

***Citizen social science and spatial planning in the Low Lands - New collaborations between citizens, academics, and public authorities – Tom Goosse***

In the last decade, the Low Lands have experienced an onset of citizen science projects. These citizen science practices allow to sense and understand spatial challenges closer to citizen's everyday reality through quantitative or qualitative data collection. They feature diverse collaborations between citizens, academics, and public authorities and how they can serve each participants' interests. The concept of citizen social science suggests a citizen involvement going beyond mere participation in scientific research but also as active agents in policy innovations through citizen science. Planning scholars identified citizen (social) science as a promising path to establish new collaborations. It remains however unclear how citizen (social) science can enable more effective collaborative settings and how it pertains with existing political agendas and diversity of actors' interests. This paper reflects on how citizen social science can influence collaborations in spatial planning and local interest-related dynamics. We delve into 3 Belgian and 3 Dutch citizen science projects that directly relate to local planning issues and debates. This ongoing research combines an analysis of public documents, articles from newspapers and scientific publications with ongoing semi-structured interviews of key-stakeholders. We study how existing connections between citizens and public authorities evolved through these projects. This preliminary analysis demonstrates how citizen (social) science allows to sense and understand multiple spatial issues from citizens' perspective. It shows how it can significantly transform working arrangements between public authorities and civil society. It also displays how some projects instrumentalize citizen science in local power dynamics and how they influence local planning debates.

# Citizen social science and spatial planning in the Low Lands

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**Tom Goosse**

## Stellingen:

Burgerwetenschappen kan de weg effenen voor verschillende vormen van samenwerking tussen burgers en overheden voor meer burgergerichte ruimtelijke planning.

Burgerwetenschappen vertonen verschillende raakvlakken met ruimtelijke planning. Ze kunnen maatschappelijke planning debatten beïnvloeden door middel van burgerparticipatie, nieuwe wetenschappelijk gegronde inzichten en de sensibilisatie van publieke opinie.

De gemeenschappelijk ontwikkelde inzichten kunnen de basis vormen van een consensus tussen antagonistische belanghebbenden of verder een probleem concretiseren en zelfs leiden tot een gemeenschappelijk beaamde maatregel.

Deze voordelen zijn echter afhankelijk van de onderlinge positionering en interessen van belanghebbenden, de bestaande institutionele structuren en machtsdynamieken. Deze kunnen de wetenschappelijke en democratische legitimiteit van burgerwetenschappen ondermijnen.

Dit vraagt om transparantie in burgerwetenschapsprojecten rond de wetenschappelijke methodologie, de positionering en interessen van de betrokken belanghebbenden.

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# **Citizen social science and spatial planning in the Low Lands**

## *New collaborations between citizens, academics, and public authorities*

### ***Introduction***

In the last decade, the Low Lands have seen the rise of citizen science initiatives studying the living environment of citizens. Scholars and public institutions have acknowledged citizen science's plurality and its benefits for policy-making to address sustainability issues (de Ruiter et al., 2024; Veeckman et al., 2021). Studies emphasize its potential for creating citizen-centred knowledge and increasing citizen's engagement and awareness in policy-making process (Van Oudheusden et al., 2023). Some underline citizen science can be instrumentalised by citizens to sense their direct environment and acquiring insights about their concerns (Dillon et al., 2016). These reflections led to the emergence of the citizen social science concept that aims at enhancing civic engagement in scientific research and for evidence-based policy-making closer to citizen's everyday reality (Kythreotis et al., 2019).

Spatial planning is struggling since decades to endeavour plans closer to citizen's everyday reality. Planning approaches have sought means to detach from its dominant top-down technical rationality and to apply a more bottom-up communicative rationality in its practice. Scholars have therefore developed planning approaches, such as collaborative planning (Healey, 2003) or coproduction (Albrechts, 2013), proposing means of involving citizen more closely in planning practice. Spatial planning remains however strongly entangled in its government-controlled paradigm (Boelens & De Roo, 2016). More recently, research has focused on the rise of citizen initiatives (Boonstra, 2015; Devos, 2016). Some suggest not to start from inside the institutionalised form of planning but rather from the initiatives that emerge from civil society itself (Boonstra & Boelens, 2011). While not completely excluding the possibility of a public-led planning, scholars seek approaches that would be applicable in both directions of planning, leading to a possible double connection between public authorities and citizens (Devos & Boelens, 2024).

Devos & Boelens (2024) have presented citizen science as a promising path for instigating bi-directional connections between citizens and public authorities. The potential role of citizen science in spatial planning and urban transformation remains yet underexplored (Peer, 2023). Recent studies indicate that citizen science projects in urban governance and spatial planning cannot be regarded outside of the existing political agendas and diversity of actors' interests (Danke et al., 2025; Goosse et al., reviewed and submitted). This research delves into six citizen science projects from the Low Lands (Belgium and The Netherlands) that address spatial planning related issues. The objective of this research is to investigate how these projects impact the cooperation between citizens and local public authorities. It analyses the projects' influence on the main actors' positioning to the addressed issue and on their inclination for further cooperation and higher citizens' involvement.

### ***Citizen social science and spatial planning***

Citizen science can be defined as scientific research where citizens participate in one or several steps of the scientific process. Studies underline the potential of citizen science to address sustainability challenges and to produce scientific evidence more relevant in citizens' everyday life (Dillon et al., 2016). Some scholars therefore advocate for the concept of citizen *social* science where citizens are involved in all steps of the scientific process and aims at generating more citizen-centred information to improve policy-making (Kythreotis et al., 2019).

This research agrees with the premise that such concept of citizen social science could enhance the social relevance of policies and serve emancipatory and democratisation ideals. But it could also constraint citizen science into focusing on one type of practice without considering pragmatic challenges. This research follows Van Oudheusden et al. (2023) who underline citizen science's plurality and its potential to experiment various modes of democratic representation and participation. This plurality offers various working arrangements between partners depending on situational factors determined by social, cultural, political and economic specificities (Goosse et al., reviewed and submitted). These factors relate to the interests, biases and norms of the involved partners and influence the set-up of any collaborative form of research (Klintman et al., 2022). We hence suggest a form of citizen social science where citizens are not necessarily involved in every step of the scientific process. Citizens should however remain essential active key-agents in the set-up of the citizen science process, the best working arrangements, and the interpretation of the results to policymaking. Such approach offers more flexibility to practical participatory constraints such as time restrictions, social role perceptions and citizens' motivations (Fischer et al., 2021). This view on citizen social science offers the possibility of "*various enactments*" (Van Oudheusden et al., 2023, p. 16) where citizens play a key role in the development of scientific evidence to support spatial planning practice.

A first exploratory study identified four types of interfaces between citizen science and spatial planning practice (Goosse et al., reviewed and submitted). First, most citizen science projects reside on monitoring objectives where citizens are often only involved in the data collection. Such projects generally focus on improving models that influence formal plan-making, consequently following a more government-led technically oriented planning practice (Boelens & De Roo, 2016). Nevertheless, they can contribute in informing public opinion, raise awareness and instigating policy and behavioural change through large scale participations (Van Oudheusden et al., 2023). Second, dissemination citizen science projects tend to develop a new understanding of a problem by presenting its manifestation and impact at citizen scale. The objective is to develop scientifically-based evidence, raise awareness, alert public opinion, influence societal debates and policy agendas (Van Oudheusden & Abe, 2021). The third interface focuses on consensus building in contexts with diverging interests. The purpose is to develop a shared understanding and create a bridge between citizens, public authorities, academics and eventually businesses (de Ruiter et al., 2024). The fourth type of citizen science are action-oriented and tend to understand specific local issues and develop immediate solutions (Tasseron et al., 2020). These solutions can include direct interventions, but also policy recommendations or use citizen science results as leverage for dialogue with concerned stakeholders.

These interfaces show how citizen science conforms to several planning approaches. Monitoring citizen science does not exclude technical oriented planning practices if the citizen science partners consider it the best situational approach. Following Healey's collaborative planning approach (2003), the interfaces also present a way to instigate mutual learning and open, inclusive and rational discourses. In addition, these interfaces introduce citizen science as potentially initiated from civil society itself (Boonstra & Boelens, 2011). They feature a potential instrumentalization of citizen science in conflictual contexts where it is not necessarily used to depoliticise conflict or exclude conflicting opinions (Gunder, 2010). In such instances, citizens and public authorities have shown to recognize their conflictual positions and negotiate their different interests (de Ruiter et al., 2024), coinciding with Albrechts' (2013) coproduction perspective. The four types of interfaces shed light on the potential applications and impact of citizen science on formal and informal planning-related processes. It remains however unclear how citizen science projects can influence the main stakeholders' positions and offer ways of addressing diverging interests.

## ***Methodology***

### **Case-studies selection**

This research builds further on the exploratory study mentioned above, which is based on 22 exploratory cases from The Netherlands and the Dutch speaking regions of Belgium (Goosse et al., reviewed and submitted). This research selected three Dutch, and three Belgian projects based on their explicit relation to spatial planning issues and their characteristics regarding the types of interfaces with spatial planning. The in-depth cases are the Curieuze Neuzen (Antwerp, 2016), Stiemerlab (Genk, 2020-2022), ExpAIR (Brussels, 2013-...), Plastic Spotter (Leiden, 2019-...), InfraVught (Vught, 2021-2031) and Samen meten naar Vliegtuiggeluid (Schiphol, 2021-2022).

**Table 1: Overview of citizen science cases with location, research theme, spatial planning interface and number of conducted interviews (as of 8<sup>th</sup> of April 2024).**

<b>Names</b>	<b>Location</b>	<b>Research theme</b>	<b>Spatial planning interface</b>	<b>N° of conducted interviews</b>
<b>Curieuze Neuzen</b>	Antwerp, BE	Air quality	Dissemination	18
<b>Stiemerlab</b>	Genk, BE	Water quality	Monitoring	7
<b>ExpAIR</b>	Brussels, BE	Air quality	Dissemination	2
<b>Plastic Spotter</b>	Leiden, NL	Water quality	Action-oriented	3
<b>InfraVught</b>	Vught, NL	Noise and vibration nuisance	Consensus building	4
<b>Samen meten naar Vliegtuiggeluid</b>	Schiphol, BE	Noise nuisance	Consensus building	4

### **Empirical & analytical framework**

This research builds on desk research compiling public documents, articles from newspapers and scientific publications that relate directly to the selected citizen science projects. Semi-structured interviews of key-stakeholders from civil society, public authorities and academic partners delivered further empirical evidence. As of the 8<sup>th</sup> of April 2025, the research conducted interviews with ten representatives of citizen initiatives, four citizen volunteers, six academics, five local civil servants, eleven representatives of public organisation and two local politicians.

The semi-structured interviews follow congruent arrangements depending on the type of interviewee. The interviews of public stakeholders and politicians include 1) their role and responsibilities; 2) the evolution of their institution's and their own positioning to the project; 3) the impact on their working approach and 4) their opinion on citizen science's potentialities and hurdles. The interviews with citizens and representatives of citizen initiatives focused on 1) their initial motivation to participate to or initiate citizen science; 2) their tasks in the citizen science projects; 3) their positioning to public authorities and; 4) their opinion on potential future projects. Finally, academics were asked about 1) their work relation to citizen science; 2) their view on the academic findings; 3) the influence on their cooperation with other stakeholders and; 4) the potentialities and hurdles of citizen science.

Following the semi-structured interviews, their content is configured and analysed following a similar structure divided in three parts. The first part includes a description of the underlying reasons and motivation for their set-up, the various intentions and objectives, the methodology of the projects and

the policy context. The second part describes the aftermaths of the project, eventual spin-offs, how the key-stakeholders used the results and further working arrangements. The third part concludes with an analysis based on the interfaces with spatial planning (Goosse et al., reviewed and submitted), focusing on the relational evolution between the citizens and public authorities, elements indicating a shared understanding, inclinations to cooperation and the stakeholders' positioning and argumentation.

## ***Results & discussion***

### **Curieuze Neuzen (Antwerp, 2016)**

The Ringland citizen movement launched the Curieuze Neuzen project amidst the turmoil of the large Antwerp mobility debate regarding the closing of the highway ring. The movement advocates for a redesign of the city's mobility system and a covering of the Ring Road. Its members present a wide set of expertise and is composed of scientists from universities, urban planners, and entrepreneurs. The project conducted a large-scale air sampling in Antwerp and gathered 2000 citizen volunteers to collect air samples. It allowed to depict a precise distribution of NO<sub>2</sub>-levels and identify specific hot spots of pollution. Curieuze Neuzen is regarded as a precursor in the field of citizen science and air quality monitoring. The project is regarded for its effective communication campaign and the scientific quality of the research process (Van Oudheusden & Abe, 2021).

The Curieuze Neuzen project helped in identifying areas with air pollution levels exceeding the European norms (Van Brussel & Huyse, 2019). Several spin-offs emerged in Antwerp and Flanders following the project. Collaborations between news media, academics and public institutions launched regional spin-offs to measure air quality (Curieuze Neuzen Vlaanderen, 2018) and soil moisture (Curieuze Neuzen in de Tuin, 2021-2022). These projects have received recognition for their scientific innovation and added value for improving existing environmental models. Citizen initiatives in Antwerp also launched their own projects to measure air quality. They tend to use their measurements as leverage for their demand to reduce traffic in their neighbourhood (Interviews of 11-2024). Ringland also set-up the Straatvinken project to monitor the evolution of the modal shift policy of the city, aiming at a car reduction by 2030 (Interviews of 5-2024). Furthermore, Ringland officialised its position in Antwerp as civic and expert stakeholder through the *Toekomstverbond* in 2017, effectively taking part in the debates regarding the Antwerp mobility system.

Some suggest a rise of communicative approaches and acknowledgement of interdependency amongst stakeholders surrounding the Antwerp mobility debate (Van Brussel & Boonstra, 2020). While we agree with the increase of dialogue between previously antagonistic actors, we also bring some nuances. This research argues that Curieuze Neuzen, through its successful dissemination, helped in legitimizing Ringland's position and claims in the public opinion. However, local authorities and citizen initiatives do not seem to evolve towards a shared understanding of the mobility challenges based on a common problematization. Local authorities question the air quality and mobility data collected by the citizen initiatives through the argument of bias, non-representativeness of the measurements and lack of scientific quality. Each party thus uses its own measurements and interpretations to contradict the other actors' claims (Interviews of 8-10-2024 and 3-3-2024).

### **Stiemerlab (Genk, 2020-2022)**

The Stiemerlab project was set-up by the Lucas School of Arts in the frame of a H2020 project. Stiemerlab sought to measure the water quality of the Stiemer, flowing through the city of Genk. The initiators' knowledge of the local city's plans and participatory programs enabled the partnerships with local authorities (Interview of 18-02-2025). The Stiemerlab was conducted in the frame of the Stiemer

Masterplan with the aim of developing the area into a green-blue network with a focus on social, economic and cultural development (Tractebel et al., 2019). The Stiemerlab figures as one of the Stiemerdeals, offering a participatory trajectory for enforcing the Stiemer Masterplan through scientific knowledge and public support (Interview of 31-1-2025).

The Stiemerlab aimed at monitoring the water quality. The project brought an increased understanding of the impact of rainfall events on the Stiemer's pollution levels caused by its connection to the local mixed sewer system. It brought further insights on potential scenario's in changing the Stiemer area into a more climate adaptive green-blue network. The initial project allowed the improvement of the Stiemer's water quality modelling based on samples collected by citizens. The project was subsequently prolonged by the city for another 2 years by including citizens' involvement in the maintenance of the official measuring sensors (Interview of 31-1-2025).

The Stiemerlab as citizen science projects presents typical monitoring citizen science characteristics. The tasks of the citizens are limited to data collection and maintenance of official sensors, while recognized experts conducted the data interpretation and results. The set-up of the project was already based on an existing government-led participation trajectory with no antagonism or diverging interests. The Stiemerlab therefore did not significantly change the collaborative arrangements between local authorities, academics, and citizens.

### **ExpAIR (Brussels, 2013-...)**

Brussels Environment, the public environmental institute of the Brussels Region, initiated the ExpAIR project in 2013. The project's objective was to assess the individual exposure of citizens to black carbon, to raise awareness and encourage behavioural change (Da Schio et al., 2019). After acknowledging their lack of expertise in participatory approaches, the public institution contacted the BRAL citizen movement. The BRAL movement decided to start from the concerns of the citizens and involve local neighbourhood committees (Interview of 3-4-2025). Both partners have since then collaborated in different citizen science projects that measure different parameters of air quality, such as Aircasting and CurieuzenAir. A collaboration between the BRAL movement and the Vrije Universiteit Brussels launched the AirCasting project through a European project between 2016 and 2019. It used airbeam-sensors connected to smartphones to measure particulate matter levels (Da Schio, 2022). The CurieuzenAir was a spinoff of the Curieuzen Neuzen project that involved 3000 citizens to measure at their windows NO<sub>2</sub>-levels over a four week period (Lauriks et al., 2022).

The many citizen science projects in the Brussels Region allowed to identify significant variations in the air pollution, highlighting areas with high pollution (Da Schio, 2022; Da Schio et al., 2019; Lauriks et al., 2022). The BRAL citizen movement can be regarded as a well-established civic organisation in Brussels, existing since 1974, who maintains a wide network of various actors. These previous partnerships contributed to initiating, facilitating, and consolidating the collaborations around the citizen science projects. Furthermore, the citizen science projects occurred during periods in which regional public authorities upheld policy agendas with compatible concerns and problematizations, ensuring the support from the government (Interview of 3-4-2025).

These citizen science projects feature dissemination characteristics as they particularly aim at alerting public opinion and influence policy agendas. The projects emerged in favourable cooperative contexts where BRAL benefited of the support and approval of public authorities (Interview of 3-4-2025). According to the BRAL movement representatives, the elections of 2024 for the regional government gave significantly different results. Combined with the popular criticism to the previous mobility

policy-agendas, this can forecast diverging problematizations between the BRAL citizen movement and the coming regional government leading more antagonistic positionings. However, contrarily to other Belgian cities, the Brussels Region features a decentralized governmental power distribution, which allows adaptive changes in their actors' networks and collaborations (Interview of 3-4-2025).

### **Plastic Spotter (Leiden, 2019-...)**

The Gracchwacht citizen initiative launched the Plastic Spotter citizen science project in Leiden. Two citizens started de Gracchwacht initiative to clean up the canals of Leiden from plastic litter. The project scaled up through dissemination efforts, such as an exhibition of the plastic litter found in the canals, to alert public opinion and raise awareness. The initiative consequently benefited from an increase in volunteers (Schipper, 2020). Both initiators were in contact or professionally related to the local Leiden University, who was developing a special department focusing citizen science as a new academic practice. This led for both initiators to start PhDs under the new department's support by conducting citizen science's research projects (Interview of 19-2-2025).

Although the citizen initiative and the local authorities acknowledged some antagonistic moments, the Plastic Spotter evolved towards more cooperation between parties. De Gracchwacht showed the lack of a particular organisational structure to address plastic litter in the canals (Schipper, 2020). The local authorities started to support the citizen initiative with the permission to occupy one of the city's official canal bridge houses. Joint efforts of the citizen initiative and the city's administration led to the implementation of a policy instigating catering businesses to use reusable cups during city wide events, effectively reducing plastic litter. As of April 2025, the city administration is searching for funding opportunities to support the initiative also financially (Interview of 20-02-2025).

The Plastic Spotter is an action-oriented citizen science project addressing a specific local issue and trying to develop solutions. The plastic litter investigation allowed to identify the diverse sources of pollution in the Leiden's canals. The project managed to enhance public opinion but more importantly the awareness of local authorities regarding the issue, effectively leading to an acknowledgement of each party's positions, a certain mutual understanding and even an official cooperation.

### **InfraVught (Vught, 2021-2031)**

The announcement of two major supra-local train infrastructural projects in 2010 saw the rise of the Samen voor Vught citizen movement. The projects the building of additional train tracks putting the Vught municipality at the crossroads of national and freight train lines. The Samen voor Vught was created in 2012 as a citizen platform to defend the interests of citizens and reduce as much as possible the impact on their living environment. Based an initial idea in 2017, the movement started a partnership with a recognised sound expert and, with the financial support of local authorities, launched the InfraVught citizen science projects in 2021 (Interviews of 3-2025). The purpose of the citizen science project is to assess the noise and vibration nuisance caused by infrastructural works and train traffic through quantitative and qualitative data collection during ten years (RIVM, 2021).

Several public organisations regard the InfraVught project as a technically innovative project, which contributes to the development of research methodologies to assess noise and vibration nuisance and means to reduce this nuisance (Interviews of 3-2025). Samen voor Vught decided to acquiesce to the implementation of the train lines projects but explicitly tends to defend the citizens' interests. The InfraVught has the logistic support of the RIVM (the Dutch National Institute for Public Health and the Environment) and local authorities. ProRail (the Dutch organisation of the national railway network infrastructure) has shown to acknowledge the quality of the measurements and sees it as an



opportunity to increase its insights on the infrastructural factors influencing nuisance. The public organisation has consequently adopted an internal work procedure to reduce nuisance in dialogue with the local citizen movement (Interviews of 3-2025).

The InfraVught shows characteristics of consensus building oriented citizen science projects in a context with diverging interests. The project's collaboration with a recognised expert, known by the other stakeholders (Interview of 24-3-2025), in an underdeveloped field of research, contributed to recognizing its scientific legitimacy and acknowledge a common added value. The initial positioning and intend of the citizen movement not to take legal proceedings might have contributed to creating an understanding of each actor's positioning and arguments. These factors might have encouraged ProRail, the RIVM and local authorities to recognize and support the project.

### **Samen meten naar Vliegtuiggeluid (Schiphol, 2021-2022)**

The RIVM initiated the Samen meten naar Vliegtuiggeluid project around the Amsterdam Airport Schiphol (AAS) in 2021. The development of the AAS has been a long debated issue since the 1960s (De Jong & Boelens, 2014). A new controversy erupted in 2000s following the political decision of expanding the airport. SchipholWatch, a citizen movement concerned about the potential significant noise nuisance, developed an opensource application to report noise nuisance through smartphone measurements (Explane.org). Public and academic institutes considered the application not appropriate due to the lack of scientific reliability of the smartphone measurements (Interview of 23-01-2025). After receiving the approval from the Ministry of Infrastructure and Water Management who was initially reluctant, the RIVM contacted SchipholWatch to collaborate in the set-up of a new citizen science project (Interview of 14-3-2025). The Samen meten naar Vliegtuiggeluid aimed at improving the monitoring of air traffic noise nuisance by combining quantitative measurements using high levelled equipment with qualitative well-being surveys (de Ruiter et al., 2024).

The RIVM project report emphasizes the diversity of experiences and perceptions to noise, which met some criticism from the citizen movement. The project however allowed to identify peak moments of nuisance with high precision, which could support claims in the future. Furthermore, the fact that the project emanated from a recognised public institution specifically identifying noise nuisance from air traffic, can strengthen the legitimacy of these claims. These arguments led the citizen movement to appreciate and acknowledge the RIVM-efforts (Interview of 14-3-2025).

The Samen Meten naar Vliegtuiggeluid project sought to build consensus through noise nuisance measurements that would be recognised by all antagonistic stakeholders. The appreciation and acknowledgement of the citizen movement regarding the RIVM-efforts indicates a form of understanding of the RIVM's delicate position and internal reluctance in addressing such controversial topics. However, the conclusion of the RIVM report was also criticised because it emphasized the diversity of noise experience, which can downplay the potential nuisance (Interview of 23-1-2025).

### ***Conclusion***

This research examined how citizen science projects created new working arrangements between citizens, public authorities, and academic institutions in diverse institutional and policy contexts. It focused on the impact of citizen science in the relationships between key-stakeholders. The analysis investigated indications of shared understandings, the inclinations, and motivations of these key-stakeholders for collaboration and their positioning and argumentation in the policy debates.

The projects feature different applications of citizen science. Most of the projects' initiators relied on the outreach of citizen science results to inform public opinion and hence gain support. They tend to capitalize on the citizen's participation to gain democratic legitimacy and instrumentalize citizen science results as scientific evidence to strengthen their positioning in planning debates. However, the accomplishment of such endeavours is dependent on a number of situational factors that mutually influence each other. These factors are the key-stakeholders' interests, their positioning to the addressed issue, their recognition of the citizen science methodology and results, and the institutional power distributions. Case-studies with low divergence of interests and key-stakeholders' positionings, such as the Stiemerlab or Plastic Spotter, do not seem to feature enduring challenges in the recognition of these citizen science projects. They paved the way to a shared understanding of the new problematization presented by the citizen projects. Other case-studies with a higher divergence of interests and positionings, such as the local Curieuz Neuzen spinoffs or Samen meten naar Vliegtuiggeluid, are challenged with the recognition efforts of their citizen science projects. Stakeholders with diverging interests questioned the results of these projects with disputes over their democratic and scientific legitimacy. It indicates that the situational factors are essential to consider during the set-up of citizen social science project and calls for transparency regarding the positionings and interests of the concerned stakeholders. Overall, these factors influence the potentiality of citizen science and concepts such as citizen social science to pave the way to new collaborations and enhanced cooperation between citizens and public authorities. Research is necessary to further elaborate the citizen social science concept and practical approaches to deal with those challenges.

## ***References***

- Albrechts, L. (2013). Reframing strategic spatial planning by using a coproduction perspective. *Planning Theory*, 12(1), 46–63.
- Boelens, L., & De Roo, G. (2016). Planning of undefined becoming: First encounters of planners beyond the plan. *Planning Theory*, 15(1), 42–67.
- Boonstra, B. (2015). *Planning Strategies in an Age of Active Citizenship—A Post-structuralist Agenda for Self-organization in Spatial Planning*. University of Utrecht.
- Boonstra, B., & Boelens, L. (2011). Self-organization in urban development: Towards a new perspective on spatial planning. *Urban Research & Practice*, 4(2), 99–122.
- Da Schio, N. (2022). The Empowering Virtues of Citizen Science: Claiming Clean Air in Brussels. *Engaging Science, Technology, and Society*, 8(1).
- Da Schio, N., Cassiers, T., & Chemin, L. (2019). *Citizen Science: Collective Knowledge Empowers*. Cosmopolis.
- Danke, T., Hecht, R., & Hutter, G. (2025). Reflecting on the practice of citizen science projects for cities – the case of 'Colouring Dresden' in Germany. *Urban Research & Practice*, 18(1), 142–150.
- De Jong, B., & Boelens, L. (2014). Understanding Amsterdam Airport Schiphol through Controversies: A Response to van Buuren, Boons and Teisman. *Systems Research and Behavioral Science*, 31(1), 3–13.
- de Rooter, H., Hendricx, W., Volten, H., Verhoeven, E., & Woutersen, A. (2024). *Data, dialoog en infrastructuur: De opbrengst van acht jaar Samen Meten*. Rijksinstituut voor Volksgezondheid en Milieu RIVM.
- Devos, T. (2016). *Participation & Coproduction in Urban Planning—Reviving the Political Dimension of Citizen Involvement in Spatial Projects*. KULeuven.

- Devos, T., & Boelens, L. (2024). The double connection: Towards a bi-directional notion of participation. *disP - The Planning Review*, 60(1), 4–20.
- Dillon, J., Stevenson, R. B., & Wals, A. E. J. (2016). Introduction to the special section Moving from Citizen to Civic Science to Address Wicked Conservation Problems. Corrected by erratum 12844. *Conservation Biology*, 30(3), 450–455.
- Fischer, A., Dinnie, E., Ellis, R., Eastwood, A., Carter, A., & Welsh, G. (2021). Exploring the Potential of Citizen Social Science for Environmental and Sustainability Research: Experiences of and with Community-Based Researchers. *Citizen Science: Theory and Practice*, 6(1), 17.
- Goosse, T., Lamker, C., & Devos, T. (reviewed and submitted). The potential benefits of Citizen Science for Spatial Planning: An exploratory analysis of 22 Belgian and Dutch cases. *European Planning Studies*, 27.
- Gunder, M. (2010). Planning as the ideology of (neoliberal) space. *Planning Theory*, 9(4), 298–314.
- Healey, P. (2003). Collaborative Planning in Perspective. *Planning Theory*, 2(2), 101–123.
- Klintman, M., Jonsson, A., Grafström, M., & Torgilsson, P. (2022). Academia and society in collaborative knowledge production towards urban sustainability: Several schemes—three common crossroads. *Environment, Development and Sustainability*.
- Kythreotis, A. P., Mantyka-Pringle, C., Mercer, T. G., Whitmarsh, L. E., Corner, A., Paavola, J., Chambers, C., Miller, B. A., & Castree, N. (2019). Citizen Social Science for More Integrative and Effective Climate Action: A Science-Policy Perspective. *Frontiers in Environmental Science*, 7, 10.
- Lauriks, F., Jacobs, D., & Meysman, F. (2022). *CurieuzenAir: Data collection, data analysis and results* (p. 53). Universiteit Antwerpen.
- RIVM. (2021). *Trillingen meten langs het Spoor in Vught / Samen meten*.  
<https://www.samenmeten.nl/projecten/trillingen-meten-langs-spoor-in-vught>
- Schippers, A. (Director). (2020, October 2). *Canalcups* [Video recording]. Youtube.  
[https://www.youtube.com/watch?v=tAkpPirr2T4&ab\\_channel=AlexanderSchippers](https://www.youtube.com/watch?v=tAkpPirr2T4&ab_channel=AlexanderSchippers)
- Tasseron, P., Zinsmeister, H., Rambonnet, L., Hiemstra, A.-F., Siepman, D., & Van Emmerik, T. (2020). Plastic Hotspot Mapping in Urban Water Systems. *Geosciences*, 10(9), 342.
- Tractebel, ADR, Descombes, G., & IMDC. (2019, April 19). *Stiemervallei: Masterplan*. Stad Genk.
- Van Brussel, S., & Boonstra, B. (2020). From Protesters to Professionals: Governance Approaches and Capacities in the Antwerp Ring Road Struggles. In *Civic Engagement, Community-Based Initiatives and Governance Capacity*. Routledge.
- Van Brussel, S., & Huyse, H. (2019). Citizen science on speed? Realising the triple objective of scientific rigour, policy influence and deep citizen engagement in a large-scale citizen science project on ambient air quality in Antwerp. *Journal of Environmental Planning and Management*, 62(3), 534–551.
- Van Oudheusden, M., & Abe, Y. (2021). Beyond the Grassroots: Two Trajectories of “Citizen Sciencization” in Environmental Governance. *Citizen Science: Theory and Practice*, 6(1), 13.
- Van Oudheusden, M., Berti Suman, A., Huyse, T., Huyse, H., & Medvecky, F. (2023). The Valuable Plurality of the Citizen Sciences. *Science & Technology Studies*.
- Veeckman, C., Van Herck, B., Carpentier, M., Van Laer, J., & Sterken, M. (2021). *Draaiboek citizen science voor lokale besturen. Een praktische handleiding over citizen science met en door steden en gemeenten*. (De Deeluitgeverij). SCIVIL.