



Published by Avanti Publishers

International Journal of Architectural Engineering Technology

ISSN (online): 2409-9821



The Evolution, Demise, and Renaissance of Green Spaces in Dar es Salaam: An Explorative Discourse on Influential Factors

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ARTICLE INFO

Article Type: Research Article

Academic Editor: Wenjian Pan^{id}

Keywords:

Dar es Salaam

Perceived safety

African urbanism

Urban green spaces

Infrastructure quality

Environmental justice

Timeline:

Received: July 28, 2026

Accepted: September 21, 2026

Published: October 17, 2026

Citation: Swai O, Nkini S. The evolution, demise, and renaissance of green spaces in Dar es Salaam: An explorative discourse on influential factors. *Int J Archit Eng Technol*. 2026; 13(3): 254-283.

DOI: <https://doi.org/10.15377/2409-9821.2026.13.13>

ABSTRACT

Urban green spaces in African cities are under unprecedented pressure from rapid urbanisation, yet the factors influencing their utilisation remain poorly understood. This paper examines the determinants of green space use in Dar es Salaam, Tanzania, one of Africa's fastest-growing metropolitan areas. This study employs a mixed-methods approach across 42 green spaces in three municipalities, drawing on Attention Restoration Theory, Place Attachment Theory, and the Ecological Model of Physical Activity. Data collection combined systematic observation of physical conditions and user activities with structured interviews of diverse stakeholders. Findings reveal that perceived safety is the most influential factor affecting visitation and duration of stay, with safety ratings varying dramatically between affluent areas (71.4% positive) and low-income neighbourhoods (16% positive). Infrastructure quality—particularly surface treatment and facility provision—strongly correlates with user diversity and activity range. While most spaces remain physically accessible, accessibility alone does not guarantee utilisation; usability depends on infrastructure quality, maintenance, and social meaning. The study reveals significant socio-spatial inequalities, with higher-income areas enjoying better-maintained, safer, and more diverse green spaces. These findings extend theoretical understandings of green space use to African urban contexts and provide evidence-based guidance for policy and practice.

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1. Introduction

1.1. The Urban Green Space Imperative in African Cities

Urban green spaces—including parks, botanical gardens, recreational grounds, and green corridors—are critical infrastructure for sustainable urban development. They contribute to environmental regulation, public health, social cohesion, and climate adaptation. In sub-Saharan Africa, where urban populations are projected to triple by 2050, these functions are increasingly vital yet severely threatened as municipal capacity lags behind growth [1, 2].

Dar es Salaam, Tanzania's primary city with over six million residents and 5.6% annual growth, exemplifies these pressures. The city has lost approximately 70% of its green cover over four decades—a rate exceeding most comparable cities—as informal settlements, commercial developments, and infrastructure have encroached upon public open spaces while remaining parks deteriorated through neglect [3, 4].

1.2. Colonial Legacies and Post-Independence Trajectories

Dar es Salaam's green spaces originated under German colonial rule (1885–1918) as instruments of racial segregation. They were designed to serve European elites while excluding African populations. Spaces such as the Botanical Garden and Mnazi Mmoja were conceived as physical manifestations of colonial hierarchy—buffers reinforcing segregation between Europeans, Asians, and Africans [5, 6].

Independence in 1961 brought political transformation but not sustained attention to urban greenery. National priorities centred on rural development, while pressing demands for housing and infrastructure overshadowed green space preservation. Economic crises and structural adjustment programmes further weakened municipal capacity, accelerating decline and encroachment [7–9].

1.3. The Utilisation Problem

Despite recent policy recognition—the Dar es Salaam Master Plan (2012–2032) proposes new waterfront parks and rehabilitation [10]—many green spaces remain significantly underutilised, particularly among women, children, the elderly, and low-income residents. This "utilisation gap" constrains the potential of these spaces to deliver social, health, and environmental benefits.

The reasons are multi-dimensional: safety concerns due to inadequate lighting and limited surveillance [4, 11]; infrastructure deficits including lack of seating, shade, and sanitation [12]; maintenance failures that signal neglect [13]; and colonial legacies shaping perceptions of ownership, where spaces designed for elites remain unwelcoming to ordinary Tanzanians [14]. Gender, age, and socio-economic status further differentiate experiences, with women facing particular constraints related to safety and social expectations [15].

1.4. Significance of the Study

Theoretically, this research extends established frameworks to an under-researched African urban context, contributing to more globally inclusive urban theory. Empirically, it generates systematic data on green space conditions and utilisation patterns across multiple sites and neighbourhood types. Practically, it offers actionable guidance for municipal authorities, planners, and community organisations, while providing evidence to support implementation of the Dar es Salaam Master Plan and advocacy for environmental justice.

2. Literature Review

2.1. Global Perspectives on Urban Green Space Utilisation

Over the past four decades, the scholarly discourse on urban green spaces has evolved substantially. This has generated robust theoretical frameworks and empirical evidence, predominantly from cities in the Global North.

Research consistently demonstrates that green spaces provide critical ecosystem services—mitigating urban heat islands, managing stormwater runoff, improving air quality, and supporting biodiversity within densely built environments. From a public health perspective, green spaces promote physical activity, social interaction, and psychological restoration, with studies showing that even relatively short exposures can reduce stress and enhance cognitive function [16].

A parallel stream of scholarship has examined urban green spaces through the lens of environmental justice, revealing systematic inequalities in their distribution and quality. Research in North American and European cities consistently demonstrates that low-income neighbourhoods and communities of colour have access to fewer, smaller, and poorer-quality green spaces than affluent, predominantly white areas [17]. More recent scholarship has expanded the justice framework beyond distributive concerns to encompass procedural and recognition dimensions, examining who participates in planning decisions and whether diverse cultural values are acknowledged in green space design [18].

2.2. Recent Advances in African Urban Green Space Research

The past five years have seen a significant expansion of research on urban green spaces in African cities, as per the bibliometric analysis that was conducted using the Scopus database (Elsevier) in January 2024. The search string employed was: (TITLE-ABS-KEY("urban green space" OR "*urban park*" OR "green infrastructure" OR "open space*") AND TITLE-ABS-KEY("Africa" OR "sub-Saharan Africa" OR "African")). The search was limited to peer-reviewed journal articles and conference proceedings published between 2000 and 2024. The initial search yielded 264 unique articles after removing duplicates. Articles were screened based on relevance to urban green space research in African contexts, with 187 articles retained for full bibliometric analysis, including publication trends, geographic distribution, thematic analysis, and citation patterns. The authors note that high-income areas tend to exhibit higher percentages of green coverage, while many African cities show lower green coverage, reflecting historical inequalities and contemporary development pressures [19].

Recent systematic reviews have examined green infrastructure planning specifically in Global South contexts. One study synthesised 30 studies on transforming underutilised urban spaces into green infrastructure, identifying four dominant themes: spatial analysis and site identification, participatory and community-led planning, governance and policy mechanisms, and multifunctionality in green infrastructure strategies. Crucially, the review identifies significant gaps including the absence of unified definitions, reliance on static spatial datasets that overlook informal land use, and limited integration of justice dimensions—specifically social, spatial, and procedural justice—into green infrastructure planning [20].

Emerging research challenges conventional assumptions about urban green spaces as unambiguous public goods. Work in Nairobi's informal settlements reveals that greening and ungreening processes often coincide, are frequently politicised, and are implemented selectively in ways that affect vulnerable groups. Land transformation can accompany the formation of socio-economic enclaves, fragmenting neighbourhoods into zones that favour wealthier newcomers while further marginalising low-income residents [21]. These findings expose the co-option of green spaces for elite-driven aesthetic and commercial purposes, complicating narratives that position greening as inherently beneficial.

2.3. Critical Debates: Greening, Gentrification, and Environmental Justice

A growing body of scholarship critically examines the tensions inherent in urban greening initiatives. Scholars pay particular attention to the risk of 'green gentrification,' whereby environmental improvements increase property values and attract higher-income residents, potentially displacing the communities the interventions were intended to benefit. The concept of "just green enough" describes strategies that provide environmental benefits while avoiding displacement pressures [22]. This debate is particularly relevant in African cities experiencing rapid urban transformation, where land values are escalating and informal settlements face constant threat of clearance.

Research from Kumasi, Ghana, demonstrates that community-driven re-greening efforts backed by institutional support are more impactful than large-scale, standalone greening projects implemented by institutions alone. However, limited space, encroachment pressures, and insecure tenure significantly affect the effectiveness of re-greening efforts in informal settlements. The study advocates for policies that prioritise inclusive participation, equitable re-greening, and flexible frameworks aligned with the realities of informal settlements [23].

Recent work also highlights the relationship between green space and subjective well-being in Global South contexts. Research found that increases of 10% in surrounding greenness at distances from 100 to 500 metres increase the likelihood of self-reported happiness by 13% to 18% in a mid-sized Colombian city. When quality aspects of green areas are considered, they are also significantly correlated with happiness, suggesting that both quantity and quality matter for human well-being [24].

2.4. Methodological Approaches in Green Space Research

Methodological approaches to studying urban green spaces in African contexts have diversified considerably. Early studies relied heavily on remote sensing and change detection to document green cover loss, providing valuable baseline data on the scale of decline. More recent work combines satellite imagery with household surveys, interviews, and participatory methods to understand not just where green spaces are located, but how they are used and valued by different populations [25].

Systematic observation tools such as SOPARC (System for Observing Play and Recreation in Communities) have been adapted for use in African cities, enabling standardised documentation of user characteristics, activities, and physical conditions [26]. Mixed-methods designs combining quantitative observation with qualitative interviews are increasingly recognised as essential for capturing both the "what" and "why" of green space utilisation patterns [27].

However, significant methodological gaps remain. Research notes that most approaches rely on static spatial datasets that fail to capture informal land use and changing vacancy patterns [28]. The review recommends hybrid geospatial methods that integrate temporal, spectral, and morphological data to overcome limitations of static datasets. Additionally, more comparative studies across cities and countries at the continental scale are needed, along with greater incorporation of informal land tenure and ambiguous land ownership into analytical frameworks.

2.5. Governance, Policy, and Institutional Dimensions

UN-Habitat's comparative analysis of urban governance for planning in ten Global South countries emphasises the need to strengthen institutional frameworks, empower diverse urban stakeholders, and ensure predictability and coherence in urban development plans [29]. The report highlights that weak governance frameworks remain a significant barrier to effective green space planning and management in many African cities.

Recent policy initiatives demonstrate growing recognition of green infrastructure's importance. The Scaling Urban Nature-Based Solutions for Climate Adaptation in Sub-Saharan Africa (SUNCASA) project, launched in 2024 with CAD\$28.7 million in funding, is implementing watershed restoration, urban tree planting, and conservation actions in Dire Dawa (Ethiopia), Kigali (Rwanda), and Johannesburg (South Africa) [30]. Similarly, FAO's Sustainable Cities Integrated Programme in Zimbabwe aims to restore 1,931 hectares of forest and 39 hectares of wetlands in Bulawayo and Harare [31]. These initiatives signal increasing policy attention to green infrastructure as a climate adaptation strategy, though their long-term impacts on equity and utilisation remain to be evaluated [32].

Research argues that nature-based solutions in African cities must move beyond technical interventions to address underlying structural inequalities. Drawing on case studies from across the continent, studies demonstrate that successful greening initiatives require sustained community engagement, attention to livelihood impacts, and integration with broader urban development strategies [33].

2.6. Literature Synthesis and Research Gaps

The literature reviewed above reveals several key findings and significant gaps that this study addresses. The literature demonstrates that urban green spaces provide critical ecosystem services, public health benefits, and social functions across diverse contexts [34-36]. Research consistently shows that green space distribution and quality are patterned by socio-economic inequalities, with low-income and minority communities having access to fewer, smaller, and poorer-quality spaces [37-39]. In African cities, scholarship has expanded rapidly, with 68% of studies produced in the last five years, yet concentration in only four countries (South Africa, Nigeria, Kenya, Ethiopia) leaves significant geographic gaps [40].

Critical debates highlight the risk of "green gentrification," where environmental improvements increase property values and potentially displace intended beneficiaries [41]. The concept of "just green enough" and the expansion of environmental justice frameworks to encompass procedural and recognition dimensions provide important analytical tools. Recent work in African cities reveals the politicised and selective nature of greening processes [42], while community-driven approaches show promise in informal settlements.

However, the literature reveals several significant gaps. First, there is limited research on urban green space utilisation in East African cities, particularly in rapidly growing metropolitan areas like Dar es Salaam [43]. Also, while individual factors influencing use (safety, facilities, accessibility) have been examined separately, few studies simultaneously investigate multiple factors using an integrated theoretical framework [44]. Fourth, engagement with environmental justice frameworks in African green space research remains limited, with most studies focusing on distributional inequalities without examining procedural or recognition dimensions [45].

This study addresses these gaps through: (1) empirical investigation in Dar es Salaam, an under-researched East African metropolitan area; (2) a mixed-methods design combining systematic observation (SOPARC) with user interviews and key informant interviews; (3) an integrated theoretical framework (ART, Place Attachment Theory, Ecological Model) examining multiple factors simultaneously; (4) explicit engagement with environmental justice frameworks to examine socio-spatial inequalities in green space quality and utilisation; and (5) generating evidence for policy and practice that can inform equitable green space planning in rapidly urbanising African cities.

2.7. Theoretical Foundations in Green Space Research

This study is underpinned by three complementary theoretical frameworks that together provide a comprehensive lens for examining factors influencing urban green space utilisation. Each framework has been extensively validated in previous research and provides specific insights relevant to understanding green space use in African urban contexts.

Attention Restoration Theory (ART), developed by [46], explains why people are attracted to natural environments: they possess restorative qualities that help recover directed attention—the cognitive capacity essential for focused work that becomes depleted through sustained use. The theory identifies four key qualities of restorative environments: being away (sense of escaping routine demands), extent (sufficient scope to engage the mind), fascination (effortless attention drawn by stimuli), and compatibility (alignment between environmental demands and individual purposes). ART has been widely applied in green space research, demonstrating that vegetation, spatial configuration, and tranquillity significantly influence user preferences and visitation patterns [47, 48]. In African contexts, [49] found that ART's principles apply across diverse cultural settings, though the specific features that facilitate restoration may vary. Accordingly, some authors demonstrated that access to restorative environments has measurable impacts on health outcomes, reinforcing the importance of understanding what makes green spaces restorative in different contexts [50].

Place Attachment Theory, articulated comprehensively by [51], provides a complementary lens for understanding why individuals form emotional bonds with specific places. The theory posits that attachment arises through personal experiences, cultural meanings, and social interactions embedded within physical settings. These bonds influence behaviour—individuals who feel attached to a place are more likely to visit it regularly, care for it, and defend it against threats [52, 53]. Research has elaborated multiple dimensions of place attachment,

including place dependence (functional attachment related to activities afforded) and place identity (emotional-symbolic attachment related to self-concept). In green space contexts, studies demonstrate that attachment mediates the relationship between environmental quality and use patterns [54, 55]. The theory is particularly relevant in post-colonial African cities where historical exclusion may shape contemporary attachment patterns [56, 57].

The Ecological Model of Physical Activity, developed by [58], offers a multi-level framework for understanding the determinants of active living in public spaces. The model conceptualises physical activity as shaped by interacting factors at multiple levels: individual (psychological, demographic), social (cultural norms, social support), physical environment (facilities, aesthetics, safety), and policy (regulations, investment priorities). This ecological perspective recognises that behaviour cannot be explained by any single factor but emerges from complex interrelationships across levels. Applied to green spaces, the model has generated valuable insights into how park characteristics influence use, demonstrating that facility provision, maintenance quality, and safety perceptions significantly predict visitation levels and physical activity intensity [59].

These three theories have been used together in previous research due to their complementary foci. [60] combined ART and Place Attachment Theory to examine how restorative experiences in urban parks contribute to place attachment formation. [61] integrated all three frameworks to examine the pathways through which park characteristics influence use and well-being. The combined framework has been validated across diverse cultural contexts, though application in African cities remains limited. This study extends this integrated approach to Dar es Salaam, examining how cognitive (ART), emotional (Place Attachment), and behavioural (Ecological Model) factors combine to shape green space utilisation patterns in a rapidly urbanising African context.

3. Theoretical Framework- An Integrated Approach

This study integrates three complementary theories—Attention Restoration Theory (ART), Place Attachment Theory, and the Ecological Model of Physical Activity—to provide a comprehensive analytical framework for examining factors influencing urban green space utilisation in Dar es Salaam.

These three theories were selected for several reasons. They provide complementary lenses: ART addresses cognitive and psychological dimensions of environmental experience; Place Attachment Theory addresses emotional and social dimensions; and the Ecological Model addresses behavioural determinants across multiple levels (individual, social, environmental, policy). Moreover, collectively they cover the key domains identified in the literature as influencing green space use. In addition, these theories have been used together in previous research and have demonstrated complementary explanatory power. Also, they were selected over alternative frameworks (such as Social-Ecological Systems Theory or the Theory of Planned Behaviour) because they have clear operational measures, strong empirical support, and proven relevance to urban green space research.

The factors presented in Fig. (1) were selected for each theory based on: (a) theoretical relevance, where each factor is explicitly identified in the respective theory as influencing outcomes; (b) empirical evidence from previous studies demonstrating significant associations; (c) operational feasibility—the factors could be measured reliably through observation and interviews in the Dar es Salaam context; and (d) relevance to the research questions. This integrated framework allows examination of the multiple, interacting pathways through which green space characteristics influence utilisation, while acknowledging that different factors may be more or less important for different user groups and in different contexts.

Fig. (1) illustrates the integrated theoretical framework guiding this study. The framework conceptualises urban green space utilisation as shaped by: (1) physical characteristics influencing restorative potential and functional affordances (ART); (2) social and perceptual factors shaping emotional bonds and willingness to visit (Place Attachment); (3) governance and management practices conditioning physical quality and social dynamics (Ecological Model); and (4) socio-spatial context patterning opportunities for attachment and use across different populations (integrated).

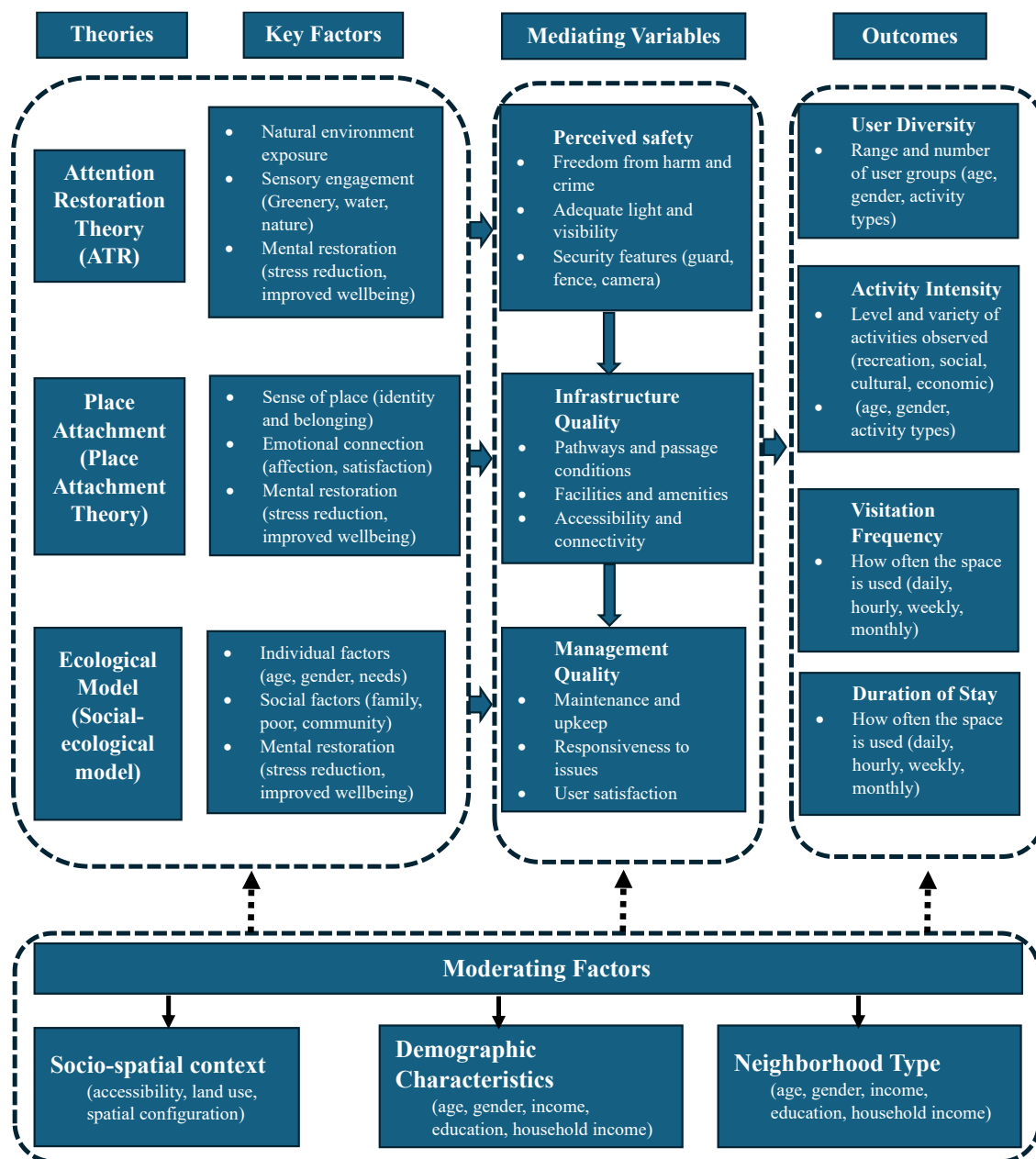


Figure 1: Theoretical and Conceptual Framework.

4. Materials and Methods

4.1. Study Area

The research was conducted in Dar es Salaam, Tanzania's largest city and primary economic hub. Located on the Indian Ocean coast, the city covers approximately 1,393 square kilometres. With an estimated population exceeding 6 million and an annual growth rate of 5.6 percent, Dar es Salaam ranks among the fastest-growing cities in Africa [62, 63]. The city's rapid growth has placed unprecedented pressure on urban infrastructure, including green spaces, with approximately 70% of green cover lost over four decades [64] (Fig. 2).

4.2. Description of the Study Areas

The five study areas were selected to represent the diversity of neighbourhood types and green space conditions in Dar es Salaam. Kariakoo is the commercial heart of the city, characterised by high population density,

mixed land uses, and intense commercial activity. Its green spaces are predominantly small, heavily used, and subject to encroachment from informal traders. The area has a predominantly low-income population with limited municipal services. Posta encompasses the central business district, containing colonial-era green spaces such as Mnazi Mmoja, which historically served as segregated spaces for European elites. These spaces are now heavily used for commercial and social activities but suffer from maintenance deficits and safety concerns.

Upanga is a historically Asian residential area that has transitioned to a mixed-income neighbourhood with relatively well-maintained green spaces. It benefits from proximity to the city centre and a more stable socio-economic profile. Oysterbay and Masaki constitute the most affluent neighbourhoods in Dar es Salaam, characterised by low-density residential development, high property values, and better municipal services. Green spaces in these areas are generally larger, better maintained, and more secure. Kinondoni and Temeke represent rapidly urbanising areas with a mix of planned and unplanned settlements. They have high population densities, significant informal sector activity, and strained municipal services. Green spaces are often poorly maintained and subject to encroachment.

The five areas were classified into two comparison groups based on socio-economic characteristics, property values, and municipal service levels. The high-income/affluent group comprises Upanga and Oysterbay/Masaki. These areas are characterised by: (a) median household incomes above the city average (≥ 2.5 million TZS/month); (b) property values in the highest quartile for the city; (c) consistent municipal service provision including regular refuse collection and road maintenance; (d) lower population density; and (e) active neighbourhood associations with advocacy capacity. The low-income group comprises Kariakoo, Kinondoni, and Temeke. These areas are characterised by: (a) median household incomes below the city average (≤ 1.2 million TZS/month); (b) property values in the lowest quartile; (c) inconsistent municipal service provision; (d) high population density; and (e) limited community advocacy capacity. This classification was validated using municipal data on household incomes [65], property tax assessments, and service delivery records from the respective municipal councils.

4.3. Sampling Strategy

A multi-stage sampling strategy was employed to identify the 42 green spaces from an initial inventory of 187 spaces. The inventory was compiled through a combination of municipal records review (from the Dar es Salaam City Council and the three municipal authorities), analysis of high-resolution satellite imagery (Sentinel-2, 2023), and field verification. Stage 1 involved the identification of all potential green spaces (parks, gardens, recreational grounds, open spaces, and green corridors) within the three study municipalities. This yielded 187 candidate spaces. Stage 2 involved stratification of the inventory by municipality: Ilala (78 spaces), Kinondoni (64 spaces), and Temeke (45 spaces). Within each municipality, spaces were further stratified by neighbourhood type (high-income, middle-income, low-income) based on property values, household income data, and municipal service levels. Stage 3 employed systematic sampling with a random start to select spaces from each stratum, ensuring representation across all municipalities and neighbourhood types.

The selection criteria included: (a) physical accessibility for research purposes; (b) willingness of local authorities and communities to permit research activities; (c) representativeness across the socio-economic gradient; (d) variation in green space typology (formal parks, informal open spaces, recreational grounds); and (e) spatial distribution across the municipality to ensure geographic coverage. This process resulted in the selection of 42 spaces distributed as follows: Kariakoo (6 spaces), Posta (12 spaces), Upanga (6 spaces), Oysterbay/Masaki (4 spaces), and Kinondoni/Temeke (14 spaces). The 42 spaces represent approximately 22% of the total inventory and provide comprehensive coverage of the diversity of green space types and neighbourhood contexts in Dar es Salaam. Researchers observed each space on multiple occasions (weekday/weekend, morning/afternoon).

Structured interviews with key informants explored institutional responsibilities, resource allocation, and management challenges. User interviews examined visitation patterns, activities, safety perceptions, and satisfaction. User interviews were distributed across the 42 green spaces as follows: spaces with high user presence ($n=18$ spaces) received 3-4 interviews each; spaces with moderate presence ($n=16$ spaces) received 2-3 interviews each; spaces with low presence ($n=8$ spaces) received 1-2 interviews each. This yielded 86 user interviews. Interviews were conducted between March and June 2024, during both weekday (Monday-Friday) and

weekend (Saturday-Sunday) periods, with morning (7:00-10:00) and afternoon (14:00-17:00) sessions to capture temporal variation in use patterns.

Areas with Green Spaces: Quantitative data were analysed in SPSS using descriptive statistics and cross-tabulation with chi-square tests ($p < 0.05$). Qualitative data were analysed through thematic analysis following the framework approach.

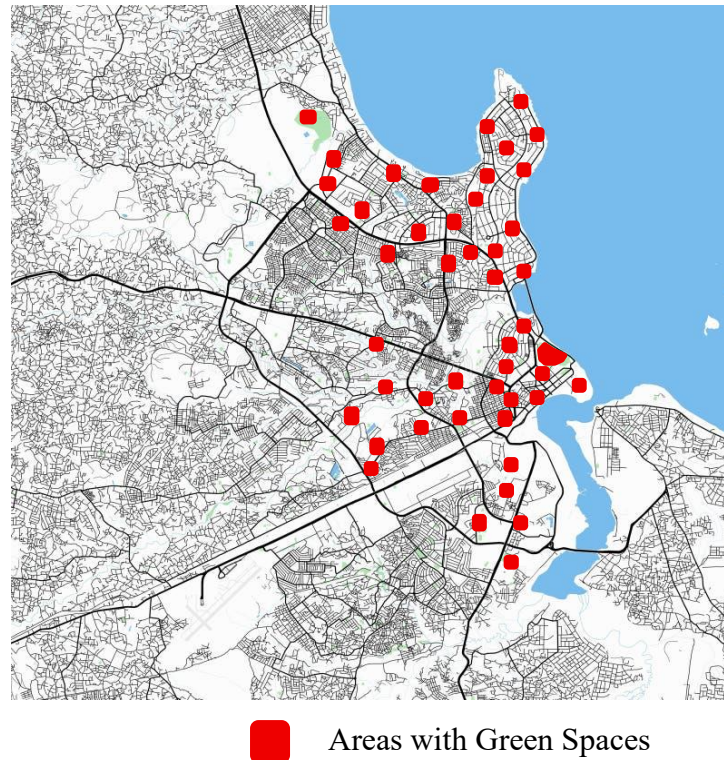


Figure 2: Location of the study areas.

4.4. Indicator Framework

To ensure systematic and transparent analysis, a comprehensive indicator system was developed for all key variables examined in the study. Each indicator was operationally defined and assessed using specified measurement procedures, scales, and classification criteria, as summarised in Fig. (3).

Specifically, it included definitions of safety (measured through user perception ratings and physical indicators), surface treatment (classified as poor/fair/moderate/good/excellent based on condition, evenness, and drainage), facilities (assessed through presence, condition, and diversity of amenities), management (evaluated through maintenance frequency, physical condition, and user satisfaction), user diversity (based on age, gender, and activity type distribution), and convenience (accessibility, usability, and temporal availability). Each indicator includes its measurement scale and classification criteria.

4.5. Survey Instrument, Qualitative Analysis, and Definition of Key Terms

The survey instrument used in this study was structured around seven thematic sections: (1) Respondent demographics (age, gender, occupation, residential location); (2) Visitation patterns (frequency, duration, timing, mode of access); (3) Activities engaged in while visiting; (4) Safety perceptions (quantitative ratings and qualitative descriptions of safety concerns); (5) Facility evaluation (presence, condition, adequacy of amenities); (6) Management perceptions (satisfaction with maintenance, security, and responsiveness); (7) Open-ended questions exploring barriers to use, preferences, and suggestions for improvement. The full questionnaire is provided in Appendix A.

In addition to the quantitative data from structured questions, qualitative data were collected through open-ended questions and key informant interviews. These data were analysed using thematic analysis following the framework approach. The analysis process involved: (1) familiarisation with the data through repeated reading of interview transcripts and field notes; (2) identification of initial codes based on recurring themes and concepts; (3) grouping codes into broader categories; (4) development of analytical themes; and (5) interpretation and integration with quantitative findings. Key qualitative themes that emerged included: safety concerns as a primary barrier to use; the importance of maintenance as a signal of civic care; the role of social presence in generating feelings of security; the impact of facility quality on usability; and the significance of neighbourhood context in shaping user experiences.

Key terms used throughout the analysis were defined as follows. "Safety" refers to the perceived freedom from physical harm, crime, and social threat while using green spaces, measured through both user perception ratings (on a 5-point scale) and objective indicators (lighting conditions, visibility, presence of security features). "Usability" refers to the practical functionality of spaces for intended purposes, encompassing physical access, comfort, amenity provision, and the absence of barriers to use. "Convenience" refers to the ease with which spaces can be used, considering location relative to users' origins, opening hours, internal circulation, and facility availability. "User diversity" refers to the range of demographic groups (by age, gender, ability) and activity types observed in a space. "Infrastructure quality" encompasses the physical condition and adequacy of facilities including pathways, seating, shade, sports facilities, playgrounds, lighting, and sanitation.

Indicator	Measurement / Observation	Classification / Scale	Findings / Outcome
Safety Perception Perceived freedom from physical harm, crime and social threat while using green spaces.	- User self-report (5-point Likert scale). - Objective indicators: lighting, visibility from surrounding areas, security features (guards, fencing, signage). - Overall rating = mean user score.	User rating (Likert scale): 1 = Very Poor, 2 = Poor, 3 = Moderate, 4 = Good, 5 = Very Good. + Objective indicators (presence/absence).	Overall safety level (mean user rating) and presence/absence of key safety features.
Surface Treatment Physical condition and usability of pathways and gathering areas.	- Site inspection of pathways and gathering areas. - Check for cracks, unevenness, mud, hazards and wet-weather usability.	Poor: cracked/uneven/muddy, significant hazards, impassable when wet. Fair: some cracks/unevenness, moderate hazards, partly usable when wet. Moderate: generally even, minor hazards, usable in most conditions. Good: well-maintained, even, minimal hazards, usable in all conditions. Excellent: perfectly maintained, hazard-free, fully accessible (incl. mobility impaired).	Surface condition rating (Poor → Excellent) based on condition, hazards and accessibility in wet conditions.
Facility Provision Availability, condition and diversity of amenities within the green space.	Inventory of facilities: seating, shade structures, playground equipment, sports facilities, water points, sanitation facilities, pathways.	Poor: 0–2 facilities, mostly non-functional or severely deteriorated. Fair: 3–4, some functional, some in need of repair. Moderate: 5–6, mostly functional, regular maintenance. Good: 7–8, well-maintained, diverse amenities. Excellent: 9+, well-maintained, diverse and inclusive.	Facility provision level (Poor → Excellent) based on number, functionality, condition and diversity of amenities.
User Diversity Diversity and range of demographic groups using the space.	Systematic observation of user groups (age, gender and activity groups).	Moderate: 2–3 user groups (e.g., adults only or adults with children). Good: 4–5 user groups (e.g., elderly, adults, youth, children, both genders). Excellent: 6+ user groups (broad demographic range incl. elderly, children, youth, women, men, diverse activities).	Diversity level (Moderate → Excellent) based on number and range of user groups present.
Management Quality Effectiveness of maintenance and management practices.	- Observe maintenance frequency (daily, weekly, monthly or rarely). - Assess physical condition, responsiveness to reported issues. - User satisfaction with management.	Fair: infrequent maintenance, visible neglect, users dissatisfied. Moderate: occasional maintenance, some issues addressed, mixed satisfaction. Good: regular maintenance, most issues addressed, users generally satisfied. Excellent: consistent/proactive maintenance, prompt resolution, high satisfaction.	Management quality level (Fair → Excellent) based on maintenance, responsiveness and user satisfaction.
Accessibility Ease and inclusiveness of physical access, movement and entry.	- Physical access: entry points, pathways, barriers. - Freedom of entry: restrictions, fees, opening hours. - Convenience: ease of reaching, internal circulation, usability for diverse purposes.	Assessed according to the extent to which physical access, entry, circulation and use are unrestricted and convenient for diverse users.	Accessibility level (based on degree of openness, convenience and inclusiveness).
Variety of Uses Diversity of activities accommodated and observed within the green space.	- Systematic observation of activities: - Passive recreation (sitting, resting, reading) - Active recreation (sports, exercise, play) - Social interaction (conversation, gatherings) - Cultural activities (events, ceremonies) - Economic activities (vending, informal trade).	Classified by the number and types of activities observed (e.g., low, moderate, high diversity).	Variety of uses level (based on number and types of activities observed).

Figure 3: Indicator system from measurements to findings.

5. Findings

5.1. Safety as a Determinant of Green Space Utilisation

The findings indicate that perceived safety is the most influential factor affecting visitation and duration of stay in urban green spaces in Dar es Salaam. As illustrated in Fig. (4a), safety perceptions were lowest in Kariakoo, Kinondoni, and Temeke (16%), suggesting that most potential users in these areas perceive their local green

spaces as insecure. In contrast, Upanga and Oysterbay recorded higher safety ratings of 71.4% and 66.7%, respectively, reflecting better maintenance conditions, stronger neighbourhood surveillance, and greater social presence. This implies that the dramatic variation in safety perceptions across municipalities reveals how green space experiences are profoundly shaped by neighbourhood context.

Further spatial analysis shows that Oysterbay and Masaki recorded 66.7% "good" safety perceptions with no poor ratings, indicating relatively stable safety environments. Conversely, Kinondoni and Temeke showed predominantly moderate safety perceptions (71.4%), suggesting partially functional but still fragile security conditions.

Safety Kariakoo, Posta, Upanga Oysterbay/Masaki, Kinondoni/Temeke

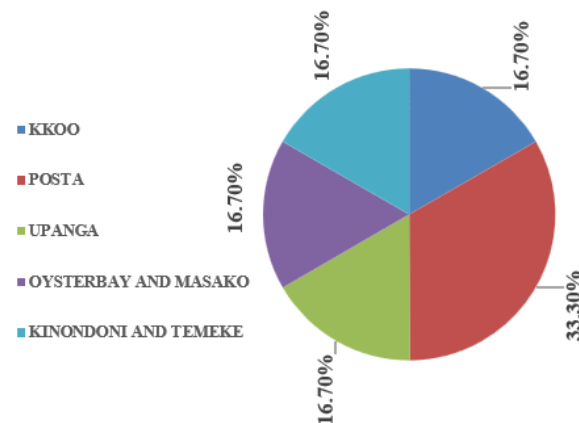


Figure 4a: Safety perception of the Green Spaces. Source: Surveyed Data, 2024.

The dramatic variation in safety perceptions across Dar es Salaam's municipalities reveals how green space experiences are profoundly shaped by neighbourhood context. The extremely low safety ratings in Kariakoo, Kinondoni, and Temeke—areas characterised by high population density, mixed land uses, and lower incomes—reflect the convergence of multiple risk factors. In these environments, inadequate lighting, limited formal surveillance, and the presence of activities perceived as threatening (such as illicit trade, loitering, or substance use) combine to create spaces that feel unsafe, particularly during early morning or evening hours. The absence of "eyes on the street"—the concept of natural surveillance generated by continuous pedestrian presence—means that potential users cannot rely on the informal social control that makes public spaces feel secure in more affluent areas [66]. This interpretation is supported by the statistical analysis showing a strong correlation ($r = 0.67$, $p < 0.01$) between user density and perceived safety.

The contrasting situation in Upanga and Oysterbay illustrates how safety perceptions are socially constructed as well as physically determined. These neighbourhoods benefit from several intersecting advantages: better-maintained infrastructure that signals civic attention, higher socio-economic status that correlates with lower crime rates, and active street life that provides natural surveillance. The absence of "poor" safety ratings in Oysterbay and Masaki is particularly telling—it suggests a threshold effect whereby once certain conditions are met, safety concerns cease to be a primary deterrent. This interpretation aligns with defensible space theory, which posits that environmental design can either encourage or discourage the territorial behaviours and social interactions that underpin perceived security [67].

The moderate safety perceptions characterising Kinondoni and Temeke (71.4%) represent an intermediate condition that warrants careful interpretation. These spaces are not uniformly unsafe, nor are they consistently secure. Rather, safety fluctuates by time of day, day of week, and specific location within the broader area. Users may feel comfortable during peak hours when others are present but avoid spaces during off-peak times. This conditional safety creates what might be termed "partial functionality"—spaces that work for some purposes, at some times, for some users, but that cannot be relied upon as consistently accessible public assets.

The findings also resonate with the concept of "eyes on the street," which emphasises how active, continuous use of public spaces generates informal surveillance that enhances perceived safety [68]. The higher safety ratings in areas with greater social presence (Upanga, Oysterbay) and lower ratings where spaces feel empty or abandoned (Kariakoo) empirically validate this foundational insight of urban design theory. Quantitative analysis provides strong support for this relationship. A Pearson correlation analysis revealed a statistically significant positive correlation ($r = 0.67$, $p < 0.01$, $n = 42$) between observed user density (measured as average number of users per observation period) and perceived safety ratings across all 42 green spaces. Furthermore, spaces that hosted regular programmed activities (defined as at least 3-5 organised events per month, including sports, cultural events, or community gatherings) had safety ratings of 71.4% positive (Good or Excellent) compared to only 33.3% positive in passive spaces without regular programming ($\chi^2 = 8.45$, $df = 1$, $p = 0.004$). In Kariakoo, spaces where interview respondents reported the presence of social surveillance (defined as informal monitoring by nearby residents, shopkeepers, or regular users) had safety ratings that were 33% higher than spaces without such surveillance.

However, the findings also suggest that "eyes on the street" are not automatically present but must be cultivated through combinations of design, management, and social dynamics that encourage sustained occupation.

5.2. Surface Treatment and User Diversity

Surface quality also plays a significant role in shaping the diversity of users and attractiveness of green spaces. Cross-tabulation results presented in Table 1 show that spaces with moderate surface treatment in Kariakoo attracted moderate user diversity (50%), whereas spaces with well-treated surfaces recorded 100% good user diversity levels. A similar pattern appears in Posta, where fair surface treatment corresponded with good user diversity in 100% of the observed spaces, indicating that even moderate improvements in infrastructure can substantially enhance public participation.

Table 1: Variety of people and surface treatment at K/Koo, Posta, Upanga, Oysterbay and Masaki and Kinondoni and Temeke.

Location	Response	Percentage of People in Rating		
K/Koo	Surface treatment	Moderate	Good	Excellent
	Poor	0%	0%	100%
	Fair	50%	50%	0%
	Moderate	50%	50%	0%
	Good	0%	100%	0%
Posta		Variety of people		
	Surface treatment	Moderate	Good	Excellent
	Fair	0%	100%	0%
	Moderate	25%	75%	0%
	Good	50%	50%	0%
	Excellent	33.3%	33.3%	33.3%
Upanga		Variety of people		
	Surface treatment	Fair	Moderate	Good
	Fair	0%	100%	0%
	Moderate	50%	50%	0%
	Good	0%	100%	0%
	Excellent	0%	50%	50%

Table 1 (contd....)

Location	Response	Percentage of People in Rating		
Oysterbay and Masaki		Variety of people		
	Surface treatment	Moderate	Good	Excellent
	Moderate	75%	25%	0%
	Good	100%	0%	0%
	Excellent	0%	100%	0%
Kinondoni and Temeke		Variety of people		
	Surface treatment	Fair	Moderate	Good
	Moderate	7.7%	46.2%	46.2%
	Good	0%	0%	100%

The relationship between surface quality and user diversity operates across all studied areas. In Upanga, spaces with excellent surface treatment supported 50% excellent user diversity and 50% good diversity. In Oysterbay and Masaki, spaces with moderate surface treatment attracted 75% moderate user diversity and 25% good diversity. In Kinondoni and Temeke, spaces with good surface treatment corresponded with 100% good user diversity.

The strong association between surface quality and user diversity reveals how physical infrastructure functions as a mediator of social inclusion in public spaces. Well-treated surfaces—smooth, level, well-drained pathways and gathering areas—fundamentally affect who can access and comfortably use a space. For elderly individuals, parents with pushchairs, people with mobility impairments, and young children, poor surface quality is not merely an inconvenience but an absolute barrier to use. The finding that spaces with moderate treatment in Kariakoo attracted only moderate diversity (50%) while well-treated spaces achieved 100% good diversity suggests that surface quality operates as a threshold variable: once a minimum quality standard is met, spaces become accessible to populations previously excluded.

Beyond accessibility, surface quality communicates social meaning. Well-maintained surfaces signal that a space is cared for, valued, and intended for public use. This signalling effect influences who feels welcome and entitled to be present. Poor surfaces—cracked, uneven, littered, or muddy—convey neglect and abandonment, discouraging visitation across all demographic groups but particularly among those with the least tolerance for discomfort or risk. The finding that even fair treatment in Posta produced good user diversity (100%) is particularly significant because it suggests that relatively modest investments can yield substantial returns in user engagement when targeted appropriately.

The spatial patterning of surface quality across Dar es Salaam's municipalities also demands interpretation. The better surface conditions in Upanga and Oysterbay reflect cumulative advantages: these areas have historically received more municipal attention, benefit from higher property tax revenues, and are home to populations with greater capacity to advocate for maintenance. The poorer conditions in Kariakoo, Kinondoni, and Temeke reflect historical neglect, weaker political voice, and the challenges of maintaining infrastructure in high-density, rapidly changing environments.

5.3. Role of Facilities in Supporting Activity Diversity

The availability and quality of facilities significantly influence the intensity and variety of activities in green spaces. Data from Fig. (4b–6) and Tables 2–3 indicate that in Kariakoo, 50% of open spaces lacked diverse facilities, resulting in limited functional uses, while only 16.7% offered moderate facilities and varied activities. In comparison, Posta recorded 41.7% of spaces with moderate facilities and 66.7% with diverse activities, demonstrating a stronger relationship between infrastructure provision and user engagement.

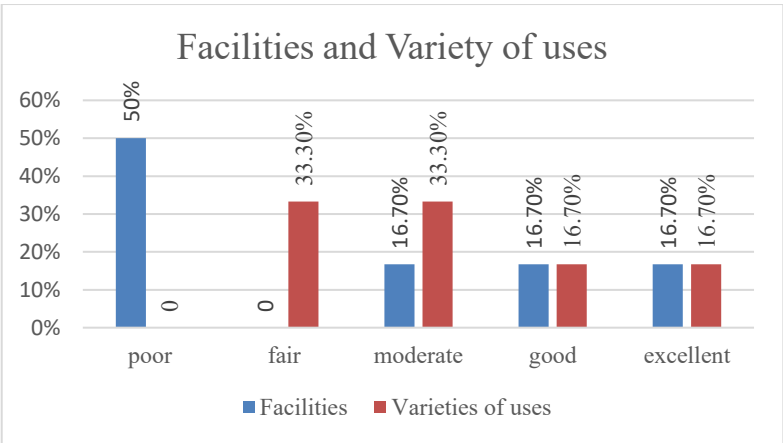


Figure 4b: Facilities and varieties of uses at K/Koo, Source: Surveyed Data, 2024.

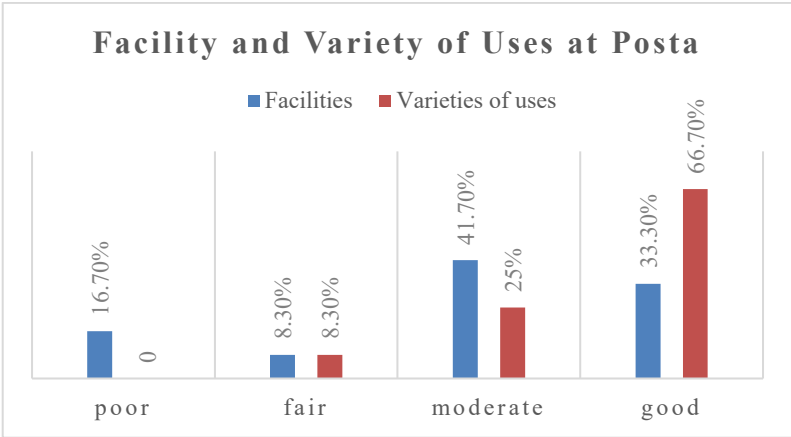


Figure 5: Facilities and variety of uses at Posta, Source: Surveyed Data, 2024.

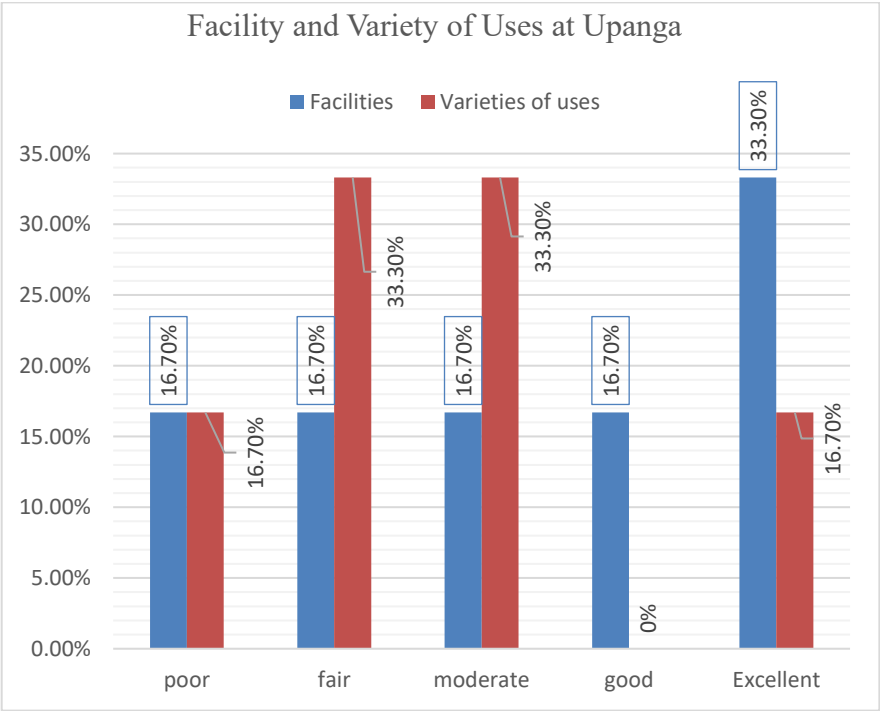


Figure 6: Facility and variety of uses at Upanga, Source: Surveyed Data, 2024.

Upanga presented the most balanced scenario, where 33.3% of spaces provided excellent facilities accompanied by high activity diversity. Evidence from Oysterbay and Masaki further reinforces this relationship: spaces with poor facilities supported only fair activity diversity (100%), whereas improvements to moderate facilities resulted in balanced moderate and good activity levels (50% each).

Table 2: Facility and variety of uses at Oysterbay and Masaki.

Facility	Variety of Uses		
	Fair	Moderate	Good
Poor	100%	0%	0%
Fair	0%	66.7%	33.3%
Moderate	0%	50%	50%

Source: Surveyed Data, 2024.

Table 3: Facility and variety of uses at Kinondoni and Temeke.

Facilities	Variety of Uses		
	Fair	Moderate	Good
Fair	20%	0%	80%
Moderate	14.3%	42.9%	42.9%
Good	50%	0%	50%

Source: Surveyed Data, 2024.

The relationship between facility provision and activity diversity reveals how green spaces function as assemblages of affordances—possibilities for action that emerge from the configuration of physical elements. Seating invites rest and social interaction; playgrounds invite child-directed play and family gathering; sports facilities invite organised and informal athletic activity; shade structures invite refuge from sun and heat; pathways invite movement through space. Spaces lacking these elements offer few affordances and consequently support limited activity ranges. The finding that 50% of Kariakoo spaces lacked diverse facilities and consequently supported limited uses illustrates this dynamic starkly [69].

The progression from poor to moderate to excellent facilities corresponds to qualitative shifts in what spaces can support. Poor facilities support only minimal uses—perhaps passing through or brief, uncomfortable sitting. Moderate facilities begin to support multiple activities but may not accommodate them simultaneously or comfortably. Excellent facilities support diverse, overlapping activities that can occur concurrently without conflict. The finding that Posta's moderately equipped spaces supported diverse activities in 66.7% of cases suggests that threshold effects operate here as with surface quality: once a certain level of provision is reached, spaces become capable of supporting a wide range of uses.

The spatial variation in facility provision across municipalities reflects both historical investment patterns and contemporary management capacity. Upanga's balanced provision of excellent facilities and high activity diversity indicates what is possible when spaces receive sustained attention and resources. Kariakoo's deficits reflect the challenges of maintaining facilities in high-density, low-income areas where pressure on land is intense and municipal resources are stretched thin. These disparities have cumulative effects: spaces with better facilities attract more users, which generates political attention and resources, which leads to further improvements, while poorly equipped spaces remain trapped in cycles of neglect and underuse.

5.4. Influence of Management on Safety and Space Quality

Management practices emerged as another key factor influencing safety conditions and overall green space quality. Cross-tabulation analysis from Fig. (7) and Table 4-5 demonstrates that improved management is generally

associated with better safety perceptions. For example, in Kinondoni and Temeke, 100% of spaces with moderate safety were fairly managed, while all spaces with good safety ratings were under excellent management. A similar trend was observed in Posta, where 41.7% of spaces with moderate management corresponded with moderate safety levels, while 33.3% of spaces with excellent management recorded excellent safety ratings.

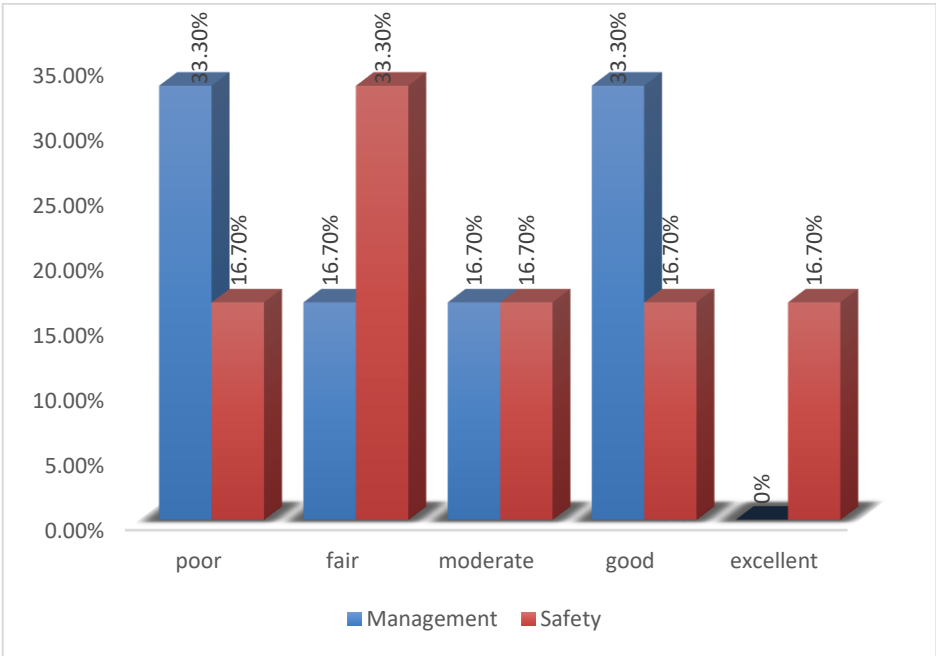


Figure 7: Management and safety at K/Koo, Source: Surveyed Data, 2024.

However, in some areas such as Oysterbay and Masaki, relatively high safety levels were observed even under moderate management conditions. This suggests that informal social controls, neighbourhood socio-economic characteristics, and community presence also contribute to perceived security, complementing formal management interventions.

Table 4: Cross-tabulations on management and safety at Oysterbay and Masaki.

Management	Safety	
	Moderate	Good
Moderate	66.7%	33.3%
Good	0%	100%
Excellent	0%	100%

Source: Surveyed Data, 2024.

Table 5: Cross-tabulations on management and safety at Kinondoni and Temeke.

Management	Safety	
	Moderate	Good
Fair	100%	0%
Moderate	83.3%	16.7%
Good	33.3%	66.7%
Excellent	0%	100%

Source: Surveyed Data, 2024.

The association between management quality and safety perceptions reveals the critical role of ongoing human attention in shaping green space experiences. Management encompasses multiple practices: routine maintenance (litter collection, vegetation trimming, facility repair), security provision (lighting maintenance, surveillance, rule enforcement), and user engagement (programming, outreach, response to concerns). Where these practices are consistent and effective, they produce spaces that feel cared for and safe. Where they are absent or inconsistent, spaces deteriorate physically and socially, reinforcing perceptions of neglect and danger.

The Kinondoni and Temeke findings are particularly instructive: spaces with good safety ratings were uniformly under excellent management, while moderately safe spaces were only fairly managed. This suggests a threshold effect whereby management quality must reach a certain level before safety perceptions improve meaningfully. Below this threshold, management efforts may be insufficient to counteract the signals of neglect and the conditions that generate fear.

The Oysterbay and Masaki exception—high safety despite moderate management—illuminates the interaction between formal management and informal social controls. In affluent neighbourhoods, several factors compensate for management deficits: higher socio-economic status correlates with lower crime rates. Another factor is that residents have greater capacity for informal surveillance and intervention; the presence of security personnel in adjacent properties spills over into public spaces; and the overall environment signals order and investment. This finding supports the Ecological Model's emphasis on multiple, interacting determinants rather than single-factor explanations [70]. It also highlights the environmental injustice inherent in relying on informal controls: affluent communities can compensate for management deficits through private resources and social capital, while low-income communities cannot

5.5. Accessibility and Freedom of Entry

Accessibility analysis shows that most green spaces remain physically open to the public, irrespective of the quality of their facilities. According to Table 6, 100% of spaces in Kariakoo with poor facilities still maintained good or excellent freedom of entry, indicating that barriers such as entry fees or restricted access are not major limitations in the current system.

Nevertheless, physical accessibility alone does not guarantee usability. Cross-analysis between convenience and facility quality (Table 7) reveals that spaces with poor facilities corresponded with poor convenience in 100% of cases in Kariakoo, whereas spaces with excellent facilities exhibited good convenience levels.

Table 6: Cross-tabulation of 'freedom to enter' and facility quality across all study areas.

K/Koo		Facilities				
	Freedom to Enter	Poor	Fair	Moderate	Good	Excellent
	Moderate	0%	0%	33.3%	33.3%	33.3%
	Good	100%	0%	0%	0%	0%
	Excellent	100%	0%	0%	0%	0%
Posta		Facilities				
	Free to enter	Poor	Fair	Moderate	Good	Excellent
	Fair	0%	0%	0%	100%	0%
	Moderate	25%	0%	25%	50%	0%
	Good	25%	0%	75%	0%	0%
	Excellent	0%	33.3%	33.3%	33.3%	0%

Table 6 (contd....)

Upanga		Facilities				
	Free to enter	Poor	Fair	Moderate	Good	Excellent
	Fair	0%	0%	0%	100%	0%
	Moderate	16.7%	0%	16.7%	33.3%	33.3%
	Good	28.6%	14.3%	57.1%	0%	0%
	Excellent	0%	33.3%	33.3%	33.3%	0%
Oyster bay & Masaki		Facilities				
	Free to enter	Poor	Fair	Moderate	Good	Excellent
	Moderate	33.3%	0%	66.7%	0%	0%
	Good	0%	100%	0%	0%	0%
Kinondoni & Temeke		Facilities				
	Free to enter	Poor	Fair	Moderate	Good	Excellent
	Moderate	0%	40%	40%	20%	0%
	Good	0%	20%	60%	20%	0%
	Excellent	0%	50%	50%	0%	0%

Source: Surveyed Data, 2024.

Table 7: Crosstabulation of convenience and facilities at K/Koo, Posta, Upanga, Oysterbay and Masaki and Kinondoni and Temeke.

K/Koo		Facilities				
	Convenience	Poor	Moderate	Good	Excellent	
	Poor	100%	0%	0%	0%	
	Moderate	50%	25%	25%	0%	
	Good	0%	0%	0%	100%	
Posta		Facilities				
	Convenience	Poor	Fair	Moderate	Good	
	Moderate	28.6%	14.3%	4.3%	14.3%	
	Good	0%	0%	66.7%	33.3%	
	Excellent	0%	0%	0%	100%	
Upanga		Facilities				
	Convenience	Poor	Fair	Moderate	Good	Excellent
	Fair	0%	100%	0%	0%	0%
	Moderate	33.3%	0%	33.3%	0%	33.3%
	Good	0%	0%	0%	50%	50%
Oysterbay and Masaki		Facilities				
	Convenience	Poor	Fair	Moderate	Good	Excellent
	Moderate	25%	25%	50%	0%	0%
	Good	0%	100%	0%	0%	0%
Kinondoni and Temeke		Facilities				
	Convenience	Poor	Fair	Moderate	Good	Excellent
	Moderate	0%	33.3%	55.6%	11.1%	0%
	Good	0%	50%	25%	25%	0%
	Excellent	0%	0%	100%	0%	0%

The finding that physical access is largely unrestricted across Dar es Salaam's green spaces might initially seem encouraging. Unlike some cities where entry fees, membership requirements, or gated access exclude populations, Dar es Salaam's spaces are formally open to all. This openness reflects both legal frameworks that designate these spaces as public and the practical reality that enforcement capacity is too limited to restrict access even where authorities might wish to.

However, the distinction between formal accessibility and actual usability revealed in these findings is critical. Spaces may be open to all yet usable by few if they lack basic infrastructure. The Kariakoo finding of poor facilities corresponding with poor convenience in 100% of cases illustrates this dynamic starkly. Convenience encompasses multiple dimensions: ease of movement within the space, availability of places to sit, protection from sun and rain, access to sanitation, and freedom from hazards. Spaces lacking these qualities may be technically accessible but practically unusable for most purposes beyond brief transit.

This distinction between accessibility and usability has profound implications for environmental justice. Formal policies of open access create an appearance of equality while masking deep inequalities in actual experience. A space that is formally open but practically unusable due to poor facilities does not serve the public equally; it serves those with tolerance for discomfort, those who do not need amenities, and those with nowhere else to go. The finding that spaces with excellent facilities exhibit good convenience levels suggests that usability, not merely access, is what transforms open spaces into genuine public assets.

This distinction between accessibility and usability engages with debates in environmental justice scholarship about distributive versus procedural dimensions of justice. Distributive justice concerns who gets what; in this case, access to green spaces, whereas procedural justice concerns how decisions are made, i.e who participates in planning and management [72]. Similarly, recognition justice concerns whose values and needs are acknowledged—whose purposes spaces are designed to serve. The finding that formal access coexists with deep usability deficits suggests that distributive justice alone (everyone can enter) is insufficient without recognition justice (spaces designed for everyone's needs) [73]. This insight extends environmental justice frameworks beyond their typical focus on access quantity to encompass quality and appropriateness.

5.6. Socio-Spatial Inequalities in Green Space Quality

The analysis reveals significant socio-spatial disparities in green space quality across Dar es Salaam's municipalities (Table 8). Higher-income areas such as Oysterbay and Upanga consistently recorded better infrastructure, higher safety perceptions, better facilities, and more diverse users. Lower-income areas such as Kariakoo and parts of Temeke showed systematically weaker performance across all indicators. These disparities are not random but patterned, reflecting historical investment priorities, contemporary resource allocation, and the capacity of different communities to advocate for and maintain green spaces.

Table 8: Summary comparison of safety perceptions, facility provision, surface quality, and user diversity across Dar es Salaam municipalities (Surveyed Data, 2024).

Municipality/Area	Safety Perception (% Positive)	Facility Quality Rating	Surface Quality Rating	User Diversity Rating
Kariakoo	16.0%	Poor-Fair	Poor-Fair	Moderate
Posta	45.0%	Fair-Moderate	Fair-Moderate	Good
Upanga	71.4%	Moderate-Excellent	Good-Excellent	Good-Excellent
Oysterbay/Masaki	66.7%	Moderate-Good	Moderate-Excellent	Moderate-Good
Kinondoni/Temeke	16.0%	Fair-Moderate	Fair-Moderate	Moderate-Good

Note: Ratings represent the predominant category observed across spaces in each area based on the indicator system defined in Section 4.5. Safety Perception: % of users rating safety as Good or Very Good. Source: Surveyed Data, 2024.

The socio-spatial inequalities documented in this study represent a form of environmental injustice that compounds other dimensions of urban inequality. Residents of low-income areas already face disadvantages in

housing quality, service provision, and economic opportunity; the finding that they also have access to poorer-quality green spaces means they are further disadvantaged in access to the health, social, and environmental benefits these spaces provide. This multi-dimensional disadvantage has cumulative effects that are not captured by examining any single dimension in isolation.

Several mechanisms produce and reproduce these inequalities. Historical legacies matter: colonial planning concentrated green spaces in areas designated for European residence, and post-independence investment patterns have not fundamentally altered this distribution. Contemporary resource allocation favours areas with higher property values and stronger political voice. Municipal maintenance resources flow to spaces that are already well-maintained, while neglected spaces remain neglected. Communities with higher socio-economic status have greater capacity to supplement municipal provision with private resources and to advocate effectively for attention. Lower-income communities, facing multiple competing priorities, may lack the organisational capacity to demand green space improvements.

The disparities also reflect different pressures on green spaces across neighborhood types. In high-density, low-income areas like Kariakoo, pressure on land is intense, and green spaces face constant encroachment from informal commercial activities and settlement expansion. Municipal authorities may be reluctant to invest in spaces whose boundaries are contested and whose future is uncertain. In affluent, low-density areas, land pressures are weaker, boundaries are clearer, and investment appears more secure.

These findings directly engage with environmental justice scholarship, which has documented similar patterns of unequal green space distribution in cities globally. The Dar es Salaam case extends this literature by demonstrating that inequalities exist not only in access quantity (how many spaces, how large) but in quality dimensions that fundamentally shape user experience and benefit receipt. This insight supports calls to expand environmental justice frameworks beyond distributive concerns to encompass recognition and procedural justice.

5.7. Convenience and Temporal Patterns of Use

Convenience levels varied across different locations and time periods, reflecting the influence of urban activity patterns. In Kariakoo, 50% of spaces with excellent convenience corresponded with excellent freedom of entry, while 100% of spaces with moderate convenience were associated with good accessibility conditions. In Oysterbay and Masaki, moderate convenience was consistently associated with moderate accessibility, indicating a balanced relationship between entry conditions and internal usability.

Temporal analysis presented in Table 9 suggests that convenience levels also fluctuate across weekdays, reflecting differences in commuting patterns, work schedules, and recreational behaviour. Such variations highlight how urban routines and spatial accessibility interact to shape patterns of green space utilisation.

Table 9: Weekdays and convenience at K/Koo, Posta, Upanga, Oysterbay and Masaki, Kinondoni and Temeke.

		Convenience		
		Poor	Moderate	Good
K/Koo	Weekdays			
	Fair	0%	100%	0%
	Moderate	25%	50%	25%
	Excellent	0%	100%	0%
Posta	Weekdays	Convenience		
		Moderate	Good	excellent
		50%	50%	0%
		75%	25%	0%
		60%	0%	40%
		0%	100%	0%

Table 9 (contd....)

Upanga		Convenience		
	Weekdays	Fair	Moderate	Good
	Poor	100%	0%	0%
	Fair	0%	0%	100%
	Moderate	0%	100%	0%
	Excellent	0%	0%	100%
Oysterbay and Masaki		Convenience		
	Weekdays	Moderate	Good	excellent
	Fair	100%	0%	0%
	Moderate	50%	50%	0%
	Good	66.7%	33.3%	0%
		Convenience		
Kinondoni and Temeke	Weekdays	Moderate	Good	excellent
	Fair	50%	50%	0%
	Moderate	80%	20%	0%
	Good	66.7%	33.3%	0%
	Excellent	0%	0%	100%
		Convenience		

The temporal patterns revealed in this analysis underscore that green space utilisation is not static but dynamically responsive to the rhythms of urban life. Convenience—the ease with which spaces can be used for intended purposes—fluctuates with daily and weekly schedules. Spaces that feel convenient during weekend leisure hours may feel less so during weekday commutes; spaces that work well for morning users may be less convenient in afternoon heat.

These temporal variations have implications for both research and practice. For researchers, they suggest that single-time observations may misrepresent patterns of use, and that understanding utilisation requires attention to temporal as well as spatial variation. For practitioners, they imply that interventions might be timed or targeted to address specific temporal gaps—for example, improving lighting to extend usable hours into evening, or providing shade structures to maintain comfort during peak heat.

6. Discussion

6.1. Safety as Foundational: Extending the Ecological Model

The finding that perceived safety is the most influential factor affecting green space utilisation strongly validates the Ecological Model of Physical Activity [74], which conceptualises behaviour as shaped by interactions across individual, social, environmental, and policy levels. The dramatic variation in safety perceptions—from 16% positive in Kariakoo to over 70% in Upanga—cannot be explained by any single factor but emerges from a convergence of multiple conditions: inadequate lighting (environmental), limited surveillance (social), and differential municipal investment (policy) that differ systematically across neighbourhoods.

Crucially, the findings extend the Ecological Model by demonstrating that safety operates as a threshold condition without which other factors cannot function effectively. In low-safety environments like Kariakoo, even spaces that are physically accessible and contain facilities remain underutilised because the foundational condition of perceived security is absent. This hierarchical relationship refines the model's multi-level framework

by suggesting that factors do not operate simultaneously but rather in a sequential, conditional manner. Interventions addressing facilities or surface treatment will fail where safety concerns persist—a critical insight for resource allocation.

The findings also resonate with the concept of "eyes on the street," which emphasises how active, continuous use generates informal surveillance that enhances perceived safety [75]. The higher safety ratings in areas with greater social presence (Upanga, Oysterbay) and lower ratings where spaces feel empty or abandoned (Kariakoo) empirically validate this foundational insight. However, the findings also suggest that "eyes on the street" are not automatically present but must be cultivated through design, management, and social dynamics that encourage sustained occupation.

The Oysterbay and Masaki exception—high safety despite moderate management—further extends the Ecological Model by illuminating equifinality: different combinations of factors can produce equivalent outcomes. In affluent areas, informal social controls compensate for formal management deficits: higher socio-economic status correlates with lower crime rates; residents engage in informal surveillance; private security spills over into public spaces; the overall environment signals order and investment. This reveals profound environmental injustice: low-income communities cannot rely on such compensatory mechanisms and therefore require more robust formal management interventions.

6.2. Surface Quality and User Diversity: ART and the Compatibility Principle

The strong association between surface quality and user diversity directly engages with Attention Restoration Theory's [76] "compatibility" dimension—the alignment between environmental characteristics and individual purposes. Well-treated surfaces make spaces compatible with diverse user needs: elderly individuals requiring stable footing, parents with pushchairs needing smooth pathways, children playing without injury risk, people with mobility impairments requiring accessible routes. Poor surfaces render spaces incompatible with these users' purposes, effectively excluding them regardless of formal accessibility.

The finding that spaces with moderate treatment attracted only moderate diversity while well-treated spaces achieved full good diversity suggests that surface quality operates as a threshold variable: once a minimum quality standard is met, spaces become accessible to populations previously excluded. Below this threshold, even formally accessible spaces remain unusable for significant portions of the population—a form of hidden exclusion masked by policies of open access.

The finding that even modest improvements (fair treatment in Posta) substantially enhanced user diversity supports ART's contention that compatibility exists on a continuum. Small investments removing critical barriers can dramatically expand the range of users for whom a space is compatible. This challenges assumptions that green space improvements require substantial resources and suggests targeted interventions addressing specific compatibility deficits may yield disproportionate returns.

ART's "extent" dimension—the sense of being in a coherent, engaging environment—is also implicated. Poor surfaces fragment spaces, drawing attention to deficiencies rather than allowing users to experience spatial coherence that supports restoration. Degraded surfaces may actively undermine restoration by creating vigilance demands (watching where one steps) that compete with the effortless attention characteristic of restorative experiences.

6.3. Facility Provision and Activity Diversity: Affordances and Attachment

The relationship between facility provision and activity diversity illuminates how physical infrastructure creates affordances—possibilities for action that emerge from environmental configurations [77]. Seating affords resting and socialising; playgrounds afford child-directed play; sports facilities afford organised and informal activity; shade structures afford refuge from sun; pathways afford movement. Spaces lacking these elements offer few affordances and consequently support limited activity ranges. The finding that 50% of Kariakoo spaces lacked diverse facilities and supported limited uses illustrates this dynamic starkly.

This finding extends the Ecological Model [78] by specifying the mechanism through which facilities influence behaviour: they expand the repertoire of possible activities, thereby attracting diverse users with diverse purposes. The model's emphasis on multiple levels of influence is also validated: facilities alone are insufficient—they must be accompanied by social conditions (safety, welcoming atmosphere) and policy supports (maintenance, programming) to realise their potential. The finding that some moderately equipped spaces achieve high activity diversity while others do not confirms these interacting effects.

From a Place Attachment Theory perspective [79], facility quality influences not only current use but the cumulative processes through which emotional bonds with places develop. Attachment forms through repeated, positive interactions that satisfy needs and support desired activities. Facilities that enable such experiences—a bench where one regularly rests, a playground where children make memories, a sports court where friendships form—become woven into personal and collective narratives. The facility deficits in Kariakoo thus represent not merely infrastructure gaps but barriers to the place-making processes through which communities come to value and protect green spaces.

The finding that moderate facility provision can support diverse activities while poor provision cannot suggests a threshold effect in the relationship between facilities and attachment formation. Below a certain provision level, spaces cannot generate positive, repeated interactions necessary for attachment development. Above this threshold, attachment processes can begin, creating virtuous cycles wherein increased use generates social meaning, which attracts further use, which strengthens attachment.

6.4. Management and Safety: Integrating Formal and Informal Controls

The association between management quality and safety perceptions, qualified by the Oysterbay and Masaki exception, reveals complex interactions between formal governance and informal social controls. The Kinondoni and Temeke findings—spaces with good safety uniformly under excellent management—suggest that in low-income areas, formal management is necessary for safety because informal controls insufficiently compensate for deficits. The threshold effect observed—where management quality must reach a certain level before safety perceptions improve meaningfully—indicates that below this threshold, management efforts may be insufficient to counteract signals of neglect and conditions generating fear.

The Oysterbay and Masaki exception illuminates how different combinations of factors can produce equivalent outcomes. In affluent areas, informal controls substitute for formal management to a degree. This finding supports the Ecological Model's emphasis on multiple, interacting determinants rather than single-factor explanations. However, it also highlights environmental injustice: affluent communities compensate for management deficits through private resources and social capital unavailable to low-income areas.

From a Place Attachment Theory perspective, management practices communicate whether a space is valued by authorities and the community. Consistent maintenance signals that someone cares, inviting users to care as well—a phenomenon termed "reciprocal care." Neglect signals abandonment, discouraging emotional investment. The finding that well-managed spaces have higher safety perceptions connects management quality to the long-term viability of green spaces as community assets.

The concept of "eyes on the street" [80] is complicated by these findings. Jacobs emphasised natural surveillance generated by active street life, which she contrasted with formal surveillance mechanisms. The Oysterbay and Masaki findings suggest that in contemporary urban contexts, formal management and informal surveillance are not substitutes but complements, and their relative importance varies with neighbourhood characteristics. In low-income areas where informal surveillance is weaker, formal management is essential; in affluent areas, informal mechanisms partially compensate for management deficits.

6.5. Accessibility Versus Usability: Refining Environmental Justice

The Kariakoo finding that poor facilities correspond with poor convenience in 100% of cases, despite excellent freedom of entry, illustrates a fundamental distinction between formal accessibility and actual usability. This

distinction directly engages with environmental justice scholarship. Distributive justice—who gets access to green spaces—is insufficient without recognition justice—whose needs spaces are designed to serve [81]. Spaces formally open but practically unusable do not serve the public equally; they serve those whose needs align with limited affordances provided—those with tolerance for discomfort, those who do not need amenities, those with nowhere else to go.

This finding extends environmental justice frameworks beyond their typical focus on access quantity to encompass quality and appropriateness. Formal policies of open access create an appearance of equality while masking deep inequalities in actual experience. The finding that spaces with excellent facilities exhibit good convenience levels suggests that usability, not merely access, transforms open spaces into genuine public assets.

From an ART perspective, this distinction maps onto the compatibility dimension. Spaces lacking facilities are incompatible with many potential users' purposes. Formal access without compatibility is hollow; it grants entry to spaces that cannot satisfy purposes for which people might want to enter them. The finding that even formally accessible spaces remain underutilised when facilities are poor empirically validates this theoretical insight.

From a Place Attachment Theory perspective, the accessibility-usability distinction explains why some formally public spaces never become public in the meaningful sense of being claimed, valued, and defended by communities. Attachment requires not just access but positive, repeated interactions satisfying needs. Accessible but unusable spaces cannot generate such interactions and cannot become attachment sites. This connects the accessibility-usability distinction to long-term viability: spaces that are merely accessible but not usable will not develop community constituencies that advocate for their protection and improvement.

6.6. Socio-Spatial Inequalities: Cumulative Disadvantage

The systematic disparities in green space quality across municipalities represent a form of environmental injustice that compounds other dimensions of urban inequality. Residents of low-income areas already face disadvantages in housing quality, service provision, and economic opportunity; poorer-quality green spaces mean they are further disadvantaged in access to health, social, and environmental benefits. This multi-dimensional disadvantage has cumulative effects not captured by examining any single dimension in isolation.

The Ecological Model provides a framework for understanding how inequalities at multiple levels interact. Individual-level factors (income, mobility, time) combine with social environment factors (neighbourhood safety, social capital) and physical environment factors (facility quality, maintenance) and policy factors (resource allocation, planning priorities) to produce observed disparities. This multi-level perspective suggests interventions must operate at multiple levels, addressing not only physical infrastructure deficits but also social, political, and economic processes producing inequality.

From a Place Attachment Theory perspective, spatial inequalities have implications for who develops emotional bonds with urban nature. Residents of areas with poor-quality green spaces have fewer opportunities for positive, repeated interactions through which attachment forms. They are doubly disadvantaged: they receive fewer benefits in the present, and they are less likely to develop place attachments that motivate stewardship and advocacy over the long term. The cumulative effect reinforces existing inequalities, as communities with weak place attachments are less able to mobilise for green space protection and improvement.

From an ART perspective, disparities mean residents of low-income areas are systematically deprived of restorative benefits that may be most needed in precisely these areas, where stressful living conditions (crowding, noise, insecurity) are most pronounced. This represents a failure of distributive justice that compounds existing health and social inequalities.

The Oysterbay and Masaki exception—high safety despite moderate management—reveals the deeper injustice: affluent communities can compensate for management deficits through private resources and social capital, a mechanism systematically unavailable to low-income areas. Without deliberate policy interventions, inequalities will persist and deepen as disadvantaged communities remain trapped in cycles of neglect and underuse while advantaged areas enjoy reinforcing cycles of investment and quality.

7. Conclusions and Recommendations

7.1. Conclusions

This study examined factors influencing urban green space utilisation in Dar es Salaam through an integrated theoretical framework. Perceived safety emerged as the most influential determinant, operating as a threshold condition without which other improvements cannot effectively function. Safety ratings varied dramatically from 16% positive in low-income Kariakoo to over 70% in affluent Upanga, reflecting convergence of multiple factors: inadequate lighting, limited surveillance, neighbourhood reputation, and presence of informal social controls.

Infrastructure quality—particularly surface treatment and facility provision—strongly correlates with user diversity and activity range through ART's compatibility principle. Well-treated surfaces make spaces compatible with diverse user needs, while poor surfaces exclude elderly individuals, parents with pushchairs, and people with mobility impairments regardless of formal accessibility. Even modest improvements can yield substantial returns when they cross critical thresholds that exclude particular user groups.

The distinction between formal accessibility and actual usability emerges as critical. Spaces may be physically open yet practically unusable due to poor facilities, revealing that distributive justice alone is insufficient without recognition justice that designs spaces for diverse needs. From a Place Attachment perspective, accessible but unusable spaces cannot generate the positive interactions through which communities come to value and protect green spaces.

The study demonstrates significant socio-spatial inequalities, with higher-income areas consistently enjoying better-maintained, safer, and more diverse green spaces while low-income communities face cumulative disadvantage. These disparities are produced and reproduced through multiple interacting mechanisms: historical colonial legacies concentrating green spaces in affluent areas, contemporary resource allocation favouring communities with stronger political voice, and differential capacity to supplement formal management with informal social controls.

The Oysterbay and Masaki exception—high safety despite moderate management—reveals that affluent communities can compensate for management deficits through private resources and social capital, a compensatory mechanism unavailable to low-income areas. This finding has profound implications for environmental justice, suggesting that without deliberate policy interventions, inequalities will persist and deepen as disadvantaged communities remain trapped in cycles of neglect and underuse while advantaged areas enjoy reinforcing cycles of investment and quality.

Theoretically, the study extends the Ecological Model by demonstrating hierarchical organisation among determinants and equifinality—different combinations of factors can produce equivalent outcomes, but compensatory mechanisms are unequally distributed. It extends ART by showing that compatibility operates at the level of social inclusion, not merely individual restoration, and that degraded environments may actively undermine restoration by creating vigilance demands. It reveals that Place Attachment Theory must account for colonial legacies that shape whether historically exclusive spaces can develop inclusive attachments.

7.2. Recommendations

7.2.1. Practice Perspective

Practitioners should prioritise safety as the foundational condition for green space utilisation. This can be achieved by implementing adequate lighting, maintaining clear sightlines, ensuring consistent maintenance that signals civic care, and programming regular activities that generate natural surveillance. Strategic investment in infrastructure should target threshold effects, recognising that modest improvements—particularly in surface treatment—can yield substantial returns in user diversity when they cross critical quality thresholds that exclude particular groups. Facility provision should create multiple affordances that enable diverse activities, recognising that spaces supporting varied uses attract diverse users and generate the repeated positive interactions through

which place attachment develops. Management systems must be strengthened with attention to their communicative function, establishing routine maintenance, responsive user engagement mechanisms, and partnerships with community groups to supplement municipal resources, particularly in low-income areas where formal management is most essential. Participatory approaches should address the accessibility-usability gap by engaging diverse user groups—women, elderly, youth, people with disabilities—in identifying barriers and designing context-specific solutions that transform formally accessible spaces into genuinely usable public assets.

7.2.2. Policy Perspective

Policymakers should formally recognise green spaces as essential urban infrastructure, on par with transportation and sanitation systems. This recognition should lead to the establishment of minimum quality standards, dedicated funding mechanisms insulated from political cycles, and professional management cadres with appropriate resources and training. Deliberate targeting of underserved communities is essential to address systematic socio-spatial inequalities, requiring equity metrics that track quality across neighbourhoods, targeted investment programmes for low-income areas, and land value capture mechanisms that fund improvements in areas experiencing development pressure. Legal protection for public green spaces must be strengthened through clarified tenure arrangements, enforcement of planning regulations prohibiting conversion without rigorous consultation, registers of protected spaces, and substantial penalties for encroachment. Green space planning should be integrated with health, climate adaptation, transportation, and housing sectors, recognising their multiple benefits and maximising synergies across urban systems. Frameworks for meaningful community participation should be established, supporting community-based stewardship organisations, requiring public consultation on major decisions, and building local government capacity for effective engagement.

7.2.3. Planning Perspective

In the context of Dar es Salaam's rapid urbanization and widespread informality, urban green space planning should prioritize realistic, enforceable standards and incremental protection of existing open spaces. Municipal authorities should adopt flexible planning guidelines that require minimum neighbourhood green spaces within walking distance (300–500 metres) while recognizing that many informal settlements lack formally planned parks. Instead of relying solely on large parks, the city should promote smaller, distributed green spaces, including community gardens, rehabilitated river buffers, school grounds, and coastal open spaces that can function as public recreation areas. Existing open spaces identified in urban plans should be formally mapped and registered in a municipal GIS inventory to prevent encroachment, while future residential developments should allocate at least 10 per cent of land for public open space where feasible. To address land scarcity, the city can prioritize greening underutilized public land, such as road reserves, drainage corridors, and waterfront buffers, while encouraging private developers to integrate publicly accessible green areas within new developments.

Given the limited institutional capacity of municipalities and strong community structures in Tanzanian neighbourhoods, effective management of green spaces should combine municipal oversight with community participation. Local governments can establish ward-level green space committees involving residents, local leaders, and community-based organizations to support maintenance, safety monitoring, and small-scale improvements. Design standards should emphasize low-cost, durable features—such as shaded seating areas, accessible walking paths, lighting for safety, and multipurpose open grounds that support cultural activities, informal sports, and community gatherings. To ensure equitable distribution, municipal planning authorities should prioritize underserved high-density neighbourhoods when allocating green space investments and incorporate green infrastructure considerations into transport, flood management, and coastal protection projects. Strengthening coordination between urban planning departments, environmental agencies, and local communities will be essential to protect remaining open spaces while gradually expanding the city's green infrastructure network.

7.3. Study Limitation

Several limitations should be considered when interpreting this study's findings. First, the cross-sectional design captures green space utilisation at a single time point, preventing causal inferences. Longitudinal research would be valuable to track changes over time in response to interventions or evolving conditions. Again, the

sample of 86 user interviews across 42 green spaces, while suitable for the mixed-methods design, may not fully represent the diversity of user experiences citywide. The distribution of two to four interviews per space was constrained by time, access, and user availability, particularly in underutilised areas where few users were present.

Moreover, the geographic focus on three core municipalities of Dar es Salaam excluded peri-urban and informal settlements, where green space conditions may differ considerably. Consequently, the findings may not be generalisable to the entire city or to other Tanzanian or African cities without further research.

In addition, the reliance on self-reported safety perceptions introduces potential social desirability bias, with respondents possibly under-reporting fear or over-reporting positive views. Triangulation with objective indicators—such as lighting and physical signs of disorder—partially mitigates this but cannot eliminate it entirely.

Furthermore, the observation period was limited to six months (March–June 2024), meaning seasonal variations in weather, vegetation, and user behaviour were not captured.

Finally, while multiple theoretical frameworks were engaged, particularly the Ecological Model, the analysis may not have fully addressed the complex interplay among individual, social, environmental, and policy-level factors. Future research using more sophisticated analytical methods could examine these interactions more systematically.

Consent to Participate

Respondents were asked to give their consents before interview.

Conflict of Interest

The authors have no conflict of interest to declare.

Funding

The study received no financial support.

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Appendix A

User Interview Questionnaire

[Study Title: Determinants of Urban Green Space Utilisation in Dar es Salaam]

Interviewer: _____ Date: _____ Time: _____

Green Space Location: _____ Space Code: _____

Section A: Respondent Demographics

A1. Age: ☐ Under 18 ☐ 18-25 ☐ 26-40 ☐ 41-60 ☐ Over 60

A2. Gender: ☐ Male ☐ Female ☐ Other

A3. Occupation: ☐ Student ☐ Employed ☐ Self-employed ☐ Unemployed ☐ Retired ☐ Other

A4. Residential location: ☐ Ilala ☐ Kinondoni ☐ Temeke ☐ Other

A5. Distance travelled to this green space: ☐ <500m ☐ 500m-1km ☐ 1-3km ☐ >3km

Section B: Visitation Patterns

B1. How often do you visit this green space? ☐ Daily ☐ 2-3 times/week ☐ Weekly ☐ Monthly ☐ Occasionally

B2. How long do you typically stay? ☐ <15min ☐ 15-30min ☐ 30min-1hr ☐ 1-2hrs ☐ >2hrs

B3. When do you usually visit? (Multiple) ☐ Weekday mornings ☐ Weekday afternoons ☐ Weekday evenings
☐ Weekend mornings ☐ Weekend afternoons ☐ Weekend evenings

B4. How do you travel here? ☐ Walk ☐ Bicycle ☐ Motorcycle ☐ Bus ☐ Private car ☐ Other

Section C: Activities

C1. What activities do you usually engage in at this green space? (Multiple) ☐ Walking ☐ Jogging/running
☐ Sitting/resting ☐ Socialising ☐ Playing sports ☐ Children's play ☐ Reading/studying ☐ Attending events
☐ Other

C2. On a scale of 1-5, how important is this space for your: Physical health _____ Mental wellbeing _____
Social life _____ Relaxation _____

Section D: Safety Perceptions

D1. How safe do you feel in this green space? ☐ Very Unsafe ☐ Unsafe ☐ Neither ☐ Safe ☐ Very Safe

D2. What safety concerns do you have? (Multiple) ☐ Fear of crime ☐ Poor lighting ☐ Lack of people
☐ Presence of threatening individuals ☐ Lack of security ☐ Other

D3. Have you ever avoided this space due to safety concerns? ☐ Never ☐ Rarely ☐ Sometimes ☐ Often
☐ Always

D4. What would make you feel safer?

Section E: Facility Evaluation

E1. Rate the following facilities (1=Very Poor, 5=Excellent):

- Pathways: _____
- Seating: _____
- Shade/cover: _____
- Playground: _____
- Sports facilities: _____
- Lighting: _____
- Sanitation: _____

E2. What facilities are most important to you? _____

E3. What facilities are missing? _____

Section F: Management Perceptions

F1. How would you rate the maintenance of this space? ☐ Very Poor ☐ Poor ☐ Fair ☐ Good ☐ Very Good

F2. How often is maintenance carried out? ☐ Daily ☐ Weekly ☐ Monthly ☐ Rarely ☐ Never

F3. Have you ever reported any issues? ☐ Yes ☐ No

F4. If yes, was your concern addressed? ☐ Promptly ☐ Eventually ☐ Never

Section G: Place Attachment

G1. How attached do you feel to this green space? ☐ Not at all ☐ Slightly ☐ Moderately ☐ Strongly
☐ Very strongly

G2. How long have you been visiting this space? ☐ <1 year ☐ 1-5 years ☐ 5-10 years ☐ >10 years

Section H: Open-Ended Questions

H1. What do you like most about this green space? _____

H2. What improvements would you like to see? _____

H3. What prevents you (or would prevent you) from using this space more? _____

Thank you for participating in this research