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Cultural ecosystem services of informal green spaces: usage, perception and preference of residents in deprived urban neighbourhoods

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ABSTRACT

In urban areas, informal green spaces (IGS) can offer complementary green resources next to designed parks and gardens, contributing to green space equality. Therefore, particular attention should be paid to what cultural ecosystem services (CES) IGS provide in socioeconomically deprived neighbourhoods. However, how residents of these neighbourhoods perceive IGS and how IGS can serve as an everyday social space is still an under-explored area. This research investigates local residents' perception and preference of CES provided by an IGS in Amsterdam K-buurt through semi-structured interviews. The interview data were processed through five thematic groups including human scale, recreational and social activities, adequate amenities, inclusivity and accessibility, and appropriation, revealing two dynamic networks of CES perceptions and preferences. Positive perceptions centred on recreational activities like play and dog walking, while challenges included inadequate amenities, poor maintenance, and a sense of neglect. Suggestions emphasised enhancing amenities, fostering community-focused programmes, improving human scale by defining borders, and creating opportunities for appropriation to make the space more inclusive and engaging. By diving into qualitative perspectives, the paper reveals the social dynamics in IGS and highlights the design potential for IGS to contribute to the livability of local environments.

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Cultural ecosystem services; informal green spaces; urban design; ecosystem services evaluation; environmental justice

1. Introduction

1.1. Cultural ecosystem services of urban green spaces

Urban green spaces provide a range of ecosystem services that guarantee the quality of citizens' everyday life (Fleming and Shwartz 2023; Pretty et al. 2005; van Leeuwen,

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Nijkamp, and de Noronha Vaz 2010). Within those ecosystem services provided, cultural ecosystem services (CES), defined as "all the non-material, and normally non-rival and non-consumptive, outputs of ecosystems (biotic and abiotic) that affect the physical and mental states of people"(Haines-Young and Potschin 2018, 10), are important ingredients because of the recreational, aesthetic, spiritual, and other benefits they provide to people (Cheng et al. 2019). For residents in socioeconomically deprived neighbourhoods, characterised by lower socioeconomic status, high levels of poverty, unemployment, low educational attainment, and poor health outcomes (Krieger et al. 2003; Sikorska et al. 2023), CES provided by urban green spaces are especially valuable. Outdoor green spaces in these areas offer residents essential opportunities for social interactions and restorative experiences in their everyday lives (Grahn and Stigsdotter 2010; Stubbs et al. 2016). Consequently, they serve as effective means of promoting the mental and physical well-being of individuals in these communities (Nejade, Grace, and Bowman 2022; van den Bosch and Ode Sang 2017).

However, studies conducted in the US and Europe reveal that deprived neighbourhoods often only have access to fewer and lower-quality green spaces, highlighting an environmental justice issue (Heynen, Kaika, and Swyngedouw 2006). The unequal distribution of green spaces in cities stems from various factors, including urban planning principles, land-use systems, urban development processes, and government policies related to ethnic-racial issues (Wolch, Byrne, and Newell 2014). This phenomenon urges local governments to seek alternative solutions that balance green resources in the city, adding effective green spaces that are eimbedded in the existing neighbourhoods (Lokman 2017).

1.2. Informal green spaces as complementary resource for cultural ecosystem services provisioning

Informal green spaces (IGS) hold the potential to address the unequal distribution of green resources in urban areas due to their omnipresent nature as well as their unique quality of "looseness" that encourages diverse usages and interactions (Sendra 2016). IGS are defined as green open spaces that are not formally designed or managed by the municipality or property owners (Rupprecht et al. 2015). These spaces can be overgrown lots, abandoned post-industrial sites, or linear residual green spaces alongside railways and highways. Since they are no longer regulated or maintained for performing a definite urban function, they often become overgrown with spontaneous vegetation, creating a wild appearance that contrasts with formal parks and gardens. IGS provide a range of ecosystem services, similar or even higher than formally designed urban green spaces (Kim, Miller, and Nowak 2018; Luo and Patuano 2023; McPhearson, Kremer, and Hamstead 2013). Moreover, IGS are omnipresent in the urban landscape due to the highly fragmented nature of urban development. Consequently, some small-scale IGS can often be found in close proximity to citizens' everyday living environment and serve as accessible outdoor spaces for local residents to engage in activities such as walking, observing nature, or engaging in explorative play, similar to formally designed urban green spaces (Farahani and Maller 2019). What is unique about IGS is that they offer citizens opportunities for temporary appropriation and a wider range of activities than defined and controlled formal green spaces (Długoński and Dushkova 2021; Naghibi, Faizi, and Ekhlassi 2021). The flexibility of informal green spaces (IGS) removes

barriers for specific social groups and practices, fostering inclusivity and adaptability. Their unstructured nature allows for spontaneous interactions and diverse uses, encouraging social encounters across cultural and socioeconomic boundaries. As highlighted by Carr et al. (1992), such spaces act as equalisers, promoting community building and mutual understanding through both everyday and unplanned social practices. This fosters the emergence of numerous unexpected local social-cultural practices and hence enhance the identity and resilience of neighbourhoods.

However, IGS also sometimes function as untapped resources in the cities, where their potential remains unexplored because of accessibility, perceptions or economical barriers. Therefore, it is also relevant to explore design strategies that balance minimal intervention with opportunities for socio-cultural interaction, inclusive access, and site-specific maintenance practices.

1.3. Assessing the cultural ecosystem services of informal green spaces

Current studies identify the social value of IGS by assessing the cultural ecosystem services (CES) they provide. Examining these studies can shed light on the advantages and disadvantages of varied methods for CES assessment of IGS.

The first type of assessment is through sending questionnaires to users with pre-defined indicators. These indicators are usually about people's perception, usage, and aesthetic preference of studied sites (e.g. Farahani and Maller 2019; Kim, Rupprecht, and Furuya 2020; Palliwoda, Banzhaf, and Priess 2020; Pinto, Ferreira, and Pereira 2021; Włodarczyk-Marciniak, Sikorska, and Krauze 2020). Three key variables – "usage", "perception", and "preference" – are often applied in the questionnaire.

The second type of assessment is to directly ask users of the site to select pre-defined CES items, created by researchers according to the definition provided by ES classification documents such as CICES (e.g. Lin et al. 2021; Palliwoda, Banzhaf, and Priess 2020). The approach yields more concrete insights into CES as it relies on direct reports from residents.

The third approach is to use digital models to calculate CES based on topographic features of the studied location (e.g. Cortinovis and Geneletti 2020; Długoński and Dushkova 2021; Zhong et al. 2020). The approach is efficient for large-scale studies, but it is unable to provide nuanced insights into how people interact with the space.

However, researchers point out that the assessment of CES is intrinsically linked to people's subjective perceptions, shaped by "perpetual interactions between humans and their environment" (Margaryan et al. 2022, 501) and involves people's lived experience and personal background (Kumar and Kumar 2008). Similarly, Low (2022) puts forward that people's socio-cultural practices can reshape the social-cultural value of a public space, both from everyday life, as well as cultural events and artistic expressions (Low 2022). Therefore, deeper and qualitative insights on the potential of IGS for hosting everyday social-cultural practices and functioning for CES provisioning are required.

1.4. Research objective

This paper aims to address the existing knowledge gap concerning the cultural ecosystem service (CES) provision in informal green spaces (IGS) in the context of socioeconomically

deprived neighbourhoods. The study has two main objectives. Firstly, it aims to explore local residents' perceptions and preferences of CES in IGS. Secondly, the study seeks to investigate the potential for enhancing CES in IGS by linking interview findings with theoretical themes on socio-cultural practices in public spaces, developed in the following section. The research adopts a qualitative approach–using semi-structured interviews to explore the following questions: (1) How do local residents perceive the IGS? (2) What daily uses take place in IGS? And (3) What are the potentials to develop IGS as meaningful social spaces in the neighbourhood? By answering these three questions, this study consequently inform urban design practices that mitigate environmental injustice for deprived neighbourhoods.

2. Theoretical framework: revealing the social value of informal green spaces

To better understand how local citizens perceive IGS and their potential as nearby green spaces for everyday social activities, this study draws on theories of public space and social life, particularly the works of Jan Gehl (2011), Vikas Mehta (2013), and Setha Low (2000). These theories provide insight into how people engage with informal spaces, build connections, and develop a sense of place and attachment.

Jan Gehl's research focuses on human-centred design principles, emphasising the role of human scale (2010), types of outdoor activities (2011), and soft edges in shaping public spaces (2013). His framework highlights the need for public spaces to align with human perception and movement, considering factors like walking speed and eye-level views. Gehl categorises public activities into three types: (1) Necessary activities, including everyday errands and commuting to meet functional needs; (2) Optional activities, including recreational and leisure-oriented actions; and (3) Social activities, including spontaneous interactions and cultural events that emerge in shared spaces.

In Life Between Buildings (Gehl 2011), Gehl advocates for small open spaces without clearly defined boundaries—as they provide opportunities for incidental social interactions. The ultimate goal of his framework is to create livable urban environments that invite people to engage in the public realm. Vikas Mehta builds upon Gehl's principles, emphasising how everyday street design can foster social encounters and a sense of community (Mehta 2013). In his research, Mehta highlights the importance of public amenities and the functional aspects of public spaces in enhancing opportunities for social interaction. These amenities—such as seating, lighting, and trash bins—determine the accessibility and usability of a space, serving as the foundation for inclusivity and engagement (Mehta 2013).

Setha Low's (2000) appropriation theory examines how people use spaces informally, assigning new meanings and identities to them. Appropriation can take physical forms, such as moving furniture or customising a space, and cultural or symbolic forms, such as using a public square for a temporary dance workshop. These appropriations animate spaces, making them more meaningful and personalised. However, they can also create exclusivity, potentially limiting access for other social groups (Low 2000).

Based on these theoretical perspectives, the following themes serve as the framework for analysing local perceptions and preferences regarding IGS. This framework identifies key dimensions of public engagement and explores how these themes interact:

1. **Human Scale**: Ensuring that the scale and dimensions of spaces align with human perception and needs, supported by appropriate amenities.
2. **Recreational and Social Activities**: Designing inviting physical conditions that encourage both optional and social activities.
3. **Inclusivity and Accessibility**: Creating porous and active edges to make spaces more welcoming and inclusive.
4. **Adequate Amenities**: Providing features that promote longer stays, such as seating and focal points (e.g. event spaces), while ensuring basic amenities like lighting and waste disposal are available.
5. **Appropriation**: Offering opportunities for users to engage in self-directed activities and create personalised interventions, fostering new socio-cultural meanings and connections.

By applying this framework to interview analyses, we can identify the most influential dimensions of public engagement in IGS and potential interventions that making IGS more welcoming social space for local people.

3. Method

This study adopts a qualitative approach inspired by O'Brien and Morris (2014), who used interviews and focus groups to investigate community engagement with urban green spaces.

The neighbourhood K-buurt in Amsterdam was chosen as the case study area for its unique socio-economic and environmental dynamics, making it a representative case for exploring the social-cultural value of IGS. The semi-structured interview method was used to identify local residents' attitude on the usage, perception and preference of the case study IGS. The interview record was transcribed and processed through a thematic analysis, using the five themes–human scale, recreation and social activities, inclusivity and accessibility, adequate amenities, and appropriation–developed in the theoretical framework section. The overall methodological flow is shown in Figure 1.

3.1. Case study site

The K-buurt neighbourhood is characterised by a significant lower-than-average socioeconomic status, with a high percentage of residents with immigrant backgrounds. In the municipal statistical dashboard (Onderzoek en Statistiek, Gemeente Amsterdam 2023), this neighbourhood is marked by an SES (SocioEconomic Score, determined by wealth, education level, and employment history) much lower than the Amsterdam average (Figure 2).

The case study location is an empty grassland in the middle of K-buurt, which used to be a parking garage for the apartment buildings built in the 1960s. In recent years, several urban regeneration projects have been conducted in the neighbourhood, and many old apartment buildings have been transformed into private houses. Due to these developments, the old parking garage was no longer needed and was removed in 2017 (Figure 3). The site was then converted into a grassy open area, centrally located within the neighbourhood.

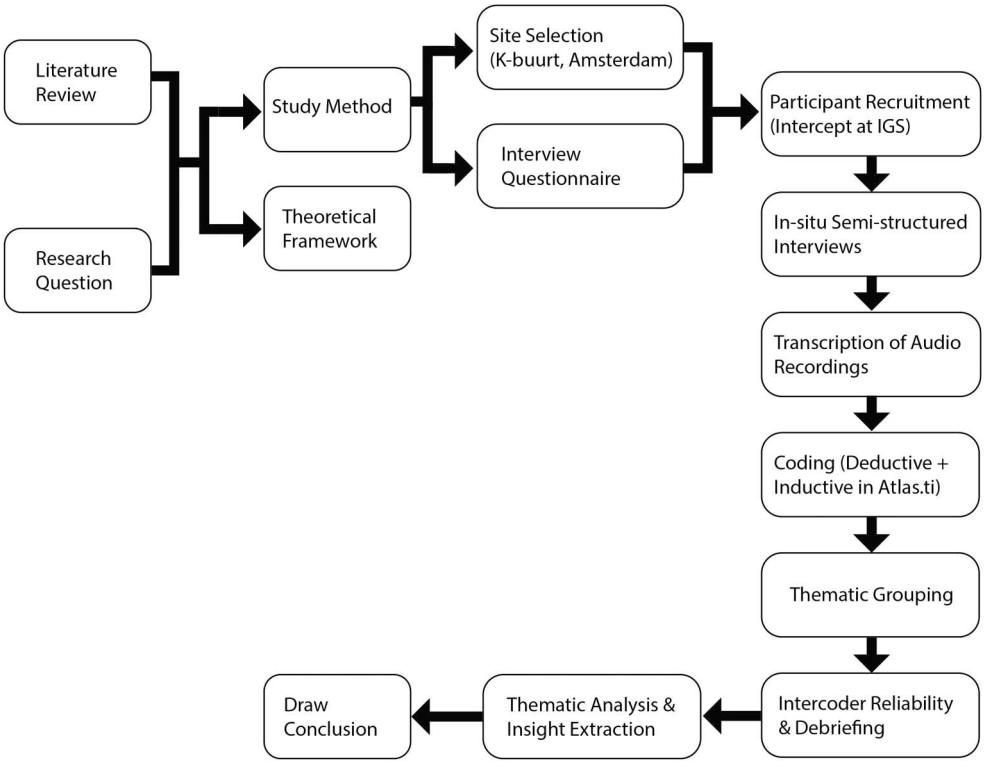

Figure 1. Methodological flowchart outlining the step-by-step process of the interview study. The process begins with the formulation of the research question and literature review, followed by the development of a theoretical framework and study method. Subsequent stages include site selection, participant recruitment through intercept at IGS, and the conduct of in-situ semi-structured interviews. Collected audio recordings are transcribed and coded both deductively and inductively using Atlas.ti. Thematic grouping is then conducted, followed by the themes derived from the literature review, leading to insight extraction, and the final drawing of conclusions.

3.2. Sample size determination

Given the study's focus on cultural ecosystem services (CES) in informal green spaces, theoretical saturation was used as a guiding principle for sample adequacy. Theoretical saturation is a widely recognised standard in qualitative research, ensuring that the sample size is sufficient to capture the diversity of experiences without unnecessary redundancy (Strauss and Corbin 1998). Previous research suggests that for in-depth qualitative studies, thematic saturation—the point at which no new insights emerge—typically occurs between 12 and 24 interviews (Guest et al. 2006; Marshall et al. 2013; Palliwoda and Priess 2021; Sikorska et al. 2020). Practical considerations, such as participant availability and willingness to engage, also influenced the final number of interviews conducted.

3.3. Sampling time and rationale

Interviews were conducted on two separate days: one weekday (July 7, 2022) and one weekend day (July 9, 2022). Each day was divided into three time slots: morning (11:00–12:00), afternoon (14:00–15:00), and early evening (17:00–18:00). This approach

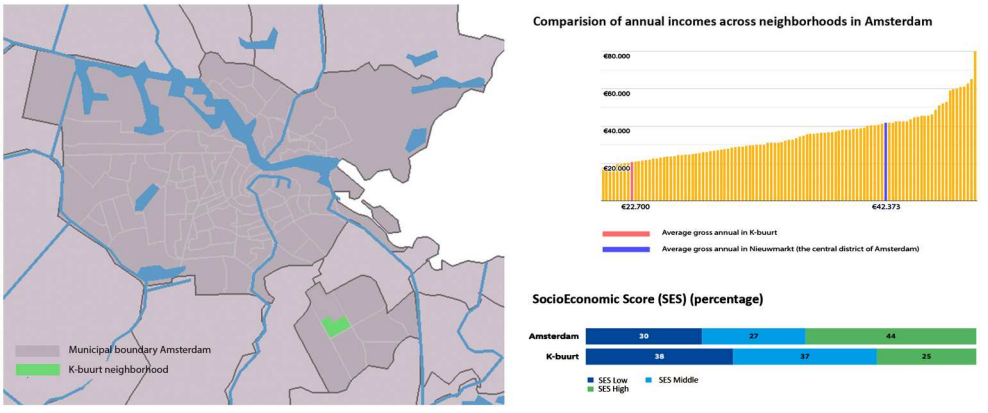

Figure 2. The location of the case study neighbourhood: K-buurt is located in the southeast of Amsterdam, characterised by a population with disadvantaged socioeconomic status. The right chart shows the average gross annual income in K-buurt (red) among other neighbourhoods (yellow) in Amsterdam (Wijk K-buurt, gemeente Amsterdam, in cijfers en grafieken | AlleCijfers.nl 2023).

Figure 3. The case study site is located between two twelve-floor apartment buildings to the east and west, a cluster of single houses (constructed as part of urban renovation) to the south, and the neighbourhood's shopping centre to the north. This site comprises an open grassland area, bordered by a row of trees along its southern edge.

was designed to maximise the diversity range of users with differing schedules, routines, and modes of interaction with the IGS.

Each interview lasted up to 20 min. This duration was considered to allow for in-depth discussions while respecting the time constraints of the participants.

3.4. Inclusion criteria and recruitment process

Participants were recruited using an intercept interview method. Researchers approached individuals who were using, walking through, or situated near the IGS. No prior database

or door-to-door recruitment was used. All interviews were conducted in situ, either directly within the IGS or on adjacent benches and pathways. This spatial immediacy allowed for contextual responses and parallels shadowing or walk-along methodologies. The real-time setting facilitated observation of user behaviour and enhanced the relevance of participant reflections. It is important to acknowledge that the study may involve a degree of self-selection bias. Participation was voluntary, and individuals who agreed to be interviewed may have had stronger opinions about the site or been more engaged with local green spaces.

Inclusion criteria focused on individuals directly connected to the neighbourhood—residents or workers who had visited the study site within the past six months. This ensured participants had relevant engagement with the area. To include typically underrepresented groups, researchers addressed barriers such as time, language, and accessibility. Interviews were scheduled flexibly, multilingual researchers supported communication, and accessible locations were chosen to accommodate physical and transportation needs. These efforts promoted diverse and inclusive participation.

66 individuals were reached out to during the two-days interview, and 39 of them declined to participate due to reasons such as negative attitude towards interviews or time constraints, such as privacy concerns or skepticism about the impact of the research. Additionally, some individuals cited a lack of available time as their reason for non-participation. Altogether 27 individuals were interviewed, three of whom were not able to finish the interview. In the end, 24 validated interviews were collected. While statistical generalizability is not the goal of qualitative studies, this sample size ensures the collection of rich, in-depth perspectives from diverse participants.

3.5. Interview design and procedure

Building on the first and second assessment approaches identified in the introduction section, we adopted a semi-structured interview framework for collecting qualitative data regarding current and potential CES of the case study IGS. The design of the interview and subsequent analysis was guided by relevant literature on CES of IGS (Farahani and Maller 2019; Kim, Rupprecht, and Furuya 2020; Palliwoda, Banzhaf, and Priess 2020; Pinto, Ferreira, and Pereira 2021; Włodarczyk-Marciniak, Sikorska, and Krauze 2020). The tree key variables most often used were extracted: usage, perception, and preference. Semi-structured interviews were designed around two main sections: current usage and perception/preference (Table 1).

The primary focus of the study was on qualitative data gathered through interviews. Nevertheless, this study also informally noted observations during the recruitment and interviewing phases into supplement interview data. These observations included non-verbal cues, the environment of the interviews, and informal conversations before and after the formal interview process. While not as structured as survey data, these notes provided valuable context and supplementary insights, enriching our understanding of the participants' experiences and perspectives. During the interview, participants were asked to give answers to predefined open-ended questions. A set of sub-questions were prepared beside the main questions, to let participants elaborate on their answers. We tested the preliminary interview in a pilot with three residents in a neighbourhood that shares similar demographic characteristics with the case study

Table 1. Main questions and sub-questions used in the semi-structured interview guide.

Section	Main Questions	Sub-Questions	Follow-up Questions
1. Useage	Do you use this green space or not?	How often do you come here?	How long do you often stay here?
		What are other green spaces you would go to in the neighborhood?	Why do you come to this site instead of going to other green spaces?
		Do you pass by this green space?	What is the destination?
	How do you get from home to this green space?	Do you think it is easy to reach here?	
	Do you come alone or do you meet other people here?	How do you like to do that?	
2. Perception & Preference	What do you enjoy here?	What aspects of this space are related to that?	
	What aspects you do not like here?	What aspects of this space are related to that?	
	Are there any changes you would like to see? (spatial aspects)	Such as what? / do you mean by … ?	
		Why do you like to make this change?	

neighbourhood, aiming to refine the questions for clarity and relevance. This also allowed us to ensure that the length of the interview was appropriate for the respondents to remain focused and active throughout.

3.6. Data analysis

These were aligned with the broader cultural ecosystem services (CES) categories and supplemented by theoretical insights from Jan Gehl (2010, 2011, 2013), Vikas Mehta (2013), and Setha Low (2000). From these sources, five overarching themes were developed: human scale, recreational and social activities, inclusivity and accessibility, adequate amenities, and appropriation.

The analysis of the interviews was carried out in four steps. (1) Transcription of Audio Recordings: Initially, we transcribed the audio recordings of the interviews into text. This transcription process served as the foundation for our in-depth analysis. (2) Coding in Atlas.ti (Version 8.4.4): Next, we coded the transcripts in Atlas.ti. This software facilitated an organised and systematic approach to handling qualitative data. (3) Collaborative Coding and Qualitative Content Analysis: In the third step, two of our researchers independently analysed the data. We employed a qualitative content analysis using a content-structuring approach, as suggested by Mayring (2015). We started with identifying codes that are associated with the main criteria of the interview questionnaire, namely usage, perception, and preference, and refined them by incorporating emergent themes from the interviews. This coding process involved continuous examination and refinement of the original codes to ensure the overall code structure aligned with the usage, perception and preference. (4) Grouping Codes into Themes and Drawing Insights: By examining all the generated codes, the two researchers further grouped them into code groups, using the five themes identified in the theoretical framework section, built on the work from Jan Gehl (2010, 2011, 2013), Vikas Mehta (2013), and Setha Low (2000).

3.7. Reliability

To ensure intercoder reliability, researchers independently developed codes, then compared and resolved differences through discussion. Regular debriefings addressed potential biases, especially in relation to K-buurt's socio-cultural context. Coding groups were refined continuously, and researchers actively looked for disconfirming evidence to challenge assumptions. Assumptions were revisited iteratively based on new insights or contradictions. Once no new themes emerged—a point of theoretical saturation—the assumptions were considered well-supported by the data.

4. Result

The Atlas.ti analysis creates a set of codes on the usage, perception and preference of CES. The codes was further interpreted through the five social public space themes. The main findings of the thematic analysis are presented here accompanied by interview quotations enclosed in quotation marks.

4.1. Demographic profiles of participants

The participants represent a diverse demographic profile (Table 2). While the gender proportion is quite well balanced, most respondents were aged between 40–65 and employed. However, we also interviewed three retired and three unemployed persons. Concerning education levels, most have a middle – to high education level.

4.2. Current usage of the IGS

Based on the usage section of the interviews, findings indicate that more than half of the respondents opt not to use the site (Table 3). A prevalent response was that people pass by the site while commuting between their homes and the shopping centre situated

Table 2. Demographic profile of interview participants.

Gender	Male	11
	Female	13
Age	Younger than 20	1
	20–40	7
	40–65	14
	65–80	2
	Older than 80	
Occupation	Student	1
	Employed	17
	Retired	3
	Unemployed	3
	Others	
Education	voortgezet onderwijs (secondary education)	1
	Mbo (vocational secondary education)	8
	Hbo (higher professional education)	9
	Wo (university education)	6
	Not applied	

Table 3. An overview of responses regarding the current usage of the site.

Respondents	Site usage	Notes
Female (younger than 20)	Yes	Play football
Female (20–40)	Yes	Look at nature
Male (20–40)	No	Just passing by
Male (40–65)	No	Just passing by
Female (20–40)	Yes	For walking
Male (40–65)	Yes	Walk dog
Male (40–65)	Yes	Play with kids
Male (40–65)	No	
Female (65–80)	No	Just passing by
Female (40–65)	No	Just passing by
Male (20–40)	Yes	Look at nature
Female (40–65)	Yes	Look at nature
Female (20–40)	No	
Male (40–65)	No	
Male (40–65)	No	
Male (20–40)	Yes	Look at nature
Female (40–65)	No	
Female (40–65)	No	
Female (40–65)	No	Just passing by
Female (40–65)	No	
Male (65–80)	No	
Male (40–65)	No	Just passing by
Female (20–40)	No	Just passing by
Female (40–65)	Yes	Look at nature

across the street. Among the mentioned CES by those who did use the site, the majority encompassed active interactions with nature including playing in the open grass field, walking through, or walking dogs. Few reported CES were passive or observational interactions with nature involving activities like gazing at or looking through the space and enjoying the natural scenery: "if I come by here, I take a picture" (male, 20–40). Additionally, some respondents reported that they use the site as an informal meeting space for social interactions: "I usually come alone, but then I'll meet new people here" (female, 20–40). To summarise, the present conditions of the IGS provide only a limited number of CES that leverage the site's open and natural attributes, while the majority of existing activities remain of short duration and with a low level of engagement.

4.3. Thematic analysis

As the perception codes were analysed (Figure 4), a dominant linkage to the theme **recreational and social activities** was identified: people were drawn to the site for its potential to offer simple, everyday pleasures. Many described the space as a place to unwind, where the greenery and natural atmosphere helped them feel relaxed and refreshed, providing a *restorative experience*. Nine participants shared experiences that spoke to this sense of calm. One put it simply: "You feel relaxed, because there is quiet" (Male, 40–65). For others, the presence of occasional cultural activities added to the restorative quality, lifting their mood and offering a break from the stresses of daily life. Two participants from Ghana commented that the meadow-like field reminded them of their hometown's landscape, and that they therefore appreciate the semi-wild environment because of a *cultural meaning*.

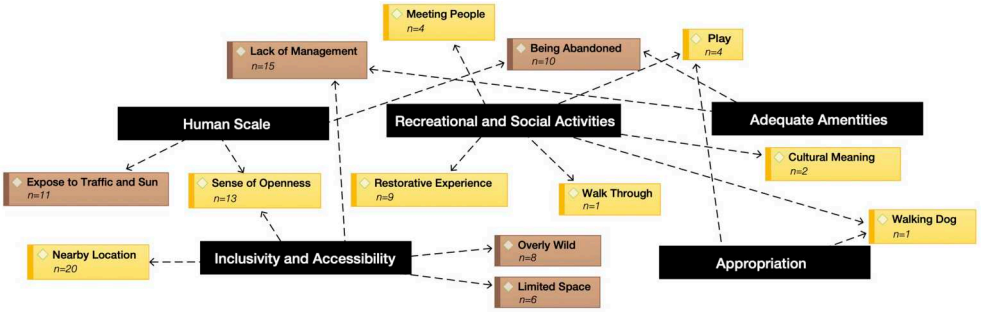

Figure 4. Positive perceptions (yellow) and **negative perceptions** (brown) were identified in relation to the **five thematic groups** derived from the theoretical framework: human scale, recreational and social activities, inclusivity, accessibility, and appropriation (black). The diagram illustrates how these positive and negative perceptions influence social practices and interactions within the case study IGS.

Another positively perceived activities was *play*. The large, open space was appreciated as a safe and freeing environment—"*Good for children to run around a little*" (Female, 40–65), one participant noted. While not mentioned by the majority, dog owners also spoke fondly of *walking dogs* here, finding joy in the informal routine. What stood out was how these activities—playing, walking, pausing—weren't assigned uses of the space. Rather, they were invented by the people who used them, shaped by both their personal needs and the unique qualities of the site. Its generous openness and natural setting seemed to invite this kind of casual, hence indicating a linkage to the theme **appropriation**.

Themes like **human scale**, **inclusivity and accessibility** brought out a mix of responses from participants. On the one hand, many spoke positively about the site's *sense of openness*, which gave the space a welcoming and accessible feel. People appreciated how open the area felt—not just physically, but visually too. As one participant put it: "You could view far away, and you could also see people coming" (Male, 40–65). The theme **inclusivity and accessibility** was another aspect that drew positive feedback. Several participants emphasised the *nearby location* of the site, describing it as being "near my house" (Male, younger than 20) or "in my close neighborhood" (Male, 40–65). For these individuals, the site felt like an extension of their daily environment—something close at hand, familiar, and easy to reach.

However, not all perceptions in **human scale**, **inclusivity, and accessibility** were positive. Several participants expressed discomfort with the site's *exposure to traffic and sun*, largely due to its proximity to a busy main street. The constant noise—*"too many cars"* (Female, 40–65)—was mentioned as a source of irritation that detracted from the site's otherwise peaceful qualities. Beyond the noise, the site also gave off an impression of *being abandoned* or *overly wild*. Its overgrown grasses and lack of upkeep led to concerns about safety and cleanliness. One younger participant described it as "dangerous, like all the bugs, and that (unexpected) stuff I don't like" (Female, <20). For some, the site's untamed appearance evoked memories of its former use—as a place where building materials and sand were stored—which continued to shape their current perception. Even as they began to see potential in the site as a usable green space, these lingering impressions made it difficult to fully embrace it as part of their everyday environment.

One of the most frequently mentioned shortcomings was the lack of adequate amenities, particularly in terms of *lack of management*. Many residents pointed to the presence of trash and dog waste, which not only affected the visual appeal of the space but also limited its usability—especially for children. As one participant explained: "*Kids wanted to play … but that needed to be clean*" (Male, 40–65). This lack of care and oversight contributed to a broader feeling that the site was neglected, reinforcing negative impressions and reducing its potential as a welcoming public space.

When analysing participants' response on the preferences for future cultural ecosystem services (Figure 5), participants most often imagined the space in relation to the theme **recreational and social activities**. Some participants proposed *social-cultural activities* and *community engagement*—ideas like a small farming area for children, nature-based learning programmes, or biology lessons: "*For children to learn about animals*" (Male, 20–40). Others simply expressed a desire for the site to be a place where "*people in this neighbourhood meet each other*" (Male, 40–65), reinforcing the role of the site as a local gathering point.

Other suggestions on the theme **recreational and social activities** tended to fall into two clear categories. First, there were calls for *opportunities for playing*, including areas for teenagers and even a football pitch. Second, participants envisioned *opportunities for sitting and relaxing*, such as shaded benches or quiet corners. Interestingly, slightly more emphasis was placed on these passive, restorative interactions, which aligns with earlier perceptions of the space as calming and connected to nature. Participants seemed keen to preserve this quiet, observational relationship with the natural elements of the site. Overall, the range of suggestions reflected a broad spectrum of potential uses —from active play to quiet restoration. Artistic activities, local events, and neighbourhood initiatives were seen not just as additions, but as expressions of identity and belonging within the evolving space.

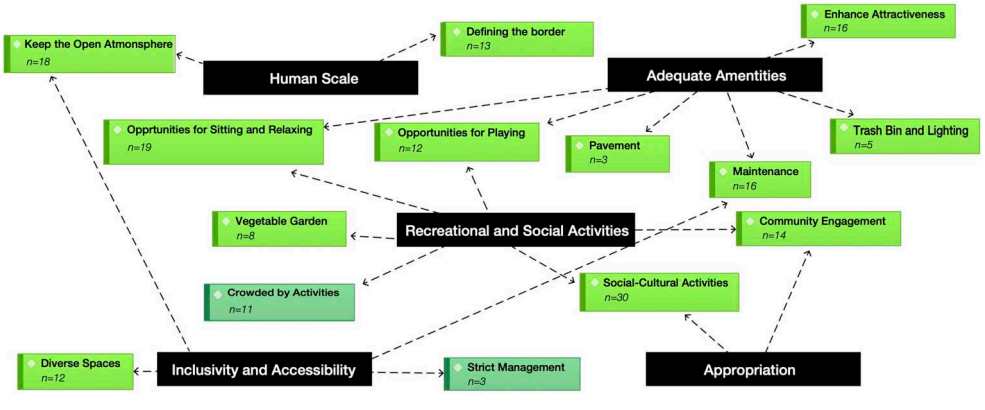

Figure 5. Preferred developments (light green) and **avoided developments** (darker green) were identified in relation to the **five thematic groups** derived from the theoretical framework (black): human scale, recreational and social activities, inclusivity, accessibility, and appropriation. The diagram illustrates how different options for potential changes in IGS align with these five theoretical concerns that support social life in public spaces. In doing so, it highlights possible directions for engaging with IGS through **design interventions**.

Improving on the theme **adequate amenities** emerged as one of the most consistent recommendations, especially as a way to address its current neglected and uninviting appearance. Many participants expressed concerns about *maintenance*, calling attention to the buildup of trash and the overgrown vegetation. One participant stated plainly: "*The trash needs to be cleaned up"* (Male, 20–40), while another added: "*If it was mowed, it would be better"* (Female, <20). These comments reflect a shared desire to see the space more actively cared for.

Under the theme **adequate amenities,** there were calls for practical improvements to make the site more usable and welcoming. Suggestions included adding *pavement* to improve accessibility, as well as addressing *trash bins and lighting* to enhance safety and tidiness. Several participants also expressed a wish to *enhance the attractiveness* through **greenery and planting**, offering simple but clear ideas like: "*I would like to see more flowers and biodiversity*" (Female, 20–40) and "*Trees in the front*" (Male, 40–65).

Together, these proposals reflect a shared aspiration: to transform the site into a more welcoming and better-maintained public space—without losing the natural character that many found so appealing. When it came to the theme **inclusivity and accessibility**, participants expressed a clear desire for *diverse spaces* to serve different groups of users. One participant noted: "*It would be great if there is also a possibility for the elderly people and for the young children"* (Female, 20–40). However, this desire for inclusiveness was balanced by concerns about preserving the site's current atmosphere. Some feared that adding too many features or programming could make the space too *crowded by activities*, mentioned by 11 participants. *Strict maintenance* was cited by three participants as potential downsides. These comments reflected an appreciation for the site's liminality —a spatial condition that remains open to a variety of users and practices—and a shared hope that this unique quality could be preserved even as the site continues to evolve. Many participants were also clear in stating they did not want the space to become a typical, overly manicured urban park. Instead, they hoped to preserve its unique naturalness, allowing for both informal use and ecological richness to continue shaping its identity.

Under the theme **human scale**, participants shared a nuanced perspective. Many expressed to *keep the open atmosphere* of the site, which contributed to its feeling of freedom and informality. At the same time, some expressed a desire for a stronger *definition of the border* to help distinguish the site from its urban surroundings. Suggestions included creating a soft enclosure, like a hedge or low fence, particularly to buffer the space from nearby road traffic. Still, it was important to most that any interventions remain subtle—enhancing the sense of place without compromising the site's open, accessible character.

Lastly, many proposed socio-cultural and community-oriented activities were closely tied to the theme of **appropriation**. These ideas reflected a desire for the space to support personal expression and shared creativity. One participant expressed this clearly: "I would like there to be more space to boost creativity and art … where people can express their creativity (sex, age)" There was a strong sense that if the spatial design allowed for flexibility, people would feel more encouraged to shape the site in meaningful ways. In doing so, users could develop a deeper connection to the space, rooted not just in use, but in identity and the sense of place.

5. Discussion

The semi-structured interviews explored local residents' perceptions and preferences regarding CES in the studied IGS. The thematic analysis identified perceptions and preferences networks comprising 25 codes and five thematic groups related to social practices and the appropriation of public space.

In this discussion, patterns from the thematic analysis are further interpreted by examining key literature on informal green spaces, everyday social practices, and the appropriation of public spaces. By doing so, it offers deeper insights into the potential of the case study IGS as a meaningful place of social encounters within the neighbourhood. Finally, spatial design suggestions were proposed to enhance CES provisioning in IGS.

5.1. The perceptual barriers on IGS

The thematic analysis underscores various facets of CES provisioning by IGS that are in line with recent studies. Firstly, the most contradictory aspects are in the thematic group *inclusivity and accessibility*. Although a number of respondents appreciate the sense of openness provided by the IGS and acknowledge the nearby location of the site, most respondents do not perceive it as an inviting and stimulating open space to visit on a daily basis, considering it poorly managed and *overly wild*. It is in line with the findings of previous studies on the perception of IGS (Konijnendijk van den Bosch 2012; Lippert, Kowarik, and Straka 2022), which highlight that wilderness can arouse negative connotations involving messiness and risk.

Another area of conflict is the theme of *human scale*. On one hand, interviewees appreciated the sense of openness the site provides. On the other hand, they felt the lack of comfort without human scale, citing feelings of exposure to traffic and sunlight, as well as the abandoned appearance of the site. An inviting public space, as emphasised by Gehl (2010), allows people to walk into it, linger, and engage. The inability of IGS to address the *human scale* creates barriers that discourage people from inhabiting the space. Other negative perceptions are primarily associated with the lack of *adequate amenities*. Public amenities should be emphasised, as they can help counteract the perception of abandonment and neglect, thereby enhancing the accessibility and inclusiveness of the space. This is particularly relevant for IGS, where its neglected appearance often attracts littering and other anti-social behaviours.

Regarding the theme *appropriation*, the most common informal uses are dog walking, followed by using the IGS for kids to run around and play. Those informal uses are all made possible by the open grassland of the space, which pertains to the common characteristic of IGS where the space is most often covered by spontaneous vegetation. Pietrzyk-Kaszyńska highlights this value of IGS: "The value of informal green spaces is often related to their unofficial and unmanaged character (wildness, ecological importance, natural habitat, microclimate)" (2017, 92).

Similarly, two respondents expressed positive perceptions of the semi-wild environment in IGS, as it reminded them of the landscape of their home country. This aligns with previous findings that the perception of CES varies among individuals due to different life experiences and cultural backgrounds (de la Barrera et al. 2016; Margaryan

et al. 2022). Therefore, evaluating CES provisioning, particularly within the unique spatial context of IGS, requires a deeper engagement with individuals' identities and lived experience.

5.2. IGS as places for everyday social practices

Examining the pattern of preferred developments in IGS, the majority of codes reoccurring were regarding *recreational and social activities*, as well as *adequate amenities*. *Recreational and social activities* are considered catalysts for public spaces, attracting more attention from neighbourhood groups, fostering social interactions, and encouraging diverse groups to use the space (Gehl 2010). *Adequate amenities*—such as seating, shade, and shelter—as Mehta suggests, are essential for encouraging people to linger and engage in social activities, thereby enriching the social fabric of urban areas (Mehta 2013).

Within the theme of *appropriation,* socio-cultural and community-engaged activities were the most favoured. These activities align more closely with cultural and symbolic appropriation, which may reflect the current state of IGS, where opportunities to associate with cultural or symbolic meanings are largely absent (Kowarik 2017). By encouraging appropriation to a certain extent, the potential of IGS to serve as a space for social life can be significantly enhanced.

5.3. Challenges regarding the liminality of IGS

The thematic analysis highlights several contradictions between positive and negative opinions of the IGS. These conflicts are pertinent to the liminal character of IGS and should be considered by future design interventions. The first significant challenge revolves around the diverse needs of various social groups. Within the interviews, individuals from different households articulated varying desires for utilising the IGS. For instance, households with children wish to have a safe area for their kids to play, while households with dogs seek an open space to allow their pets to run freely. Conflicting interests are common in public spaces but become more pronounced in IGS due to the absence of designated functions and behaviour regulations. Consequently, when designing for the provision of CES in IGS, it is imperative to address this challenge by mediating and integrating these diverse usage requirements.

The second challenge entails addressing the public perception of wilderness within the IGS and finding a balance with the biodiversity potential inherent in these natural areas. While some respondents directly appreciate the quality of naturalness associated with wilderness, many express concerns about potential risks arising when "grasses grow too high". Furthermore, numerous respondents find the nature within the IGS to be uninteresting and desolate. Research on people's perceptions of urban wilderness highlights a disparity between perceived and actual biodiversity (Hoyle, Hitchmough, and Jorgensen 2017; Southon et al. 2018). Even though the IGS may host a diverse range of species, these species might remain unseen and unidentified by people due to the required level of knowledge (Dallimer et al. 2012). Therefore, it remains a question regarding how to

maintain the wilderness of IGS while making it more accessible and appealing to a larger group of citizens.

The aforementioned challenges can be intricately tied to the informal and liminal nature of IGS. Rupprecht and Byrne (2014) define liminality as a state of spatial–temporal transition characterised by an array of impromptu social-ecological processes. In this context, the central focus of the design lies in creating a connection between the site and human experiences, while managing the balance between maintenance, openness, and indeterminacy that are inherent to IGS.

5.4. Design suggestions for IGS

Building on the thematic analysis, key design lessons have been identified. For human scale, it is essential to preserve the existing spatial features appreciated by users while articulating the border of the space to create a sense of unity and to enhance the perception of the place. Enhancing the *inclusivity and accessibility* of the site is another primary concern of the design, which can be achieved through introducing basic public amenities, such as paved pathways, trash bins, and lighting, as well as maintenance. The challenge lies in avoiding strict management and maintenance practices that normalise IGS into a prototypical urban park, thereby diminishing the open and liminal characters that make IGS unique. Inventing site-specific maintenance can balance an inviting atmosphere with the allowance for spontaneous social-ecological processes to occur.

Greater focus should also be placed on creating diverse opportunities for community-involved and socio-cultural activities. To achieve this, stakeholder involvement should be integrated early in the design process to ensure that local wishes and desires are incorporated. Considering the demographic composition of the local community is equally important, as perceptions and desired developments may vary among different groups. New socio-cultural programmes should be designed to be inclusive and accessible, reaching as diverse a group as possible. Positioning IGS as a social encounter space can enhance its CES provisioning while preventing any single local group from dominating or claiming authority over the space.

5.5. Limitations and future recommendations

Several limitations may affect the generalizability and depth of the findings. One of the primary limitations of this study pertains to the restricted sample size. With only 24 interviews, with limited representation of individuals with lower levels of formal education, the ability to generalise findings to the entire neighbourhood is limited. Furthermore, due to the relatively small pool of respondents, it was not feasible to undertake a comprehensive examination of the results in conjunction with the demographic profile of the respondents. A more substantial sample size, as well as detailed demographic information including the ethnicity, nationality and disability condition, would have facilitated a more detailed exploration of how demographic nuances might influence the observed outcomes. It is also important to acknowledge that the study may involve a degree of self-selection bias, as participation was voluntary and many individuals declined the invitation due to time constraints or disinterest. Consequently, those who chose to participate may be more inclined to engage with local green spaces or have stronger opinions about their use, which could have influenced the findings.

Therefore, we propose two avenues for future research. Firstly, expanding the number of respondents and scrutinising patterns from a demographic perspective, encompassing factors like education level, household composition, and cultural background. Secondly, exploring the utilisation of interactive workshops to communicate the potential for CES provisioning. When confronted with the current image of the IGS, envisioning plausible CES might prove challenging. Yet, this scenario can change when alternatives are presented through various design concepts. Different design scenarios can serve as mediums that broaden individuals' perspectives on potential CES offered by the site, while also capturing their personal preferences regarding specific CES types.

Despite its acknowledged limitations, this study offers unique contextual insights into residents' perceptions of CES and the findings serve as a valuable reference for researchers and practitioners in similar contexts. Serving as a foundation for comparative studies, it enables researchers to identify commonalities and disparities in CES perceptions pertaining to deprived neighbourhoods.

6. Conclusion

Informal green spaces (IGS) play a crucial role in the urban landscape, providing cultural ecosystem services (CES) that complement existing urban green infrastructure. Despite initial studies having highlighted the latent potential of CES within IGS, a knowledge gap remains when it comes to the perception and preference of residents as a public space for everyday social practices. This study tackles this knowledge gap with a semi-structured interview study of an IGS in K-buurt, Amsterdam. Through thematic analysis, key aspects of residents' perceptions and preferences regarding CES offered by the site were identified. Positive perceptions of the space primarily highlight its potential for *recreational and social activities*. However, many participants find the IGS uninviting due to its wild, unmanaged appearance and lack of amenities, which limits accessibility and inclusivity. Generally, perceptions of IGS vary widely, with some valuing their natural, semi-wild character based on cultural or personal experiences. Furthermore, there is strong potential for IGS to support social and cultural activities if enhanced with appropriate design and community input. Lastly, the liminal nature of IGS presents both challenges and opportunities, requiring a careful balance between openness, maintenance, and diverse user needs. In essence, the study highlights the dynamic interplay between the perceptions and preferred social practices of IGS, the liminal nature of such spaces, and the opportunities for design intervention. Moving forward, this research lays the groundwork for further exploration into the broader applicability of these findings in similar urban contexts and underscores the importance of design strategies that reimagine IGS as valued social spaces within neighbourhoods.

Disclosure statement

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