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ANALYSIS OF USER PARTICIPATION IN THE MANAGEMENT AND IMPROVEMENT OF URBAN GREEN SPACES CASE STUDY: DECEMBER 11, 1960 GARDEN IN CHLEF CITY, ALGERIA

Abstract: The aim of this paper is to analyse the extent to which users participate in the management and improvement of green spaces. The analysis considers three inter-related dimensions: awareness of participation; active participation; and perceived constraints. It also considers how users assess green spaces. The study was conducted with users of the 11 December 1960 Garden in Chlef, Algeria. A questionnaire designed for this study was administered to 223 respondents. The following statistical methods were adopted using SPSS software: frequencies, percentages, t-tests, ANOVA, the Pearson correlation coefficient, and simple linear regression. The results showed that, although user's generally assessed green spaces positively, they felt that services were lacking and that the level of participation was medium and only partially related to the assessment (10.2%). Awareness of participation was also medium to high and related to active participation (6%), as were perceived constraints, which were medium to low. No significant gender differences were found in terms of evaluation, awareness or constraints, although males exceeded females in terms of participation. No differences were found based on age, while those based on educational level favoured secondary school graduates and those based on professional status favoured active groups.

Keywords: urban green spaces, management, users' participation, perceived constraints, Chlef city

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Introduction

Urban green spaces are vital ecosystems that improve quality of life in urban environments. They contribute to ecosystem services, such as maintaining biodiversity and regulating the climate. Therefore, they are an essential component of any community development project. These spaces significantly impact the social, economic, and environmental fabric of cities (Bressane et al., 2024; Jesdale et al., 2013). According to the literature, these spaces improve quality of life by providing a healthy and comfortable environment, encouraging physical activity and social interaction, and reducing stress and noise. It has a positive impact on residents' health and daily comfort. Also, these spaces make cities more livable, especially given increasing urban density and pressures (de Jalón et al., 2020; Giannico et al., 2021).

Urban green spaces encourage positive interactions between individuals, promoting mental and physical health and contributing to social cohesion. They are also linked to increased physical activity and social engagement, which promotes public health (Ihle et al., 2024; Jabbar et al., 2022; Jennings & Bamkole, 2019). Spending time in nature reduces stress and anxiety levels, improving overall mood. Walking in a park or simply taking in a natural landscape can alleviate daily pressures and reduce the negative effects of noise and congestion. Engaging with nature has clear psychological benefits (Lafortezza et al., 2009; Markevych et al., 2017; Reyes-Riveros et al., 2021).

In addition to their environmental, social, and psychological benefits, urban parks and green spaces can provide economic benefits to municipalities and their citizens. For instance, the air-purifying properties of trees can reduce the costs associated with pollution control and prevention measures (Mandal et al., 2023; Mata et al., 2021), these spaces can also be used to generate income. According to a survey of park visitors in Nairobi, Kenya (Odhengo et al., 2024), residents prefer urban green spaces to gyms, recreation and entertainment venues, and hotels because they save 50% to 60% on the cost of engaging in the same activities at these other venues.

In addition to their aesthetic benefits, urban parks increase a city's attractiveness as a tourist destination, thereby generating employment opportunities and revenue due to their historical and recreational value. Natural elements, such as trees and bodies of water, also increase property values and, consequently, tax revenues (Semeraro et al., 2021). Studies on spatial assessment show that regulating the use of green spaces and limiting tourist numbers ensures the long-term sustainability of these areas by achieving a balance between developing tourism and protecting natural resources (Blagajac, 2023).

Management of green spaces is becoming increasingly difficult, especially in rapidly urbanizing cities with significant population growth. Urbanization leads to the reduction of these spaces and their conversion for urban projects (Hafsi et al., 2022). It contributes to the fragmentation of green infrastructure within cities, resulting in environmental imbalance, a decline in quality of life, increased disparities in urban resource distribution, and social and economic challenges related to declining environmental justice and unequal access to natural spaces (Byomkesh et al., 2012; Li et al., 2019; Rafiee et al., 2009).

Community participation is essential to the successful management and sustainability of urban green spaces. Studies have shown that active citizen participation enhances a sense of ownership and responsibility and promotes equitable access to these spaces (Jennings et al., 2016). However, many developing countries lack institutional structures and policies that encourage participation from a variety of non-governmental actors. Consequently, green spaces are often removed from public access due to regulatory laxity or appropriation by elites for private use as parks and gardens (Alam & Lovett, 2019).

In Algeria, green spaces are considered an integral part of the urban environment and have been given special attention in legislation. It is reflected in Law No. 90-29, established on December 1, 1990, which outlines the principles of urban planning and development. This law emphasizes the importance of including all segments of society in these processes, especially when creating guidelines for the Urban and Development Master Plan and Land Use Plan. This approach strengthens individuals' role in shaping urban policies, including those related to green spaces. Law No. 07-06, passed on May 13, 2007, establishes a framework for the technical and legal aspects related to the creation, management, and maintenance of green spaces. However, the law does not explicitly address community involvement in green space management, leaving this aspect to local discretion and informal community initiatives.

Given the environmental, psychological, social, and economic importance of green spaces in urban environments and the growing management challenges they face, especially in cities experiencing rapid expansion, the involvement of individuals is crucial for effectively and sustainably managing these spaces. Although Algeria's legal framework emphasizes the planning and management of green spaces, it does not address community involvement in their management. From this perspective, this study aims to shed light on the extent to which users participate in the management of green spaces in Algeria and how this participation is linked to their assessments. This study takes a comprehensive approach to participation, viewing it as an overlapping and interacting set of dimensions, including awareness, behavioral participation, and perceived constraints.

Literature Review

Over the last two decades, scientific literature has given significant attention to the topic of public participation in the management of urban green spaces, given the role that studies have shown this type of participation plays in improving the effectiveness and sustainability of these spaces. Researchers have analyzed levels of resident involvement in various management phases, including planning, maintenance, and protection. Their findings confirm that participation improves service quality and strengthens the local community's sense of responsibility and collective ownership.

Studies show a gradual evolution in approaches to understanding participation. Malek (Malek et al., 2015) started with an analysis of green space usage patterns and an assessment of quality from residents' perspectives. This study highlighted the importance of community involvement in planning and improvement processes. Then, Fors (Fors et al., 2015) expanded the scope of the research through a systematic review of the planning and maintenance phases. They showed that, although participation is often present, its

impact is limited and concentrated in certain phases. There is no tangible influence on decision-making.

Similarly, Tsekoura (2016) examined participation from a categorical perspective, pointing out that there are flexible and multidimensional spaces where young people can contribute to their communities. The study emphasized that empowerment is achieved when participation is linked to young people's daily experiences and creative expressions. Subsequently, Taylor and Smith (Taylor-Smith & Smith, 2019) presented a new conception of participation, linking it to digital and physical spaces. They argued that everyday democracy is exercised through activities that occur in overlapping technological and social environments.

Fors (Fors et al., 2021) presented a more comprehensive approach in the form of a systematic review of 34 case studies focusing on long-term strategic participation. The authors concluded that sustainable participation requires flexible, periodic models and tools to ensure the inclusion of marginalized groups and continued interaction across management phases (planning, design, implementation, and maintenance). In her discussion of the political dimension of participation, Cornwall (2024) highlighted the tension between formal and real participation within institutional frameworks. She argued that reshaping the relationship between society and authority requires mechanisms that allow for real, rather than symbolic, influence.

The study by Bressane et al. (2024) is one of the most recent empirical contributions. Through a field study in the São Paulo metropolitan area, the researchers demonstrated a statistical relationship between higher community participation, improved green coverage, and lower environmental inequality indices. Using precise quantitative analysis models (GLM and Kruskal–Wallis), the study found that participation was associated with a 13.5% increase in the population covered by green spaces and a 1.3-unit decrease in the environmental inequality index.

Taken together, these studies highlight an important conceptual shift. They show that participation should be recognized as a strategic option for achieving environmental and social equity, especially in developing cities that face structural challenges in resource distribution and institutional capacity, rather than as a technical support tool in service management.

Operational definition of the study variables

This section presents the operational definitions of the study variables to clarify how each concept was measured and applied within the research framework.

Participation in the management of urban green spaces

Refers to the extent to which individuals are involved in the joint conservation, planning, or development of these spaces. This involvement is reflected in three interrelated dimensions:

- **Awareness of Participation:** refers to the extent to which individuals are aware of their right and duty to contribute to the management of urban green spaces. It also refers to their knowledge of the legal and institutional framework governing this role and their understanding of the importance of their participation within the local cultural and social context. Finally, it refers to their psychological readiness to contribute to the protection or improvement of these spaces.

- **Active Participation:** Refers to behaviors in which individuals engage, involving them in the management, maintenance, or development of urban green spaces. This dimension includes various forms of direct or indirect interaction with green spaces or the authorities responsible for them. These interactions can occur through individual initiatives or within formal or informal collective frameworks.
- **Perceived constraints:** These are the various subjective and objective factors that hinder an individual's participation in the management of urban green spaces. These factors either reduce awareness of the importance of participation or limit the ability to act and contribute. This dimension interacts with and complements the awareness and active participation dimensions.

Green Space Assessment

It is the assessment that users give of the urban green spaces they visit, based on a set of key, observable features highlighted in the literature as being central to how green spaces are perceived (Rustamov et al., 2023; Stessens et al., 2020; Kothencz et al., 2017; McCormack et al., 2010). These aspects include:

Cleanliness and maintenance: The perceived efforts of those responsible for maintaining cleanliness and the ongoing maintenance of the space.

Adequacy of services and facilities: The adequacy of the basic services and facilities available, such as seating and rest areas, toilets, kiosks, and playgrounds.

Sense of security: The degree to which users feel safe and secure in the green space.

Overall satisfaction: The level of satisfaction experienced by users after using the green space.

Perceived design quality: Users' assessment of the design, organization, and functionality of the green space.

Attractiveness: The perceived visual and aesthetic appeal of the green space.

This variable is measured using items in the first section of the questionnaire. These items ask users to judge green spaces in light of the following dimensions:

- binary (yes/no) questions
- short Likert-type response scales

More positive responses reflect a higher evaluation of urban green spaces. For analysis purposes, this indicator is classified into three levels (low, medium, and high) to describe the prevailing assessment pattern among users.

Materials and Methods

Study Area

Chlef is a city in northern Algeria known for its historical, economic, and social importance. Spread over an area of 3,030.5 hectares, it has a population of approximately 203,329 people. Throughout history, the city has been known by several names. During the Phoenician era, it was called "Chenalif Flumen", meaning "gratitude to the gods for

the rain”. Later, it was known as “Castellum Tangitanium” because it was part of Tangier, Mauritania (Bouacheche, 2024). Chlef is one of the most important urban centers in western Algeria. It is located at a latitude of 36.17°N and a longitude of 1.33°E within the Mediterranean region. The city has experienced rapid urban expansion, accompanied by ongoing efforts to improve living conditions through the development of public spaces that align with sustainable development standards. The city's semi-continental Mediterranean climate, characterized by cold, rainy winters and hot, dry summers, clearly influences the use of public spaces and the distribution of urban activities.

The garden of 11 December 1960, located in the heart of the city on approximately two hectares of land, is one of the oldest and most prominent historical gardens in Chlef. Its roots date back to the French colonial era, which gives it distinctive symbolic and architectural value (Figure 1).

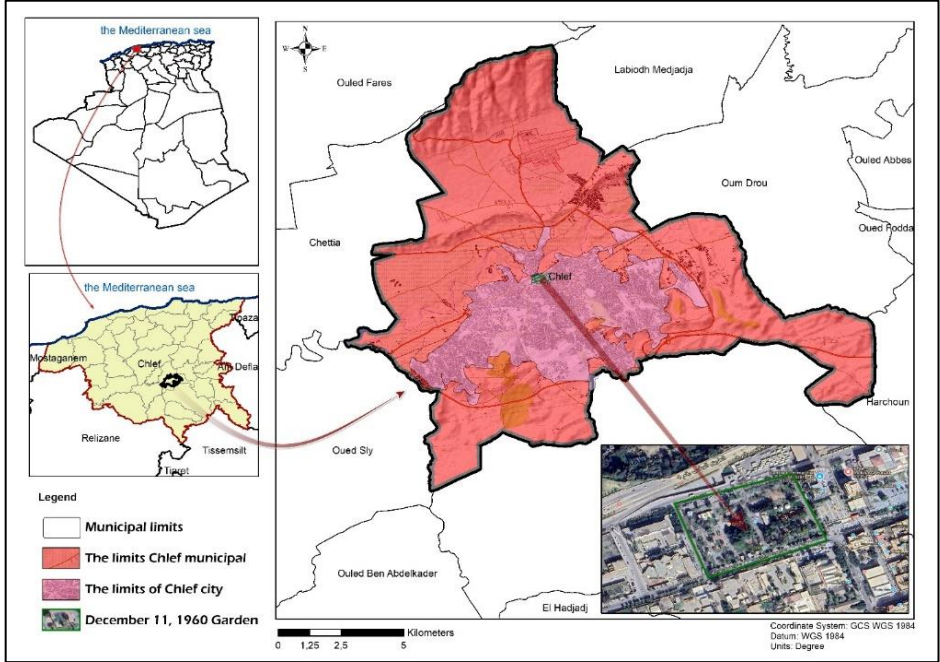


Fig. 1. Locations of the garden of December 11, 1960 in Chlef city, Algeria (Source: Authors, 2025)

The garden reopened in 2022 after being closed since 2018, as part of the municipality's efforts to strike a balance between urban expansion and environmental conservation, with a focus on involving the local community in its preservation and development. Users, especially on weekends and school holidays, flock to the garden, reflecting its status as a vibrant public space within the urban fabric of the city.

Methodology

In this study, a descriptive analytical approach employed to characterize user participation in green space management and analyze its dimensions and determinants. Based on this approach, a questionnaire developed (Ranganathan et al., 2024; Sharma, 2022; Taherdoost, 2022) for urban green space users consisting of two main parts. The first part measures the sample's assessment of urban green spaces, and the second part measures their level of participation in management. The questionnaire was constructed

according to approved methodological steps. First, the variables and their sub-dimensions were defined procedurally. Then, the items, instructions and response methods were formulated. Finally, the preliminary version was presented to seven experts, including multidisciplinary researchers and local officials responsible for managing green spaces, for review. Their comments were taken into account to arrive at the final version.

The questionnaire consists of 31 items, divided into two sections. The first section assesses urban green spaces and includes six items, some of which use a yes/no system and others use a short Likert scale. The second section measures participation and includes 25 items, divided into three sub-sections: awareness of participation (11 items), active participation (seven items) and perceived constraints (seven items). All items in this section are answered using a yes/no system. Scores range from low to high values for each domain. Evaluation is scored from 0 to 10, participation from 0 to 25, awareness from 0 to 11, active participation from 0 to 7, and perceived constraints are scored inversely from 0 (no barriers = high level) to 7 (full presence of barriers = low level). Before applying the questionnaire to the study sample, its validity verified by calculating the reliability coefficient using Cronbach's alpha indicator (0.79), which indicates a good level of internal consistency.

The questionnaire was distributed with a sample of 223 users in the garden of December 11, 1960, one of the most important urban green spaces in the city of Chlef. From April 15 to May 10, 2025, a direct interviews conducted throughout the day to guide respondents and clarify any ambiguities.

The data were entered and processed using the Statistical Package for the Social Sciences (SPSS, v 27). Binary responses (yes/no) were coded as 1 and 0, respectively, with negative items taken into account. Triple Likert scale responses (low, medium, or high) were coded as 0, 1, or 2, respectively. Statistical procedures included descriptive statistics (frequencies, percentages, means, and standard deviations) and inferential statistics (t-tests, ANOVA, Pearson's correlation coefficient, and simple linear regression analysis). These procedures aimed to answer the study questions, test its hypotheses, and discuss the results.

Results

Responses of sample individuals to questionnaire themes

Axis of respondents' assessment of urban green spaces

The results indicate that the majority of respondents (83.9%) believe clear efforts are being made with regard to cleanliness and maintenance. However, more than half of the sample (53.8%) believe that services and facilities are inadequate. Security was mostly rated as moderate to high, with 48.9% rating it as "high". Regarding overall satisfaction, the largest percentage recorded an "average" level of satisfaction (50.2%). Most respondents considered the design to be 'acceptable' (63.2%), while more than half rated the attractiveness of the space as 'average' (51.6%). These results suggest a generally positive view of maintenance and security but highlight clear concerns about the adequacy of services and facilities. This may reflect a discrepancy between maintenance efforts and the suitability of the available equipment and services for visitors' needs.

Awareness of Participation Axis

The results reveal mixed awareness of participation among the respondents. While the majority acknowledge their right to participate (78.5%), significant proportions

demonstrate limited knowledge of the relevant legislation (71.3%) and the official mechanisms and methods for exercising this right (67.7%). Conversely, slightly more than half of the sample believes that local authorities encourage citizen participation (57.0%).

At the same time, the results revealed a strong sense of responsibility and a willingness to contribute: 93.7% acknowledged their responsibility for safeguarding green spaces, and 77.1% indicated their interest in participating in development initiatives. There was also a clear awareness of the role of associations in improving green spaces (89.2%), as well as a notable interest in awareness programs (80.3%).

Regarding the submission of proposals, 51.1% of respondents had considered doing so, a figure close to those who had not considered it. However, more than half of the sample (56.5%) did not know how to submit a proposal. Finally, 91.9% of respondents believe that urban green spaces are necessary within the city. These data indicate a gap between willingness and intention and limited legal and procedural knowledge of how to participate, which may be linked to a lack of guidance and institutional communication about participation mechanisms.

Active Participation Axis

The results showed limited formal participation: just 21.5% of respondents said they had actively taken part in activities organised by the municipality or other organisations to improve urban green spaces. By contrast, 35.9% said they had taken limited individual action to improve green spaces. 31.4% reported that they had reported acts of damage or vandalism. In terms of direct intervention, 57.8% stated that they had intervened personally to protect these spaces, and 48.9% said they had repaired the damage themselves. However, only 22.4% had submitted suggestions to the authorities. Regarding cleanliness, the majority of respondents (83.4%) confirmed that they do not leave food or drink residue in green spaces. Active participation in improving urban green spaces tends to be more individual and interactive than institutional. This calls for consideration of the clarity and accessibility of formal participation channels, as well as the responsiveness of the authorities.

Perceived Constraints Axis

The results indicate that respondents perceive a number of obstacles as limiting their participation in green space activities. 39.9% reported restrictions preventing them from participating, while 40.8% cited administrative complications limiting their ability to contribute. Over half of the sample (57.4%) mentioned a lack of information on how to participate and the available mechanisms, while 38.6% reported difficulty communicating with the relevant authorities.

Regarding support and responsiveness, 30.0% of respondents said that their suggestions were not taken into consideration. Meanwhile, 45.3% said that local authorities did not provide sufficient support, and 36.8% said that the authorities were not sufficiently committed to ensuring the right to participation. Overall, the results suggest that obstacles are not only limited to a lack of information and communication difficulties but also include administrative restrictions and complexities that hinder respondents' ability to contribute. Perceptions of weak support and response to citizens' proposals may also explain limited participation within formal frameworks and the low number of proposals submitted.

Prevailing Levels of Assessment and Overall Participation and Their Sub-Dimensions among Sample Individuals

The individuals in the sample were classified into three levels (low, medium and high) for the overall assessment and participation, as well as for the three sub-dimensions of participation. This was based on their scores in each of the five study variables. Table 1 and Figure 2 show the number of individuals and their percentages at each level.

Table 1. Assessment levels, overall participation, and the three sub-dimensions of participation.

Variable	Low		Medium		High		Σ	
	N=	%	N=	%	N=	%	N=	%
Assessment	8	3,6 %	100	44,8 %	115	51,6 %	223	100 %
Awareness of Participation	3	1,3 %	120	53,8 %	100	44,8 %	223	100 %
Active Participation	44	19,7 %	139	62,3 %	40	17,9 %	223	100 %
Perceived Constraints	93	41,7 %	112	50,2 %	18	8,1 %	223	100 %
Participation (Overall)	6	2,7 %	159	71,3 %	58	26 %	223	100 %

Note: A high level in the variable 'perception of barriers' indicates a greater perception of barriers, while a low level indicates a lesser perception of barriers.

Source: Authors, based on SPSS output, 2025.

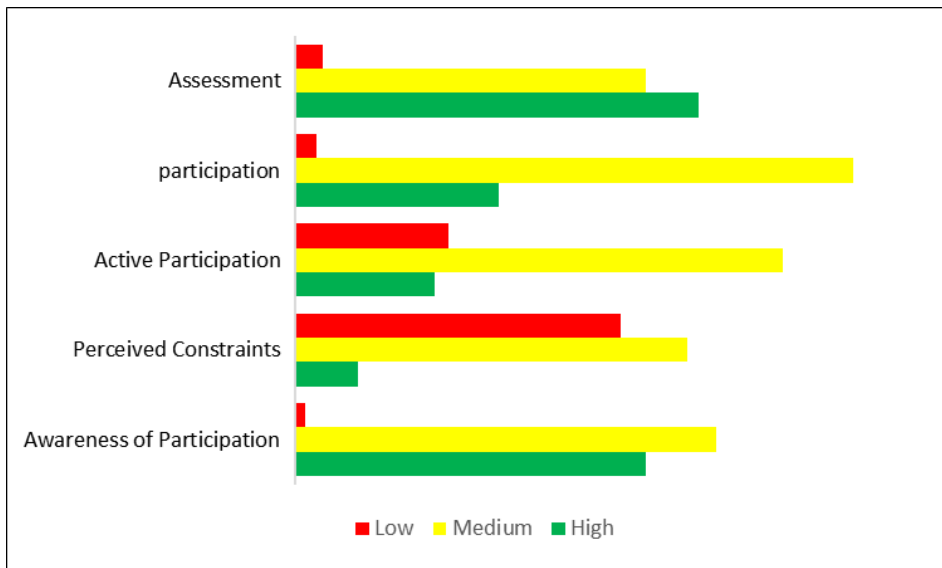


Fig. 2. Assessment levels, participation, and the three dimensions of participation. (Source: Authors, 2025)

Table 1 shows the following data:

Assessment Level

Most respondents rated the urban green space under study as having a medium-to-high rating. Almost half (51.6%) gave it a high rating, while 44.8% considered it to be of medium quality. Low ratings were rare, accounting for just 3.6% of responses. A

chi-squared test for goodness of fit revealed that these differences were statistically significant ($\chi^2 = 90.305$; $df = 2$; $p < 0.001$). This suggests that users generally evaluate the space positively. This may be related to their evaluation of cleanliness, maintenance, and security compared to other factors, such as the adequacy of services and facilities.

Level of Awareness of Participation

More than half (53.8%) of the sample fell within the medium level, compared to 44.8% in the high-level category. The percentage of individuals showing a low level did not exceed 1.3%. A chi-squared test for goodness of fit was conducted to determine the prevailing level of awareness, yielding a value of $\chi^2 = 105.372$ ($df = 2$; $p < 0.001$). This suggests that the average level of awareness is prevalent among the sample population. This may reflect a general awareness of the right to participate among most respondents, offset by a lack of detailed knowledge of the relevant laws and formal mechanisms.

Level of Active Participation

Sixty-two percent of respondents reported a moderate level of participation, compared to 17.9% who reported a high level and 19.7% who reported a low level. A chi-square test of goodness of fit ($\chi^2 = 84.493$; $df = 2$; $p < 0.001$) revealed that these differences are statistically significant, suggesting that the predominant level of participation in enhancing urban green spaces among the sample is moderate. This suggests that participation is often limited or circumstantial, rather than involving regular engagement through formal channels. This is consistent with the limited organised participation and low number of proposals submitted.

Level of Perceived constraints

The results indicate that approximately half of the sample (50.2%) is concentrated at the 'medium' level of perception of obstacles, compared to 41.7% at the 'low' level and only 8.1% at the 'high' level. The chi-square test for goodness of fit shows that these differences are statistically significant ($\chi^2 = 66.466$; $df = 2$; $p < 0.001$), indicating that medium and low levels of awareness of barriers predominate among the sample. Given that a high level indicates greater barriers, this distribution suggests that most respondents experience low overall barriers. This may be because barriers are more clearly perceived by those who attempt to participate through formal channels, such as obtaining information, communicating, and following procedures, while those who limit themselves to informal individual practices are less aware of them.

Level of Overall Participation

The distribution of sample members according to the overall participation index, which combines the three dimensions of participation (awareness, actual participation, and perceived barriers), shows that the majority fall within the 'medium' level (71.3%), compared to 26.0% in the 'high' level and 2.7% in the 'low' level. The results of the chi-square test for goodness of fit indicate that these differences are statistically significant ($\chi^2 = 162.843$; $df = 2$; $p < 0.001$), suggesting that the overall level of participation among the sample is predominantly medium. This result may reflect the nature of the overall participation index as a composite indicator. Many respondents appear to have positive attitudes towards green spaces and a sense of responsibility for them, and they express a willingness to contribute. This raises the level of awareness and readiness

within the index. However, the translation of this willingness into regular institutional participation remains limited. Actual participation, which appears to be mostly concentrated at the medium level, is a limiting factor preventing most individuals from moving to a high level of participation. This can be understood as a pattern of 'partial' or 'selective' participation, as many respondents tend to engage in individual interaction and direct initiatives rather than organised engagement through formal channels. This is due to factors such as a lack of clarity surrounding the mechanisms, difficulty accessing formal channels, and the level of response and support citizens receive when submitting their proposals.

Gender differences in assessment and overall participation, along with their three sub-dimensions, are examined

An independent samples t-test was used to test for differences between males and females in the study variables (green space assessment, awareness of participation, actual participation, perception of barriers and overall participation). Table 2 shows the means, standard deviations, t-values and statistical significance for each variable, as well as the Cohen's d effect size for variables where the difference was significant.

Table 2. Significance of differences in assessment, participation, and their three sub-dimensions by gender

Variable	Gender	N	Average	Standard deviation	T	df	Sig (p)	Cohen's d
Assessment	M	61	6,48	2,53	0,7	221	0,44	—
	F	162	6,73	2,03	7			
Awareness	M	61	7,28	1,93	0,2	221	0,81	—
	F	162	7,22	1,66	4			
Active participation	M	61	3,87	1,60	5,2	221	0,000	0,79
	F	162	2,69	1,46	4			
Perceived Constraints	M	61	4,00	1,95	0,5	221	0,56	—
	F	162	4,15	1,69	8			
Participation (Overall)	M	61	15,15	3,80	2,2	221	0,026	0,33
	F	162	14,06	2,99	4			

Source: Authors, based on SPSS output, 2025.

The results show no statistically significant differences between genders in the assessment of green space ($t = 0.77$; $p = 0.44$), awareness of participation ($t = 0.24$; $p = 0.81$), or perception of barriers ($t = 0.58$; $p = 0.56$), indicating that males and females have similar perceptions of the quality of green spaces, general awareness of participation, and assessment of barriers.

By contrast, a significant difference in actual participation was found in favor of males ($t = 5.24$; $p < 0.001$), with an average of 3.87 for males compared to 2.69 for females, indicating a large effect size ($d = 0.79$). A significant difference in total participation was also found in favor of males ($t = 2.24$; $p = 0.026$), with an average of 15.15 for males compared to 14.06 for females, representing a medium effect size ($d = 0.33$). These findings suggest that gender differences are primarily manifested in actual practice rather than in assessment, awareness, or perception of barriers. This pattern can initially be understood in light of social and organizational factors that may affect opportunities for field engagement, such as the distribution of roles and available time,

patterns of mobility, and certain safety considerations. It can also be understood in light of the nature of participation channels and their requirements for direct presence or communication.

Differences in overall participation based on age group, educational level, and professional status

These variables were included as control variables to examine whether participation in the management of urban green spaces is unevenly distributed among certain social groups or influenced more by institutional/procedural factors, and to test whether the degree of participation varies according to age group, educational level, or professional status. One-way analysis of variance (ANOVA) was used to test for significant differences in means between groups, after confirming homogeneity of variance using Levene's test (see Table 3).

Table 3. Significance of Differences in overall Participation Rates by Age Group, Educational Level, and Professional Status

Independent Variable	F	Sig. (ANOVA)	Sig. (Levene)	Post Hoc Tests	Decision
Age Group	0.174	0.914	0.396	None	ANOVA n.s.; no post hoc tests
Educational Level	1.516	0.211	0.893	Exploratory (LSD): No education vs. Secondary	ANOVA n.s.; exploratory LSD (No education vs. Secondary)
Professional Status	2.327	0.076	0.216	Exploratory (LSD): Unemployed vs. Student; Unemployed vs. Workers/Freelancers/Employees	ANOVA n.s. (p = 0.076); exploratory LSD differences

Source: Authors, based on SPSS output, 2025.

Regarding age group, the homogeneity of variance condition was met (Levene: $p = 0.396$), and the ANOVA test revealed no statistically significant differences between groups ($F = 0.174$; $p = 0.914$). This suggests that participation averages were similar across age groups within the sample. The absence of differences according to age suggests that, in this context, opportunities for participation are more closely linked to channels of participation and institutional response than to age, particularly when the age groups within the sample are relatively similar.

Regarding educational level, the homogeneity of variance condition was also met (Levene: $p = 0.893$), and the ANOVA test revealed no statistically significant differences in participation averages by educational level ($F = 1.516$; $p = 0.211$). However, LSD comparisons were conducted for exploratory purposes and showed a significant difference in favor of those with secondary education between the “no education” and “secondary education” categories (mean difference = 2.59). This difference suggests that skills acquired through education, such as knowledge of procedures or communication skills, may facilitate engagement. However, this finding should be treated as an exploratory indicator that requires confirmation.

Regarding professional status, the homogeneity of variance condition was met (Levene: $p = 0.216$), and the ANOVA result was not significant at the 0.05 level ($F =$

2.327; $p = 0.076$). However, it was close to significance, which may suggest limited variation between professional categories. In an exploratory context, LSD comparisons revealed differences between the 'unemployed' category and both students ($p = 0.033$) and workers, freelancers, and employees ($p = 0.025$), favoring students and professionally active groups, who recorded higher levels of participation. If confirmed, these differences would be related to disparities in opportunities for social integration and access to channels of participation, rather than to demographic characteristics per se. This could favor professionally active groups due to their likely possession of broader social networks or greater experience in dealing with official bodies.

Correlations between study variables

Pearson's correlation coefficient was calculated to test for correlations between the study variables, and the results are shown in Table 4.

Table 4. Pearson Correlation among study variables

Variables	Overall Participation	Awareness	Actual Participation	Perceived Constraints	Evaluation
Overall Participation	-	-	-	-	0.244**
Awareness	-	-	0.319**	0.111	-
Active Participation	-	0.319**	-	-0.070	-
Perceived Constraints	-	0.111	-0.070	-	-
Evaluation	0.244**	-	-	-	-

**Correlation is significant at the 0.01 level (2-tailed).

Source: Authors, based on SPSS output, 2025.

The results revealed two statistically significant relationships. The first was between awareness of participation and actual participation ($r = 0.319$; $p < 0.001$). The second was between evaluation of green spaces and overall participation in their management ($r = 0.244$; $p < 0.001$). The coefficient values indicate weak to moderate positive relationships, meaning higher awareness or a more positive evaluation is associated with increased participation. However, neither is strongly enough associated with participatory behavior to be considered a sole determinant.

In contrast, perceived barriers did not show a significant correlation with actual participation ($r = -0.070$; $p = 0.297$). Additionally, awareness of participation and perception of barriers did not show a significant correlation according to the traditional threshold ($r = 0.111$; $p = 0.098$). However, the latter indicates a weak trend that requires confirmation. The absence of a correlation between barriers and actual participation may reflect the fact that a significant portion of participation takes the form of informal, individual initiatives that do not pass through administrative channels where barriers are embodied. Awareness, on the other hand, is more related to general readiness and engagement and may be accompanied by a weak trend toward greater awareness of obstacles. This suggests that increased awareness may draw attention to the complexities of procedures and channels of participation. The positive correlation between evaluation and participation may indicate that satisfaction with the quality of

the space increases the tendency to maintain and improve it. Alternatively, more engaged participants may develop a higher appreciation for the space through their interaction with it. Therefore, caution is needed when drawing causal conclusions from the correlation alone.

Simple Linear Regression Analysis

Two simple linear regression models were examined to test the predictive power of certain variables: (1) awareness of participation as an explanation for actual participation and (2) overall participation as an explanation for individuals' assessment of green space. Since Pearson's correlation analysis revealed positive relationships between these variables, regression analysis was employed to confirm the direction and strength of the relationship (R^2) (Table 5).

Table 5. Results of Simple Linear Regression Test					
Model	R	R ²	F	B (Unstand-ardized)	Sig. (p)
Awareness predicting Active Participation	0.319	0.102	25.047	0.292	< 0.001
Overall Participation predicting Evaluation	0.244	0.060	14.022	0.163	< 0.001

Source: Authors, based on SPSS output, 2025.

The ability to predict active participation based on awareness of participation

The results showed that the model was statistically significant ($F = 25.047$; $p < 0.001$) and that the coefficient of determination ($R^2 = 0.102$) indicated the level of awareness of participation explained 10.2% of the variance in actual participation. The unstandardized regression coefficient, B , was 0.292, meaning that actual participation increased by an average of 0.292 for every one-unit increase in awareness, in a positive direction ($R = 0.319$). While this result suggests that awareness contributes to increased practical engagement, the model's explanatory power remains limited. This indicates that other mediating or contextual factors, such as the ease of formal channels, available time, and institutional response, influence the transition from awareness to actual practice.

Overall participation capacity for predicting green space assessment

The results showed that the model was statistically significant ($F = 14.022$; $p < 0.001$) and that the coefficient of determination ($R^2 = 0.060$) indicated total participation explained approximately 6% of the variance in individuals' assessments of green spaces. The unstandardized regression coefficient ($B = 0.163$) shows that, on average, ratings increase by 0.163 with each one-unit increase in participation, indicating a positive direction ($R = 0.244$). This indicates a positive predictive correlation between participation and evaluation, though it is weak. From an analytical perspective, the relationship could also go both ways: positive evaluation may encourage participation, and participation may increase appreciation through interaction with the place. However, there are reservations about its causal interpretation.

Discussion

The results show that respondents tend to positively assess green spaces in terms of cleanliness, maintenance, and sense of security. However, there is clear reservation

about the adequacy of services and facilities. This is consistent with the majority of the sample concentrating on “medium-high” assessment levels. This distinction can be understood as separating elements managed through visible daily operational efforts, such as cleaning, maintenance, and security, from elements requiring more costly, sustainable equipment, services, and investments, such as facilities and ancillary services. This may explain why some aspects receive a “positive assessment” while overall satisfaction tends towards the middle. This interpretation aligns with the literature indicating that people perceive green spaces positively when they are clean, well-maintained, safe, and aesthetically pleasing. However, limited facilities and services diminish their utility value and limit overall satisfaction (Fuller et al., 2010; Gilchrist et al., 2015; Malek et al., 2015; Khalilnezhad et al., 2021). The persistence of this discrepancy across previous and recent studies suggests that improvements in “service infrastructure” progress more slowly than improvements in “routine maintenance”, creating a pattern that repeats across different temporal and spatial contexts.

The results show that awareness of participation among the sample population ranges from “average” to “high”, reflecting a general acceptance of the right to participate and the importance of green spaces. There is also a high level of responsibility and willingness to contribute. However, this awareness appears to be more “value-based/attitudinal” than “legal/procedural” in nature. There is a clear limitation in knowledge of the laws governing participation, the official mechanisms available, and how to use them. This discrepancy suggests a gap between intention and willingness and the practical ability to activate participation through official channels. This gap may be linked to weak institutional guidance and communication about participation channels or the nature of the relationship between citizens and institutions when participation channels are unknown or inaccessible. This interpretation aligns with literature indicating that increased environmental and value awareness does not always come with the procedural knowledge necessary for effective participation, particularly when institutional mechanisms are unclear or unfamiliar to citizens (Krasny & Tidball, 2012; Buijs et al., 2016). Therefore, limited procedural knowledge may explain the limited organized participation and low proposal submissions, which the results of actual participation and obstacles will clarify more precisely.

The results show that most respondents' active participation is at an “average” level. In reality, however, it takes the form of individual initiatives and direct interventions, such as protection, repair, and maintenance of cleanliness, rather than organized participation through official activities or submitting proposals to authorities. This explains the limited “institutional” participation despite a willingness to contribute. This pattern can be explained from two complementary perspectives. First, individual participation does not require detailed knowledge of procedures or going through official channels. Thus, it seems “easier”, faster, and more applicable in everyday life. Second, the results of the obstacles axis show that there are barriers related to a lack of information, difficulty communicating, administrative complexities, and a weak response to proposals. These factors make engagement through official channels less attractive or feasible for many individuals. This paradox is understandable given that the perception of these barriers is often “moderate to low” among most of the sample. Only those who attempt to engage with official mechanisms may perceive them as significant, while those who limit themselves to individual practices have less contact with these barriers. This interpretation aligns with literature indicating that community participation in

green space management tends to be sporadic and irregular. It leans toward individual forms of intervention when clear and supportive formal channels are absent or when there is little confidence in the usefulness of interacting with institutions (Buizer et al., 2016; Colding & Barthel, 2013; Buchecker et al., 2003; Healey, 1998; Stansbury & Irvin, 2004).

The results indicate that the “average” level of participation is the most common among the sample. This reflects “partial/selective participation” rather than high and regular engagement. This level is the result of a balance between factors encouraging participation, such as awareness of rights, willingness, and a sense of responsibility, and factors limiting the translation of this willingness into regular institutional practice. The latter includes the limited nature of organized participation and the procedures associated with official channels. In this sense, participation is neither entirely low nor high because a significant part of it manifests as individual behaviors and direct interventions rather than institutional participation, such as involvement in official activities or submitting proposals. This pattern underscores the importance of viewing participation as a complex phenomenon where individual motivations intersect with organizational conditions and institutional responses rather than as a product of awareness or intention alone (Arnstein, 2020). This calls for considering ways to strengthen and facilitate formal participation channels to transform willingness into regular institutional practice.

The results of the gender analysis suggest that the disparity is not concentrated in the level of assessment, awareness, or perception of barriers, but rather in the level of actual practice and overall participation. This indicates that the issue is not a “gap in awareness” between the sexes, but rather a “gap in empowerment and opportunities” in translating readiness into field participation. This can be interpreted in light of the fact that practical involvement in activities related to the public sphere may require resources and conditions that vary between men and women. These conditions include available time, mobility, certain safety considerations, and the nature of the channels of participation. The latter may require direct presence or frequent communication with official bodies. In this sense, women and men may have similar appreciation for the value of green spaces and initial willingness to participate; however, women face less favorable conditions for practical engagement. This interpretation aligns with literature distinguishing between awareness and attitude, on the one hand, and actual ability to participate, on the other, when participation is limited by social and regulatory constraints (Fors et al., 2021; Cornwall, 2024).

The test results show that the degree of participation does not significantly vary within the sample based on demographics. Age does not appear to be a distinguishing factor, and there is limited evidence of a link with education and professional status. These results suggest that participation in the management of green spaces may be more related to the conditions of access to participation itself, such as clarity of channels, ease of procedures, and receiving a response when communicating or submitting proposals, than to direct demographic characteristics. In this context, signals related to education and professional activity can be understood as reflecting “enabling” differences rather than purely demographic ones. A minimum level of education, professional experience, and social networks may provide a greater capacity to deal with information, procedures, and communication with relevant parties. This interpretation

aligns with literature arguing that differences in participation often manifest through channels of empowerment and access, such as the availability of information, ease of access, and agency or capacity to act, rather than as fixed differences between age groups. The impact of education or professional integration becomes more evident when participation mechanisms are insufficiently accessible (Fors et al., 2015; Tsekoura, 2016). From a temporal comparison perspective, the continued prominence of “enabling factors” as determinants of participation—even across different contexts—explains why the results are similar to those from the middle of last decade. It appears that participation changes slowly when increased awareness is not accompanied by parallel development in the procedural and institutional structure of participation.

The correlation and regression results show that awareness of participation is positively associated with active participation and contributes to predicting it. However, the results also indicate that awareness alone is not sufficient to explain participatory behavior without an enabling environment that provides clarity regarding participation channels, ensures ease of access, and demonstrates responsiveness to proposals. Additionally, the absence of a significant relationship between perceived constraints and actual participation, coupled with the weak correlation between awareness and perception of constraints, implies that some participation occurs outside of formal channels through individual initiatives that do not involve direct procedural contact. Conversely, constraints are more prevalent among individuals who attempt to engage through formal channels. The positive relationship between overall participation and green space evaluation, with its limited explanatory power, suggests a possible two-way link. Satisfaction may reinforce the tendency to participate, and participation may increase appreciation through interaction with the place. However, this design does not determine causality. Thus, these analyses confirm that participation is the product of an interaction between individual motivations and the institutional/procedural structure that opens or closes possibilities for action (Buijs et al., 2016; Stansbury & Irvin, 2004; Malek et al., 2015).

From this perspective, the similarity between our findings and much of the earlier literature is not evidence of the stability of the study area. Rather, it is the continuation of a structural pattern that recurs when awareness and readiness grow faster than the development of the institutional structure that supports participation. Even though some conditions have changed over the past decade, such as growing environmental awareness and increased interest in public spaces, the limited development and effectiveness of formal participation mechanisms may result in outcomes similar to those documented in previous literature.

Conclusions

The study concluded that users' assessment of green spaces was positive overall. However, this positive assessment masks shortcomings in the level of available services and some infrastructure components. The results also showed that this assessment is partly linked to the level of individual participation in managing and improving green spaces. This participation is, in turn, linked to the degree of environmental awareness. However, the explanatory power of these relationships remains limited. While users have a strong sense of responsibility and willingness to contribute, this is not reflected

in their behavior due to a lack of knowledge about official channels, complex procedures, and barriers related to gender, professional experience, and educational level.

Based on these findings, the study proposes a series of measures to improve the situation and enhance user participation in the management of urban green spaces. The most important of these measures is simplifying administrative and legal procedures associated with participation. Clarifying paths and channels of participation through clear information boards in green spaces, digital platforms, and direct contact points at the local community level. Improving communication channels between administration and users; strengthening institutional frameworks that support participatory management through permanent participation mechanisms (e.g., user committees or neighborhood forums). Recognizing individual and collective initiatives in cleaning, monitoring, and simple maintenance. The study also emphasizes the need to link environmental awareness programs to practical legal and administrative components so that awareness moves from public discourse to organized action. Special measures should be taken to overcome obstacles to participation by women, young people, and vulnerable groups and to make participatory activities safer, more flexible, and better suited to their daily circumstances.

This study's results show that combining users' assessments of green space quality, environmental awareness levels, actual participation levels, and perceived obstacles provides a reliable diagnostic framework for designing field interventions that increase and improve engagement in urban green space management. This framework can be used in other Algerian cities and similar urban contexts to accurately identify weaknesses and propose policies involving the participation of local people that are suited to the specific characteristics of each urban space. This will contribute to the protection of these spaces and enhance their social and environmental roles.

Conflict of Interest: The authors declare no conflict of interest.

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