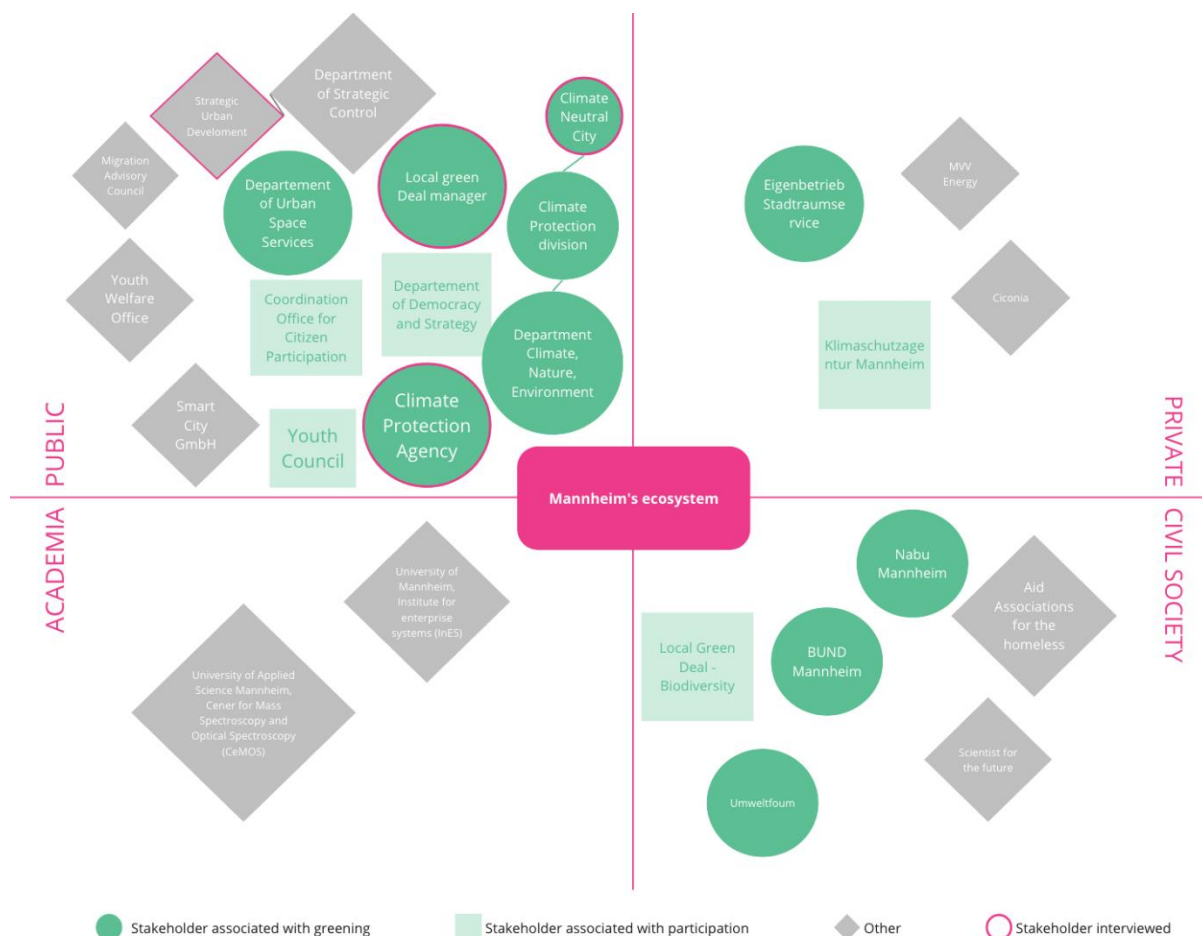


Figure 9: Mannheim ecosystem mapping

The ecosystem identified for the pilot of Mannheim, is primarily composed of public entities and civil society stakeholders, with a strong identification of relevant Departments and Services within Mannheim’s administration.

The **experts** interviewed were from the following entities (also displayed in pink circle on Figure 9):

- M1: Strategic Urban Development, Department of Strategic Control
- M2: Local Green Deal Manager, Department of the Lord Mayor
- M3: Climate Protection Agency
- M4: ClimateNeutralCity, Department of Climate, Nature, Environment, division Climate Protection

4.4.3 Identification of opportunities for inclusive citizen participation in data-collection

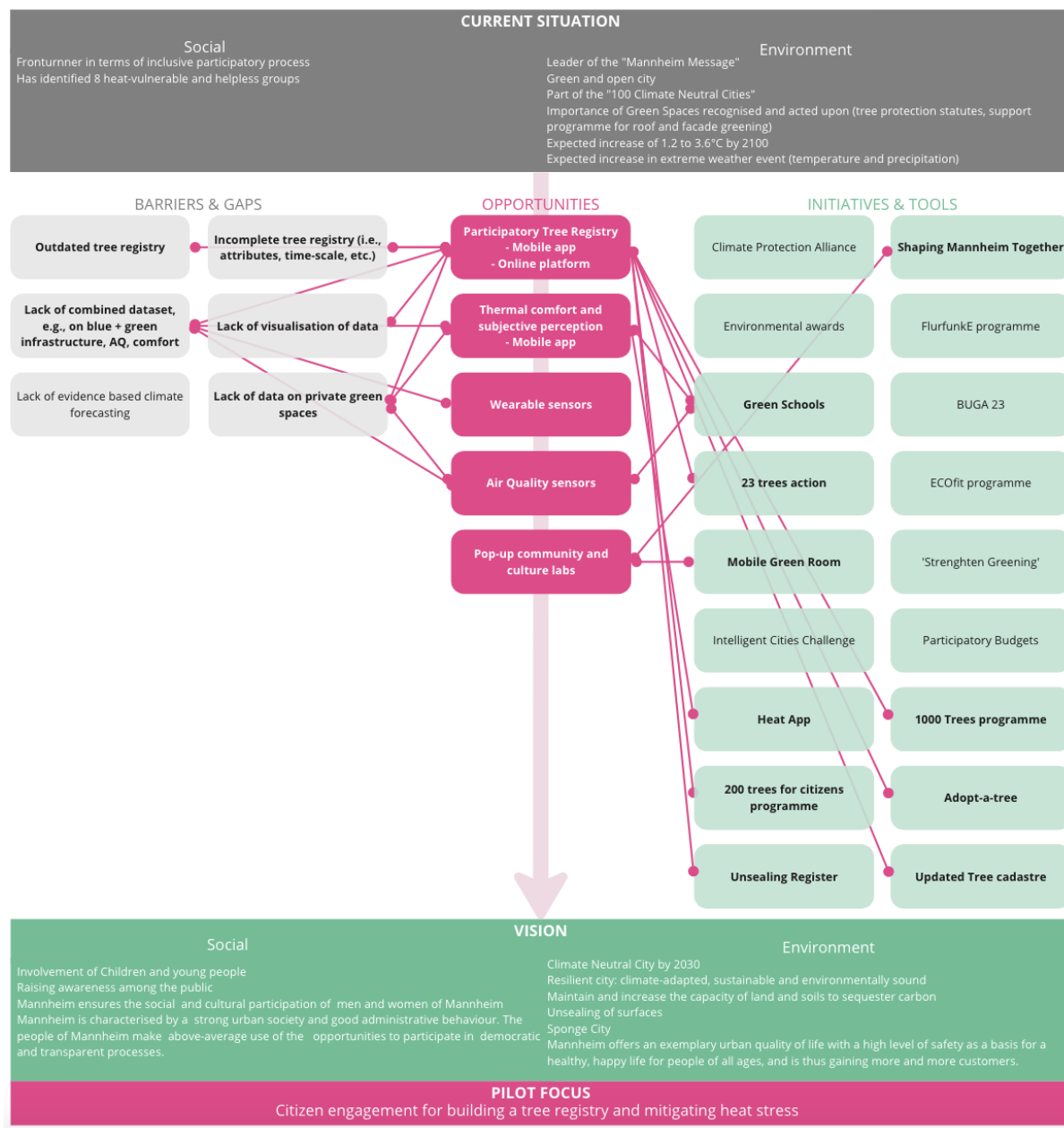


Figure 10: Mannheim identification of opportunities

The *Adaptation to Climate Change in Mannheim concept* describes the use of the digital participation via the “**Shaping Mannheim Together**” online platform, which “documents the results of past participation offerings, presents current participations in a comprehensible way and draws attention to future opportunities for participation” (p.28). **This participatory platform represents a clear opportunity for Urban ReLeaf to engage the citizens of Mannheim in its activities.**

Other elements of the dissemination strategy used during the participation process of the *Adaptation to Climate Change in Mannheim concept* also represent an opportunity for Urban ReLeaf to connect with the local community, such as the “**Mobile Green Room**”, which is an

example of what vertical greening can achieve in a city. The “**Environmental Award 2018**” was also an interesting initiative which awarded prizes to front gardens of private owners, educational institutions, initiatives, and companies that are extensively greened. Local experts (M2, M4) informed us that **a new edition of the Award would be held in October 2023, which would be an opportunity for Urban ReLeaf to integrate its activities.**

The document also details a set of action and measures, where the participation in research projects and third-party funded project on climate adaptation is seen as playing a central role, translating the openness of Mannheim to engage with the activities of Urban ReLeaf. **Several of the objectives and measures represents an opportunity for Urban ReLeaf to demonstrate the relevance of citizen-generated data, such as:**

- 2.1.2 Concept for identification and addressing heat vulnerable helpless groups;
- 2.1.6 Monitoring and control of invasive species and identification of allergenic risks;
- 3.1.3 Installation of local measuring sensors/stations in Mannheim urban areas;
- 3.2.2. Initiation of a cooperation exchange on climate change adaptation through an event on climate change adaptation;
- 4.1.2 Co-use of traffic spaces for urban greenery
- 5.1.4 Unsealing public areas, e.g., schoolyards and squares;
- 5.1.5 Unsealing and greening of private areas and storage and use of precipitation water;
- 6.1.3 Promotion of green, sustainable front gardens and green courtyards;
- 7.2.5 Greening of buildings for businesses, linkage also via funding and restrictions;
- 8.1.1 Determining, securing and expanding the relevant green and wooded areas to preserve and improve their urban climatic functions;
- 8.1.2. Adapted green space maintenance ensuring the (urban climatic) balancing function of urban green spaces;
- All of Objective 8.2: Further develop green belts and blue streams and preserve, enhance and create recreational areas (urban oases) within settlement areas;
- All of Objective 8.3: Improve the resilience of green spaces, tree cover and forest areas in the long term against extreme events and gradual changes.

The *Climate Action Plan* is composed 81 measures, from which 33 were selected as priority measures, linked to eight different fields of action, with field n°5 focusing on **Green-Blue infrastructure**. Within this field several activities represent opportunities for Urban ReLeaf's activities such as:

- Building block 2: Greenery and unsealing in the public space > TOP measure 1: unsealing of surfaces. **Urban ReLeaf could take this opportunity to map potential unsealing areas, e.g., by participating in the “unsealing register”** (FB61, EB76, RNV, FB40, and BBS as responsible local authorities).
- Building block 3: Water in the city > TOP measure 1: Sponge City Mannheim. **Urban ReLeaf could contribute to the “extension and updating of the tree cadastre”.**
- Building block 4: Overarching measures > measure 1: raising awareness among the public. **Urban ReLeaf can broadly contribute to Mobile Greening Campaign** (through the “Mobile Green Room”), the **strengthening of greening** (e.g., by supporting and collaborating on tree sponsors and tree donations), carrying out planting actions with citizens, and take part in communication campaign on the benefit of greening roofs, façades, and unsealed areas.

The *Heat Action Plan* describes the use of the **Heat App** as a communication tool. The documents informs that the app can be extended by additional functions. The app was also mentioned by the local experts (M1, M3) as a potential tool with which Urban ReLeaf could

find synergies. **Urban ReLeaf could offer to extend the function by linking it to its thermal comfort and subjective perception data collection.**

4.5 Riga's landscape report

4.5.1 Current situation, future visions, and the role of citizens

Riga is committed to achieve Climate Neutrality by 2030 through its involvement with the EU Covenant of Mayors Initiative. Additionally, Riga has signed the Green City Accord committing to improve their environmental quality and promote healthier urban environments, including the monitoring of air quality and nature and biodiversity. Currently, the city faces high levels of air pollution, which can be in part attributed to the high traffic volumes passing through. The *Energy and Climate Action Plan* points out that “although a third of Riga's territory is covered by green or aquatic areas, most of them are located in large masses on the periphery of the city, while in the densely built-up areas of the city centre there is not enough vegetation to reduce the heat island effect and overheating of buildings and streets in summer periods” (p. 115). The overall population is decreasing, and 39% are considered as vulnerable (i.e., below and above the working age).

Riga has already implemented public consultation measures. The development of *Sustainable Energy and Climate Action Plan* (2022-2030) of Riga involved a public consultation that led to 162 suggestions and/or proposals for improvement. Within the plan, the vision of urban planning describes the involvement of public participation in decision-making. The plan has identified four main targets groups: (1) energy targets; (2) CO₂ reduction targets; (3) Climate change adaptation objectives; (4) air pollution reduction targets. The plan's climate change adaptation objective is particularly relevant for Urban ReLeaf as it identifies a clear **lack of data on the impact of extreme heat on society**.

The Action Plan somewhat recognises socio-economic factors that might contribute to urban vulnerability to climate change, such as the age of residents. The Action Plan describes organisations involved in the development, implementation, and monitoring of the plan, but citizens are not directly included in it.

“The Action Plan's climate change adaptation objective is to make Riga's infrastructure resilient to the risks of climate change and to promote the well-being of citizens in the future climate reality.” (Sustainable Energy and Climate Action Plan 2022-2030, p.46)

The *Sustainable Development Strategy of Riga until 2030* details different goals to be achieved by 2030, including “[p]rovid[ing] (Riga with) with diverse and high-quality natural territories, green corridors, and accessible waterfronts” (p.14), but it is to be noted that there is no mention of citizen participation within the other 11 goals. However, the implementation principles of the strategy include the involvement of society and implementation of joint creation, which entails the “[d]iverse involvement of society and ensuring of participation is an integral feature of the activity of Riga municipality. The municipality takes a step further in the development of the public space by comprehending, explaining, and using joint creation as one of the most influential renewal tools” (p.30). The plan understands participation mainly as information provision, as “provision of information to society increases its involvement and participatory opportunities, as well as promotes a constructive dialogue between the city and various parties”. Riga's understanding of public needs is portrayed as ensuring a “**client-orientated approach** when implementing and developing the city's functions” (p.30).

The *Development Programme 2022-2027* of Riga envisions citizen participation in a more active way. The visions of Riga for its “**Diverse Public Open Space**” priority includes the design of blue and green corridors, and the creation of recreational area in forest parks, among other measures: activities that align closely with Urban ReLeaf’s scope. The creation, management, care, and responsibility for the public realm involves the participation of every individual, and focus should therefore be put on “mechanisms for citizen involvement and participation” (p.24). Within this priority, the task “develop a model for integrated urban governance” stresses the importance of promoting community involvement and participation “in the shaping of the urban environment and public-private partnerships by creating a collaborative platform for the revitalisation and maintenance of public spaces (innovation for cooperation with associations, activists and entrepreneurs)” (p. 29). However, the role of citizens is not explicitly specified.

*“The city will be able to change and survive if its diverse communities (neighbourhoods, interest representations) are involved in development processes, **promoting citizen-driven change**, and if able ensuring the inclusion of different groups in society and improving their quality of life.” (Development Programme 2022-2027, p. 12)*

According to the document, Riga’s priority also includes “[g]ood **environmental quality and resilient urban ecosystem for climate change and climate mitigation**”. Interestingly for Urban ReLeaf, this priority includes the task of enabling “**data-driven decision-making** to achieve environmental quality and climate neutrality objectives (...)” and “[i]mprov[ing] the automation, digitization and central storage of environmental, climate and energy data in the municipality (...)” (p.36).

Finally, the plan describes “[m]odern and open city governance” as a priority for Riga. This priority envisions citizen participation as a key element: “The municipality not only informs the public, but also involves them in the creation and design of major projects and strategic plans and encourages citizens to get involved in free-spirited work. The municipality develops various forms of participation, **such as digital participation tools**” (p.57). Participation should be designed according to the principles of equal opportunities and social inclusion. In this process, the inclusion of children and young people is seen as important. Among these digital participation tools, the plan mentions the **Participatory Budgeting Platform** and a **neighbourhood platform**.

*“Digital transformation and **data accessibility** will support the city’s move towards modern, efficient and open city governance across all sectors, improve services and enable **data-driven decision-making**.” (Development Programme 2022-2027, p. 12)*

The city of Riga possesses a regulation, “*On municipal support for the implementation of community integration and participation activities in Riga*”, which aims to promote “community integration, encouraging the active and responsible participation of citizens, creating an inclusive and cohesive society in the city of Riga”. The regulation includes co-financing of projects, including activities that promote social integration, promote cooperation between different groups of citizens, include citizen participation in all stages of the project, and cleaning up and improving the neighbourhood environment. There is no specific mention of greening initiatives.

Although the plans recognise the importance of the role of citizens’ contributions in their own development and within climate actions, citizens are still portrayed as passive members

of society, “clients”, that receive information from the city. Riga demonstrates that it understands the importance of public participation in the form of consultation for the development of its plan. However, the more active participation of citizens in designing, implementing, and monitoring climate adaptation measures is lacking. Consideration for different elements of justice (recognition, access/procedural, and distribution) is also lacking. The city’s current interpretation of participation and justice might represent an initial barrier to the integration of Urban ReLeaf’s activities into the municipality’s own. Demonstrating the added value of the contributions of the project to Riga’s identified gaps (see chapter 4.5.3) could help to overcome this potential issue.

4.5.2 Ecosystem mapping

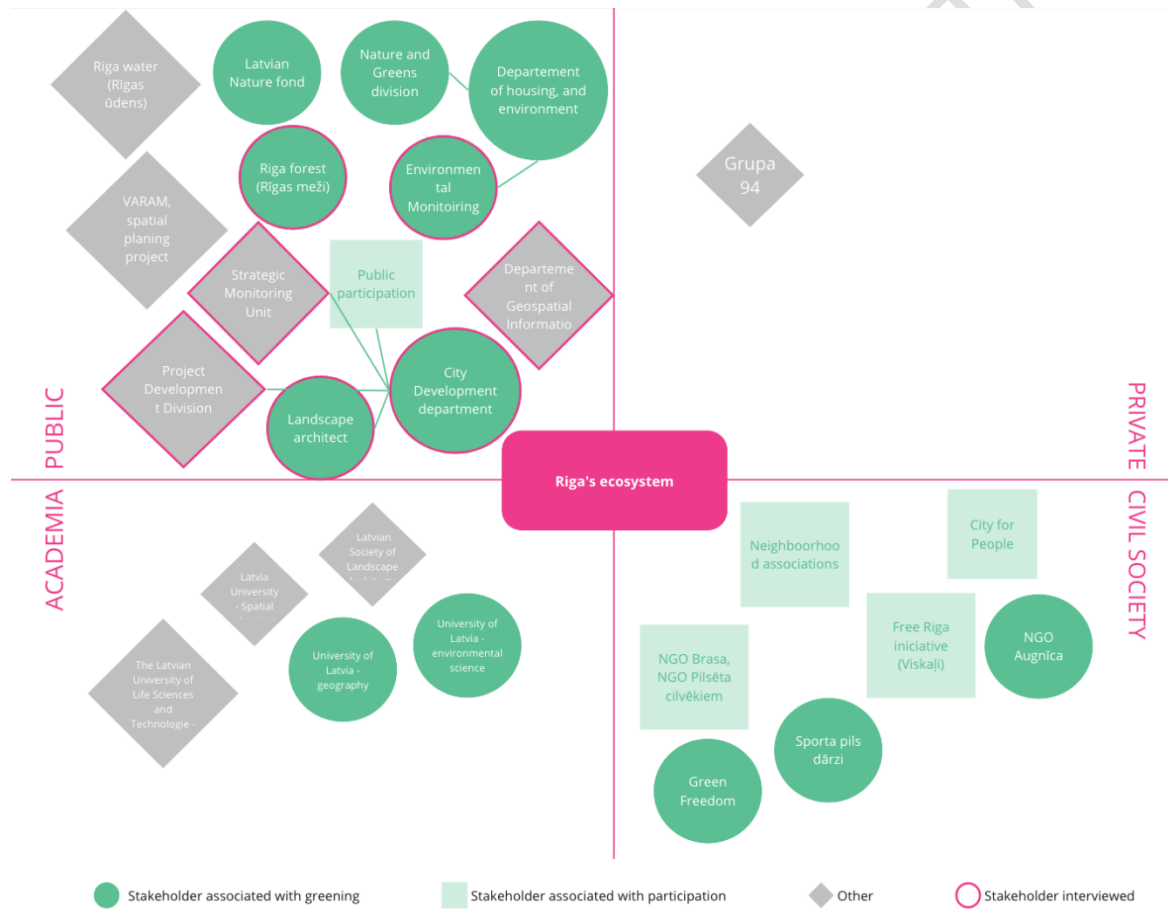


Figure 11: Riga ecosystem mapping

The ecosystem identified for the pilot of Riga is primarily composed of public entities and civil society stakeholders, with a strong identification of relevant departments and services within Riga’s administration. Several civil society entities have also been identified, within both the greening and participation domain.

The **experts** interviewed were from the following entities (also displayed in pink circle on Figure 11):

- R1: Department of City Development
- R2: Department of City Development

- R3: GEO Riga & Department of Geospatial Information Circulation
- R4: Department of City Development, Project Development Division
- R5: Environmental Monitoring Division, Department of Housing and Environment
- R6: Riga Forest

4.5.3 Identification of opportunities for inclusive citizen participation in data-collection

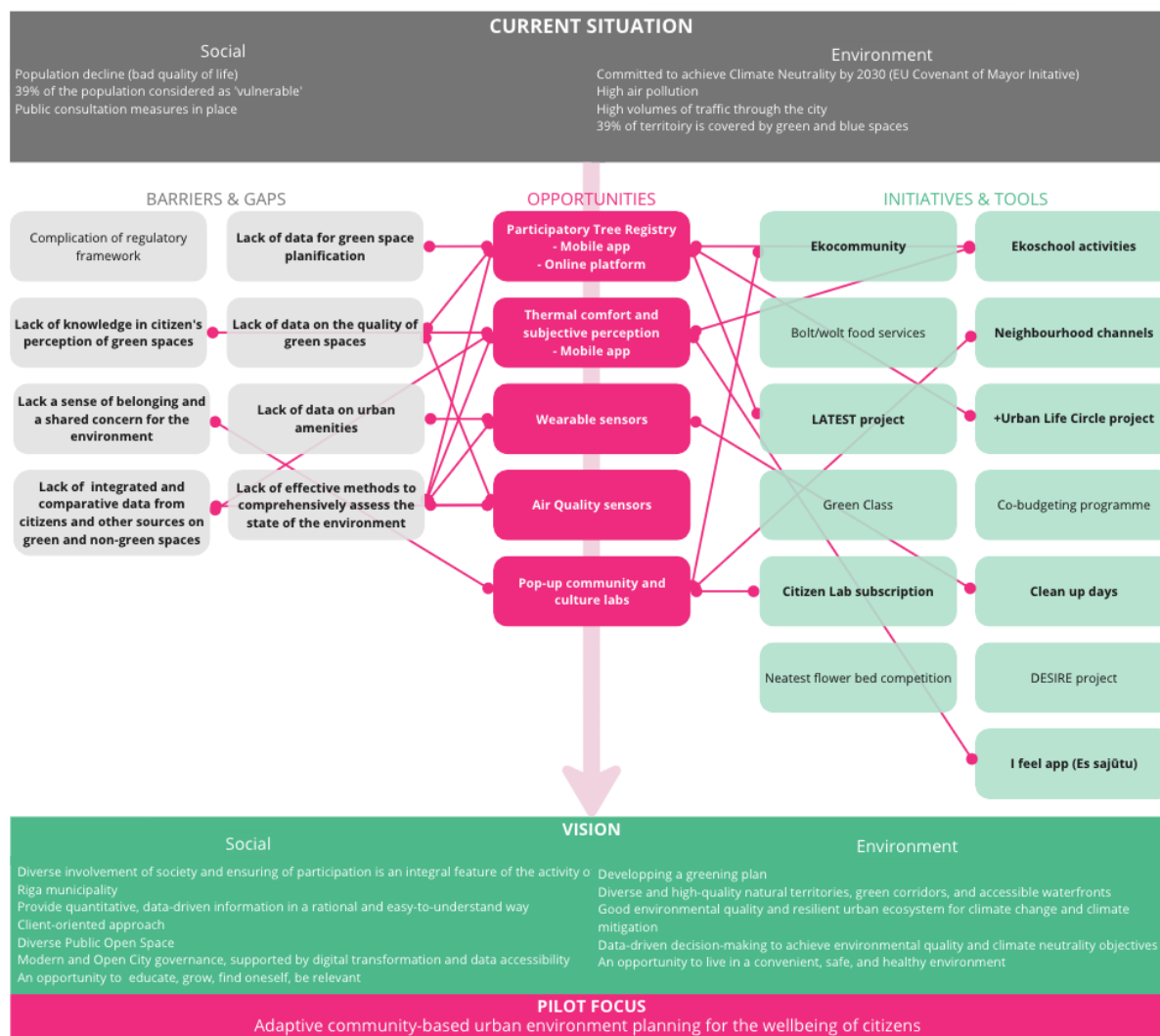


Figure 12: Riga identification of opportunities

The **experts** indicated several opportunities for synergies, such as with three ongoing projects. The **LATEST** project will create greening plans, and **+Urban Life Circles** will create a biological diversity plan. Urban ReLeaf could leverage the activities of these projects and create a map of the actions and of their effects as reflected in the citizen-generated data. **DESIRE** is a project that focuses on social inclusion in the involvement in society with the with the aim to develop a mobile app and a web platform.

The experts also recommended linking the activities of the project, or even merge them, with the existing platform “**I Feel**” (**Es sajūtu**), where citizens can express their attitude about the city’s infrastructure. Afterwards, the data they contribute is given to the municipality’s departments, who then use the data to inform future infrastructure improvements. **Within**

Urban ReLeaf's activities, on top of expression their attitude about the city's infrastructure, residents could give their opinion about the thermal comfort of different locations in the city. In the same vein, Riga has subscribed to a Citizen Lab platform service, which represents an opportunity for Urban ReLeaf to connect with the local community by showcasing activities.

The *Development Programme 2022-2027* identifies the priority of “[g]ood environmental quality and resilient urban ecosystem for climate change and climate mitigation”, and with it, barriers and opportunities (see p.34-35), of which several are relevant for Urban ReLeaf:

- **Lack of effective methods to comprehensively assess** the state of the environment and model future changes.
- **Promote data collection** and environmental assessment systems that integrate a climate change perspective into risk management practices (e.g., by collecting climate change risk/effects data relevant to Riga, including flooding, heat, frost, average air temperature, heat waves, and erosion) **and ensure that such data is freely available** to any interested party.
- **Establish a comprehensive environmental, climate, and energy monitoring system** in the city and develop **data-driven** environmental, climate, and energy scenario modelling and tools.
- Implement coordinated **nature-based solutions** - tackle multiple problems with one project.

Within the priority of “**Diverse Public Open Space**”, the vision of Riga includes the design of blue and green corridors, and the creation of a recreational area in forest parks. These examples fall within Urban ReLeaf's scope. Several challenges and opportunities to reach this vision are described, which resonates with Urban ReLeaf's activities (see p.26-27):

- **Lack of data** on urban amenities, which can be filled by Urban ReLeaf's data collection campaign.
- City-dwellers **lack a sense of belonging** and a shared concern for the environment, which can be countered by the creation of local communities within the project.
- There is a need to significantly **reduce the urban heat island effect** and improve the microclimate.
- To create an **accessible and user-friendly urban environment** for all residents and visitors
- **Involve neighbourhood communities** actively in the development of urban solutions.

Practically, Urban ReLeaf's activities can support Riga in improving performance in the following indicators:

- Positive opinion of citizens about **public outdoor space** for recreational purposes (recreation areas, parks, beaches, waterfronts, children's playgrounds, etc.) in Riga
- **Number of trees** planted by the municipality during the year (in gardens, parks, squares, and street space)

Linked to the challenge of the **lack of data on the impact of extreme heat on society**, the *Sustainable Energy and Climate Action Plan* identifies a specific “Measure to mitigate the effects of extreme heat, drought” (point 11.3.2), which entails the development of a greening plan “for the city to mitigate future increases in the urban heat island effect and other climate risks” (p.124). Apart from the different measures described, the aim of the greening plan is

also “to **map out in a holistic way which neighbourhoods and streets in the city need measures and which measures would be appropriate for each specific situation** (p.124), which represent a clear link with Urban ReLeaf’s activities.

The plan also clearly describes how Riga should go about its environmental communication with the public. Part of the strategy is described through Principle 4, “Use effective visual information”, including “**provid[ing] quantitative, data-driven information in a rational and easy-to-understand way**”. Urban ReLeaf’s activities could contribute greatly to the type and quality of data available for this strategy. Within this strategy, the plan recognises the existence of different relevant target group for environmental communication: economically active population; young families; young people; seniors; people with disabilities; people in energy poverty; other vulnerable groups; students (see p.130). Following this, the plan identifies key points of attention it aims to centre with its communication strategy towards citizens, which, among others, include “**How can citizens get involved, show initiative?**”. Here, Urban ReLeaf’s activities would provide a concrete opportunity to involve citizens.

4.6 Utrecht’s landscape report

4.6.1 Current situation, future visions, and the role of citizens

The City of Utrecht possess various and green outdoor areas. In general, the city has been very active in the domain of greening and environmental protection, with a range of policies like the “Nature Conservation Act”, the “Nature Vision Province of Utrecht: a plus on nature policy 2.0”, the “Green Neighbourhood initiative”, and the 2007 “Green Structure Plan”. These policies portray the City of Utrecht as expanding, lively, and dynamic. Campaigns to involve citizens in greening initiatives have already been conducted, such as in “de-stoning” (removing cobblestoned), or in supporting citizens to be managers of green spaces (in Vlinderhof, Kersentuin and Bickershof). The City of Utrecht is also sensitive to social inclusion, as demonstrated by their “Room for Everyone” document published in 2018.

In its *Climate Adaptation Programme* (2020-2023), Utrecht follows the goal of “[l]everaging and strengthening the cycle of knowledge and **monitoring** on climate impacts and climate adaptation measures” (p.6). This corresponds to the action of “Heat plans and heat knowledge” to stimulate heat stress adaptation measures and deploy measurement points for monitoring the effect of these measures. The programme also mentions that the climate adaptation team organises **consultations** on climate adaptation, promoting participation and knowledge exchange.

The City of Utrecht produced a *Green Structure Plan 2017-2030*, which identifies green spaces as an important contributor to better health and higher life expectancy. Within the inner-city, **nature-based solutions** are championed as a way to make the city greener and contribute to the desired ambition of healthy urbanisation. The city is specifically giving priority to green-poor neighbourhoods, in places that are already at risk of flooding and heat stress. Utrecht is active in raising awareness among its residents, as attested by the city’s public campaigns, e.g., on residents’ potential contributions to “de-stoning” (conducted in 2017). Moreover, Utrecht envisions giving more responsibilities to willing citizens, such as **letting residents participate in the management of green spaces**, such as in the Vlinderhof, Kersentuin and Bickershof green areas.

*“We continue to improve and strengthen the urban green structure in the city and especially in the **green-poor neighbourhoods**, so that every resident has accessible green space close to home.” (Green Structure Plan 2017-2030, p.7)*

In the *Urban and Village Biodiversity Approach*, Utrecht express its will to improve its urban greenery. The approach contains the theme of “Together for Nature”, including the continuation of **Green to the Neighbourhood initiatives**. The approach highlights the importance of **monitoring biodiversity**, including vulnerable species, but points out that such an endeavour takes time and money. Urban ReLeaf could offer an efficient and low-cost solution to this barrier.

The City of Utrecht has a strong participation policy, as attested by their *Making the city together the Utrecht way Action programme*. An important aspect of this programme is that it presents participation processes as needing to be tailor-made to suit both the task and the target group. The document also states that Utrecht is open to innovative forms of participation. Although the document does not mention citizen science or data collection as a form of participation, Urban ReLeaf could propose that the city add this innovative participation activities to its toolbox and provide citizens with an additional way to participate in the improvement of their city.

The programme takes inclusion seriously and has developed a **Compass for inclusive communication** in participation. The document also outlines the different groups of residents that the city has trouble engaging: “Utrechters who do not speak the Dutch language well, children, young people, students, the elderly, people with a mental or physical disability, the mentally vulnerable, people who have lost faith in the government or society ('drop-outs'), people with busy schedules (young parents, informal carers) and people who have other things on their minds ('survivors')”² (p. 11).

*“Without the creativity, knowledge, and energy from within the city, we will miss opportunities. We are looking for **new ways to involve people**, so that even more Utrechters can think and decide on issues that affect them. The perceptions of all residents are central, and we also **focus on reaching Utrechters who do not easily join in or participate of their own accord.**” (Making city together on the Utrecht way, p.4)*

Online participation is also specifically described as a way to increase the inclusiveness of participation processes: “Experience shows that online participation can enrich physical forms of participation and that participation processes run better with the right mix of online and offline resources” (p.13). Providing Urban ReLeaf’s digital tools for participation, such a with sensors and an online platform for data mapping, could strengthen this dimension of participation.

The City of Utrecht also has a participation policy specifically focusing on support for different initiatives, as described in the Action programme *Making the City Together: Initiative* (2021-2022). With this programme, the City of Utrecht signals the importance it gives to initiatives

² Translated from the Dutch: “Utrechters die de Nederlandse taal niet goed spreken, kinderen, jongeren, studenten, ouderen, mensen met een verstandelijke of lichamelijke beperking, psychisch kwetsbaren, mensen die het vertrouwen zijn kwijtgeraakt in overheid of samenleving (‘afgehaakten’), mensen met drukke agenda’s (jonge ouders, mantelzorgers) en mensen die andere zaken aan hun hoofd hebben (‘overlevers’)” (p.11)

and initiators (parties with a local interest), as they bring up topics that the municipality had not (yet) seen or prioritised. At the time of publication of the report, Utrecht was to set up a **City Together Steering Group** with people in Utrecht who work in the field of participation and citizen initiatives. The Steering Group membership is supposed to be a good representation of the city's diversity and include civil servants from the municipality who would ensure that both experienced and new people from diverse backgrounds are constantly involved.

“We believe it is important that everyone can take initiative. For those for whom this does not come naturally, we provide encouragement and extra support”. (Making the City Together: Initiative, p. 6)

The municipality of Utrecht describes their participation strategy in more detail in the *Utrecht Participation Council* document. The starting point is always: whoever wants to participate, can participate. The documents provide a step-by-step guide for entities looking to organise a participation process. The document highlights several resources the city offers to support participation, such as the contact point of **participatie@utrecht.nl** to provide guidance in involving sensitive facilities (e.g., homeless shelters or youth meeting places); **the Compass for Inclusive Communication**; and **ThinkMee** as the digital participation platform of Utrecht.

4.6.2 Ecosystem mapping

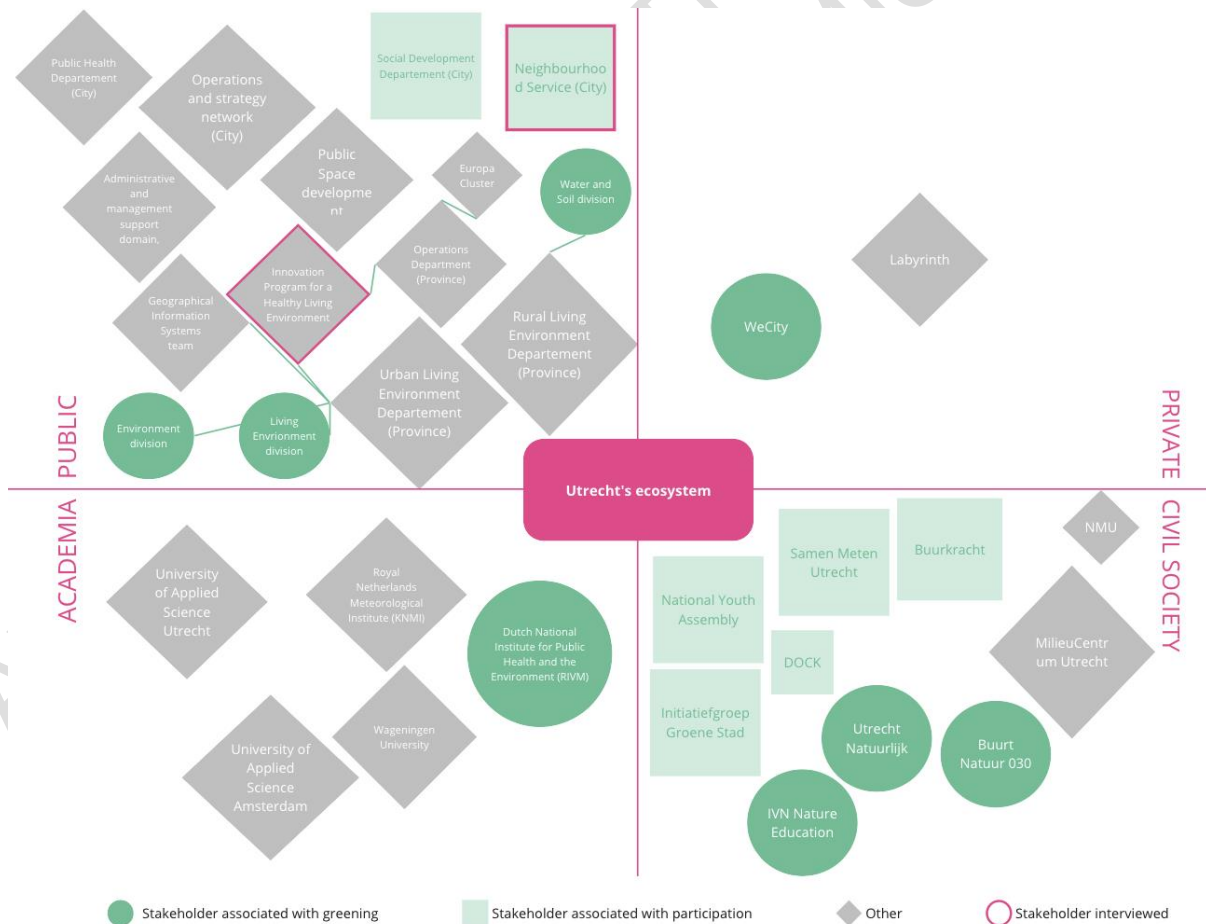


Figure 13: Utrecht ecosystem mapping

The ecosystem identified for the pilot of Utrecht, is primarily composed of public entities and civil society stakeholders, with a strong identification of relevant departments and services within Utrecht’s administration.

The **experts** interviewed were the following (also displayed in pink circle on Figure 13):

- U1: Civil servant, expert on “making the city together” and local application on neighbourhood scale
- U2: Advisors on population health
- U3: Civil servant, head of projects surrounding climate adaptation & Program manager strategy and policy for municipal execution branch (Keeping the city clean)
- U4: Civil servant, expert on (quantitative) data processing
- U5: Civil servant, strategic policy officer on “uneven investment for even changes”
- U6: Civil servant, Program director “Making the City Together”
- U7: Expert on integral approach greening projects

4.6.3 Identification of opportunities for inclusive citizen participation in data-collection

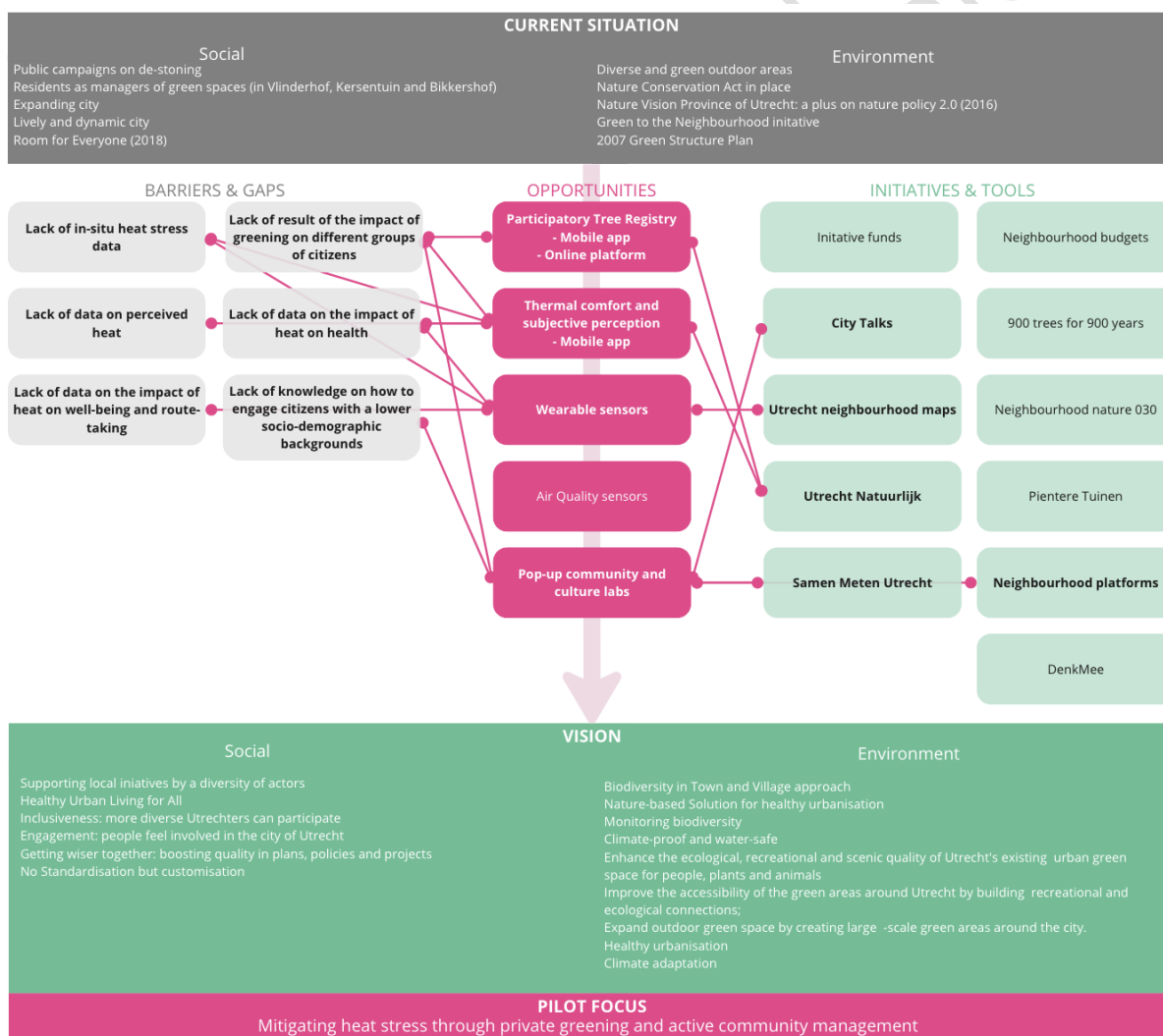


Figure 14: Utrecht identification of opportunities

The *Climate Adaptation Programme* lists 16 actions, of which several are relevant for Urban ReLeaf:

- **“The Climate in your street”**: encourages initiatives aimed at raising awareness and perception of climate adaptation measures in urban areas, with a particular focus on children and young people. Urban ReLeaf could take this as an opportunity to organise data-collection campaigns via air quality sensors.
- **“Heat plans and heat knowledge”**: points to the need to deploy measurement points for monitoring the effect of heat measures. Urban ReLeaf can easily provide data points through the thermal comfort and subjective perception app.

The *Utrecht Participation Guidelines* makes note of an online participation platform **“DenkMee”**, which is a platform where citizens can give their opinions about plans for Utrecht.

The *Making the city together the Utrecht way Action programme* specifies three goals: (1) inclusiveness; (2) engagement; (3) getting wiser together. The document makes concrete proposals for different actions that are of relevance to Urban ReLeaf. For example, the implementation of **neighbourhood platforms that would link neighbourhood organisations and the municipality represents an opportunity for Urban ReLeaf to connect locally with each community.**

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5 Discussion and recommendations

The landscape reports of the pilot cities of the Urban ReLeaf project reveal that all cities present a strong agenda regarding climate change and the place of urban greening in it to mitigate its effect and increase the cities' resilience. The documents "Athens Resilience Strategy for 2030" of Athens, "Climate Change Adaptation Action Plan" of Cascais; "Dundee Climate Action Plan" of Dundee; "Adaptation to Climate Change in Mannheim concept" and "Climate Action Plan 2030" of Mannheim; "Energy and Climate Action Plan" and "Sustainable Development Strategy of Riga until 2030" of Riga; and "Climate Adaptation Programme 2020-2030" of Utrecht are all examples of the cities' consideration for the climate crisis. While there exist variations in how the subject is approached and the type of solutions that are presented, the main differences observed regard the place and role of the citizens in these plans.

The discourse around citizens in **Athens** portrayed them as rather passive agent, visitors or consumers of the city assets (expert interview A4 – National Garden) to which "the dynamic status and performance of the city" must be "demonstrated" (Athens Resilience Strategy, p.51). However, Athens does envision citizens collaboration through different initiatives, but within its pillar "open city", the use of data-driven policymaking is framed as a way to foster accountability and "win back the trust of its people" (Athens Resilience Strategy, p. 48). While Athens does not have a specific participation policy in place, the "proactive city" pillar of its resilience strategy does mention that opportunities can be brought by different groups of individuals to the city. Opportunities to strengthen citizen participation in synergy with the activities of Urban ReLeaf has been identified, such as a "Tree Identity" registry, the "map the public realm" supporting action, and the synAthina platform for citizen engagement. Initiatives such as "Adopt your city" and "Adopt-a-Tree" are also relevant within the framework of the project.

Citizens are placed front and centre of **Cascais's** Climate Change Adaptation Action Plan. Their active participation in environmental policies is clearly stated, from the co-creation of the measures included in the Plan to their implementation, as exemplified in their "Green space and tree protection regulation" where cooperation protocols can be implemented to foster the citizen-led management of green spaces. Cascais has a strong participatory system with specific policies and processes in place, together with a large participatory budget. This participatory system has a strong inclusion component and is designed with the intention of being accessible, "leaving no one behind". Citizens are clearly framed as strategic partners with an integrative role in the city's decision-making process and not only as public policies' beneficiaries. Opportunities to strengthen citizen participation in synergy with the activities of Urban ReLeaf has been identified, such as the "City Points" initiative, "Ideias para Cascais" (idea for Cascais), "Hortas de Cascais", "Programa Oxigenio", or "Tutores de Bairro" to cite only a few.

The **Dundee** Climate Action Plan highlights the role of citizens and communities in helping Dundee reach its climate goals. The Plan itself was co-designed with public, private, and community organisations. Dundee also possesses a community choice model to allow citizen to decide on local climate change actions, e.g., through the Dundee Climate Fund. Opportunities to strengthen citizen participation in synergy with the activities of Urban ReLeaf has been identified, such as the "eco-school" initiative, the Climate Challenge Fund, and the i-Record and iTree platforms.

Mannheim's vision for citizen participation is clearly elaborated in the "Adaptation to Climate Change in Mannheim concept" and "Climate Action Plan 2030", which describe the consideration for, and involvement of, citizen participation within its development. Apart from this consideration, Mannheim also possesses specific policies on participation, such as the "Rulebook of Participation" which describes possibilities of formal and informal citizen participation. While these processes are also framed as an instrument to increase trust with citizens, Mannheim has developed a clear line for inclusive participation, describing that citizen participation should be accessible to all (i.e., target groups that are particularly difficult to reach must be addressed in a way that is appropriate to them) and fair (i.e., the process should include factual and argument-oriented discussions, which above all do not insult or discredit other participants and enable an equal exchange). Opportunities to strengthen citizen participation in synergy with the activities of Urban ReLeaf have been identified, such as the only platform "Shaping Mannheim Together", initiative such as the "Mobile Green Room", "23 trees action" or "200 trees for citizens programme".

Riga's vision for citizen participation is progressive in its framing such as in the "Sustainable Development Strategy of Riga until 2030" which mentions participation as an integral feature of the activity of Riga municipality. As such, joint creation and public consultation are portrayed as the frontrunner of this process. However, the plan rather understands participation as information provision and frames the role of Riga vis-à-vis public need as a "client-orientated approach when implementing and developing the city's functions" (p.30). The Development Programme portrays a more active role of society in its 'diverse public open space' which stresses the importance of promoting community involvement and participation, although the role of citizens is not specified. The city however possesses a regulation "On municipal support for the implementation of community integration and participation activities in Riga", which aims to promote the active and responsible participation of citizens to create an inclusive and cohesive society. The regulation includes co-financing of projects, but there is no specific mention of greening initiatives. Opportunities to strengthen citizen participation in synergy with the activities of Urban ReLeaf have been identified, such as with the ongoing projects +Urban Life Circles, LATEST and DESIRE. The platform "I Feel" can also be leveraged.

Utrecht has a strong participatory process in place, with several policies to attest it: "Making the city together the Utrecht way Action programme", "Making the City Together: Initiative", "Utrecht Participation Council". An important element of the participatory process of Utrecht is its "tailor-made" nature: whoever wants to participate, can participate, and the process needs to fit both the task and the target group. Utrecht is also aware of the different groups of citizens that it is not successful in engaging with such as older adults or young parents. Opportunities to strengthen citizen participation in synergy with the activities of Urban ReLeaf have been identified, such as the online platform "DenkMee" or the actions "The Climate in your street" and "heat plans and heat knowledge".

The different elements highlighted in this report will now serve as a basis for the co-construction of the inclusive engagement strategies of the Urban ReLeaf's pilot in T2.2. By making use of the different gaps, initiatives, and related opportunities identified in each landscape report, T2.2 will continue the reflection further by leveraging the local knowledge of each pilot city during participatory workshops to identify mechanisms of inclusive participation in decision-making processes. This is a relative novel task, as pointed out by the scoping review conducted in the deliverable, which highlights that there has been a limited number of

studies on the link of citizen-generated data for inclusive urban greening policymaking, and that within those, even less have been concerned by the question of inclusive participation, or justice more broadly. To go forward with this endeavour, the engagement strategies of Urban ReLeaf have to recognise the existence the different target groups that are to be engaged and their differing lived realities in terms of, e.g., time capital, digital literacy and capacity, or physical capacity. From there stems the consideration for inclusive engagement strategies that take into consideration the predefined target groups and their associated characteristic(s), and that allows for appropriate mechanisms of participation (e.g., data collection) for all. Finally, the impact that the subject of research has on the participants (i.e., environmental injustice in the access of greening, and the associated benefits and burdens), but also the impact of the CS activities themselves (e.g., geographical representativeness of the data which will serve as basis for decision-making, representativeness of the perception of heat within the population, etc.) has to be taken into consideration.

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6 Conclusion

This deliverable provides an overview of the current and desired situation on urban greening in each pilot city. Through mixed-methods, the deliverable identified (1) the general current situation in each pilot in regard to greening/climate and participation; (2) the future vision of the city; (3) the envisioned role of citizen within greening activities and whether considerations for justice were taken (consideration of the existence of different groups – recognition justice, inclusion of different groups – access/procedural justice, consideration for the differential impact of policies on different groups – distributional justice); (4) the current barriers and gaps to greening; (5) relevant stakeholders; (6) relevant initiative; and tools/ platforms.

By taking into consideration the foreseen sensing technology to be developed within Urban ReLeaf, this deliverable also identified opportunities for inclusive citizen-generated data within each pilot, by linking them with current gaps, and finding synergies with existing initiatives and tools/platforms.

This deliverable lays down the main building blocks for T2.2 (reported in D2.2), which will focus on making a connection between these building blocks and establishing the main characteristics of the inclusive engagement strategies applied in the project for citizen-generated data.

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Appendix A: Scoping review

Table 3: Overview of the articles focusing on citizen science or citizen generated data for urban greening policymaking.

Articles' reference	Type of urban greening investigated	Role in the policy cycle	Consideration for justice
Walker, C. M., Colton Flynn, K., Ovando-Montejo, G. A., Ellis, E. A., & Frazier, A. E. (2017). Does demolition improve biodiversity? Linking urban green space and socioeconomic characteristics to avian richness in a shrinking city.	Restoration of vacant build infrastructure into green spaces and its impact on biodiversity	Policy evaluation	Not per se, but consideration for bias in data collected: participant prefer to submit report of areas with a high biodiversity
Baker, F., Smith, C. L., & Cavan, G. (2018). A Combined Approach to Classifying Land Surface Cover of Urban Domestic Gardens Using Citizen Science Data and High Resolution Image Analysis.	Domestic gardens (garden composition) as contributor to a city's green infrastructure and ecosystem services.	Agenda setting	Not further than a representative sample.
Callaghan, C. T., Major, R. E., Lyons, M. B., Martin, J. M., Wilshire, J. H., Kingsford, R. T., & Cornwell, W. K. (2019). Using citizen science data to define and track restoration targets in urban areas.	Urban Greenspace Integrity Index (measure of urban greenspace's response to urbanisation)	Agenda setting, policy evaluation	No (existing citizen science dataset)
Deguines, N., Princé, K., Prévot, A.-C., & Fontaine, B. (2020). Assessing the emergence of pro-biodiversity practices in citizen scientists of a backyard butterfly survey.	Biodiversity	/	No
Grazuleviciene, R., Andrusaityte, S., Grazulevicius, T., & Dedele, A. (2020). Neighborhood Social and Built Environment and Disparities in the Risk of Hypertension: A Cross-Sectional Study.	Perception of the environmental quality and exposure to green spaces, and its effect on health.	Agenda setting	Yes, in representation.
Mishra, H. S., Bell, S., Vassiljev, P., Kuhlmann, F., Niin, G., & Grellier, J. (2020). The development of a tool for assessing the environmental qualities of urban blue spaces.	BlueHealth Environmental Assessment Tool (assessment of environmental aspect and attributes influencing access to, use of, and health-promoting activities in blue spaces)	Policy evaluation	Yes (question related to the accessibility of blue spaces in the assessment tool)

Wang, W.-L., Suman, D. O., Zhang, H.-H., Xu, Z.-B., Ma, F.-Z., & Hu, S.-J. (2020). Butterfly conservation in China: From science to action.	Biodiversity (butterfly)	Agenda setting	No
Cambria, V. E., Campagnaro, T., Trentanovi, G., Testolin, R., Attorre, F., & Sitzia, T. (2021). Citizen Science Data to Measure Human Use of Green Areas and Forests in European Cities.	Use of green spaces and forest	Policy evaluation	Not per see in the participation to data-collection, as they are using data from an existing platform (iNaturalist).
Cavan, G., Baker, F., Tzoulas, K., & Smith, C. L. (2021). Manchester: The Role of Urban Domestic Gardens in Climate Adaptation and Resilience. <i>Biometeorology</i> , 5, 99–118. Scopus.	Domestic gardens (composition)	Agenda setting	No
Dujardin, S., Stas, M., Van Eupen, C., Aerts, R., Hendrickx, M., Delcloo, A. W., Duchene, F., Hamdi, R., Nawrot, T. S., Van Nieuwenhuysse, A., Aerts, J.-M., Van Orshoven, J., Somers, B., Linard, C., & Dendoncker, N. (2022). Mapping abundance distributions of allergenic tree species in urbanized landscapes: A nation-wide study for Belgium using forest inventory and citizen science data. <i>Landscape and Urban Planning</i> , 218, 104286. https://doi.org/10.1016/j.landurbplan.2021.104286	Distribution of allergenic plants and its impact on health	Agenda setting and policy formulation (planning)	No
Fernández-Álvarez, R., & Gutiérrez Ladrón de Guevara, M. de J. (2022). Socio-ecological patterns of citizens science programs: The case of forestry observations in 3 central Mexico states.	iNaturalist observations (species recognition)	Policy formulation	Yes, the article focuses on the influence of the degree of marginalization of municipalities on the participatory monitoring patterns.
Hunter, R. F., Rodgers, S. E., Hilton, J., Clarke, M., Garcia, L., Ward Thompson, C., Geary, R., Green, M. A., O'Neill, C., Longo, A., Lovell, R., Nurse, A., Wheeler, B. W., Clement, S., Porroche-Escudero, A., Mitchell, R., Barr, B., Barry, J., Bell, S., ... Jepson, R. (2022). GroundsWell: Community-engaged and data-informed systems transformation of Urban Green and Blue Space for population health – a new initiative.	Urban Green and Blue Spaces	Agenda setting, policy formulation, implementation, and evaluation	Yes, in representation and participation
Rossi, L., Menconi, M. E., Grohmann, D., Brunori, A., & Nowak, D. J. (2022). Urban Planning Insights from Tree Inventories and Their Regulating Ecosystem Services Assessment.	Urban forest (tree inventory)	Policy formulation (decision support)	No

Appendix B: Guiding template Experts' interview (blank)



Citizen-powered data ecosystems for inclusive and green urban transitions

Interview guide

o Introduction

We are conducting this interview with you in the context of the Horizon Europe project [Urban ReLeaf](#). Urban ReLeaf is an action-oriented mission that aims to advance citizen-generated data as a central resource for inclusive urban greening planning in support of local policy making, European strategies and monitoring systems (e.g., the Green Deal, Copernicus), and global efforts such as the SDGs and GEOSS.

The project started in January this year and we are currently in the preparatory phase of the actions in ATHENS which is one of the 6 pilot cities. To foster the development of relevant activities within our pilot, it is important for us to identify opportunities for citizen-generated data for the local government, which is the reason for this interview.

Alongside other elements, our main goals for today's interview are to identify:

- o The gaps, opportunities, and challenges of citizen-generated data in our city, for planning and decision-making for urban greening
- o The stakeholder groups that should be engaged with, and how to best reach them (contact point)

We will first set the scope regarding greening and citizens participation in ATHENS, then identify gaps, and challenges for citizen generated data's contributions, and then go over different opportunities for collaboration.

o Setting the scope

Q1. Please state your name, your professional position and the department/service you are working for.

Q2. What is your role, and/or the role of your department/service, in the Policy Lifecycle?

Q3. What are the other actors that have a role in the Policy Lifecycle, i.e., in developing environmental policies:

- o Agenda setting (i.e., identifying problems that need intervention from the authorities)
- o Policy formulation (i.e., defining the structure of the policy)
- o Policy adoption (i.e., approval procedure of the policy)
- o Policy implementation (i.e., establishing that the correct partners have the knowledge and resources to put the policy into effect and monitoring)
- o Policy evaluation (i.e., assessment of the effectiveness and success of the policy)

Q4. Urban ReLeaf will focus on **urban greening**. Based on the different policy documents released by the city, it is clear that ATHENS is planning to expand its green network. We, the pilot of XXX, have identified the topic of XXX.

- Would you say this is in line with our city's agenda?
- Do you have any other specific focus to add in relation to greening and/or nature-based solutions?

Q5. A central component of the project is **citizens' participation**. We have identified the following participatory actions as central in our activities in this project: XXX.

- Would you say this is in line with your city's agenda?
- Do you have any other specific focus to add in relation to citizens participation for urban greening? E.g.: collecting and analysing data, local policy development, recruiting as many citizens as possible or a specific group of citizens, creating awareness around urban greening, informing the public about nature-based solutions, creating stronger collaboration with different stakeholders, implementing change through concrete actions, etc.?

Q6. Are you aware of any instance in which our city is making use of citizen's generated data? E.g., through citizen science, having low-cost sensors, taking pictures, census, surveys etc.?

- Yes (if several instance, please repeat the set of questions for each)
 - How is that data collected?
 - How do citizens contribute?
 - How is the data processed? E.g., what steps are taken?
 - Who are the parties involved? (e.g., name of departments, services, private companies)
 - How is that data being used? E.g., integration in datasets, scientific contribution, taking planning decision, taking concrete actions?
- No
 - Is there a specific reason why not?
 - E.g., is it because it has just not come up?
 - Is it because there is a resistance against it at city/municipality level or from other stakeholders?
 - Other reason?

○ Identification of gaps and challenges for citizens-generated data

Q7. Without going in too much detail, from the top of your head: what are the main points of the greening strategies, action plans, etc. (e.g., **three main themes**) for the coming years? And more specifically are there any specific focus points:

- In terms of citizen participation?
- Type of nature-based solutions?
- Neighbourhoods/area of implementation?

Q8. When thinking about these urban greening plans in our city, we have identified the following **barriers and gaps**:

- XXX
 - Which of these gaps would you say are the most critical?
 - Are there any other type of information/data are you still currently missing, or would be relevant to get?

Q9. Besides involving the general public, social inclusion is high on the Urban ReLeaf agenda. The different **target groups** have been identified:

- XXX
 - Which of these target groups would you say are the most critical to involve?
 - Do you have any experience with involving these groups? What is your experience/lessons learned?

○ Opportunities for collaboration with ongoing initiatives

Q10. XXX has developed different action plans and strategies for the coming years. There are specific points that have raised our attention and for which we have questions.

- XXX
 - Are there any additional documents, policies, action plans, etc. that you would refer us to for additional information?

Q11. We have identified some **stakeholders** to contact for our activities, such as:

- XXX
 - Would you say there are any critical actors missing (can be public, private, NGOs, etc.)?

Q12. We have identified some **initiatives** to contact for our activities, such as:

- XXX
 - Do you see an opportunity to link Urban ReLeaf to any of these initiatives? If so, how?
 - Are there any other type of initiatives missing that would be relevant to involve in the Urban ReLeaf project?

Q13. We have identified the following **tools** as opportunities to link up to:

- XXX
 - Are there any participatory tools or platforms that would be relevant to involve in the Urban ReLeaf project?

Q14. As part of the project, we will be launching a **Community of Practice (CoP)** in early 2024. A Community of Practice is a safe (online) space where practitioners, scientists, policymakers and citizens can share knowledge and resources about a specific issue (e.g., urban greening) and co-develop tools, guidelines and best practices to strengthen mutual learning. There are 3 anticipated working groups covering three different themes:

- Triggering innovation in public authorities with citizen-powered science
- Coupling citizen science and Earth Observation for the European Green Deal & SDG 11 monitoring
- Urban design foresight for Nature-based Solutions and Blue Green Infrastructure scenario planning
- Would you in principle be interested in joining one of our Communities of Practice?

Thank you for your participation!