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Examining Spatial Equity, Utilization and Quality of Public Parks in Addis Ababa, Ethiopia: Emphasis on sub-city level parks

By: Thomas Minda

This thesis is submitted to the Ethiopian Institute of Architecture, Building Construction and City Development and to Addis Ababa University in partial fulfillment of the requirements for the degree of Master of Science in Environmental Planning and Landscape Design.

Advisor: Mulugeta Maru (Ph.D.)

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Addis Ababa, Ethiopia

This is to certify that the thesis prepared by Thomas Minda entitled: Spatial Equity, Utilization and Quality of public parks in Addis Ababa, Ethiopia: Emphasis on sub-city level parks and submitted in fulfillment of the requirements for the degree of Master of Science in Environmental Planning and Landscape Design complies with the regulations of the University and meets the accepted standards concerning originality and quality.

Approved By the Board of Examiners:

Dr. Mulugeta Maru Signature: _____ Date: _____

Advisor:

Dr. Solomon Benti Signature: _____ Date: _____

Internal Examiner:

Dr. Bosena Yirga Signature: _____ Date: _____

External Examiner:

_____ Signature: _____ Date: _____

Chairperson:

_____ Signature: _____ Date: _____

Postgraduate Office Director

Declaration

I, the undersigned, declare that this thesis is my own and original work and has not been presented for a degree in any other university and that all sources of material used for the thesis have been duly acknowledged, following the scientific guidelines of the University.

Student Name: Thomas Minda

Signature: _____

Confirmation

The thesis can be submitted for examination with my approval as an Institute's supervisor.

Supervisor’s Name: Mulugeta Maru (Ph.D.)

Signature: _____

Abstract

Urban parks play a vital role in fostering livable cities by promoting environmental sustainability, social well-being. This study assesses the spatial equity, functional quality, and utilization trends of public parks in Addis Ababa, focusing on three selected sub-city-level parks: Yeka Park, Ldeta park and Sheger Park. A mixed-methods approach was employed, incorporating GIS-based spatial analysis, household and user surveys, interviews, document review and site observations. The sampling technique employed were purposive sampling for the selection of parks, simple random sampling for the user and systematic sampling for the household survey. The finding in the park distribution from 2014 to 2024 reveals notable increase with 4 parks added to the inner city and 3 parks to peripheral zones, but the western and eastern sub-cities remained underserved despite urban expansion. The service area overlap analysis also revealed persistent disparities, with 16.3% of the city's total area and 28.2% of residential parcels lack access to any park services. The northern part of the city especially the inner zone exhibits extensive overlaps, with nine or more park service constitute 16.5% of the city. Furthermore, 22.5% of the city's total area achieve 15–31 m² access per person, whereas 17.7% of the land cover 0-2 m² per person showing minimal access on the outer zone particularly on southern part of the city highlighting critical gaps on park distribution and per-capita access. Functional quality assessments revealed varied user satisfaction levels across the parks, with Lideta Park excelling in spatial arrangement and walkability, Sheger Park prioritizing safety and inclusivity, and Yeka Park facing challenges in maintenance and safety. Utilization trends underscore the importance of user-centered amenities in development of vibrant park activities. Lideta Park shows a balanced visitation pattern integrated into daily routines, while Sheger and Yeka Parks attract weekend visitors. Barriers to park use include inadequate recreational facilities, safety concerns, and poor maintenance, with notable disparities in user engagement influenced by age, gender, and proximity. The findings indicate the need for equitable allocation of public parks, user-centric improvements and strengthened park management practices. This study advocates for a holistic approach to urban park planning that integrates community needs and sustainable urban development.

Keyword: Geospatial analysis; Per-capita Density; Public parks; Spatial Equity; Urban Park Distribution; Buffering

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Acronyms

AAEPA: Addis Ababa Environmental Protection Authority

AACBGDB: Addis Ababa City Beautification and Green Development Bureau

CRRSA: Civil Registration and Residence Service Agency

GIS: Geographic Information System

ha: Hectare

MoUDH: Ministry of Urban Development and Housing

NGO: Non-Governmental Organization

PRAAC: Public Green Area Administration Corporation

SPSS: Statistical Package for Social Science

UGS: Urban Green Space

UN: United Nations

UNCED: United Nations Conference on Environment and Development

SDG: Sustainable Development Goals

Chapter One : Introduction

1.1. Background to the study

Urban development has become a worldwide phenomenon, impacting regions across the globe. As a result of this evolution, various land uses with natural settings have been changed into developed places and other sociologically connected activities. This change includes parks which are key component of Urban Green Space (UGS) (Iswoyo et al., 2020).

The concept of public parks dates back to the 19th century, when urbanization and industrialization led to the creation of green spaces (Loughran, 2020). Cranz (1982) also discussed that parks were designed as "pleasure gardens" that combined formal gardens with natural landscape features to create a naturalistic setting. These early parks aimed to provide urban dwellers with a break from the crowded city environments. Over time, the role of public parks has evolved to address a broader range of urban challenges (Cranz and Boland, 2004).

Modern Urban parks provide a social, environmental, economic and health-related needs (Chiesura, 2004). Environmentally, they contribute to biodiversity, mitigate urban heat islands, and enhance air and water quality (Rekha, 2019). Economically, they increase property values, attract tourism, and support local businesses (Nadja et al., 2015). Societally, they promote community cohesion, provide spaces for cultural and recreational activities, and enhance the overall quality of life (Per and Sven, 1999). Regarding health, access to UGSs promotes physical activity, reduces stress, and improves mental well-being (Tzoulas et al., 2007).

Furthermore recreation opportunities are significant for city dwellers' well-being because they live in a busy, stressful metropolitan environment (Bertram and Rehdanz, 2015). Even tiny green spaces can greatly impact human recreation in urban areas (Jari et al., 2010). Besides, recreation are more significant in today's world than in the past (Rukiye, 2015).

On the other hand, parks in cities is viewed as essential to developing sustainable cities (Arnberger, 2012). United Nations Sustainable Development Goals (SDGs), particularly SDG 11, which calls for 'sustainable cities and communities,' also discourses a pressing urban problem. It aims to provide universal access to safe, inclusive and accessible, green and public spaces (UN, 2015).

Additionally, the principles adopted during the UNCED held in 1992, Rio de Janeiro highlighted that human beings are the focal point of concerns for sustainable development and have the right to live a healthy and productive life in harmony with nature (UN, 1992).

Moreover, Barbosa et al. (2007) stressed that urban parks are often viewed as a good measure of the standard of urban living. Their availability and accessibility are major factors to urban environments ecological, social, and environmental justice functions. urban planners are becoming more aware of the importance equitable and sufficient access to green areas (Chao et al., 2018). In order to achieve spatial equity in public parks, cities need to make sure that there are adequate parks and that appropriate space is provided for the residents (Rashid and Haruka, 2021).

Despite the mere presence of parks is crucial, it does not guarantee their optimal use (Maniruzzaman et al., 2021). The urban resident's engagement with these spaces is closely related to the quality of the parks (Akpinar, 2016). Over the past decade, the concept of park quality has become increasingly significant in discussion of how people interact with urban space (Ter, 2011). It significantly influences the realization of various outdoor activities (Gehl, 2011). These spaces must possess specific characteristics that cater to the unique context of each community to offer tangible benefits (McCormack et al., 2010). It is also essential to ensure that various aspects of parks meet user satisfaction to accomplish the purpose of their provision. Such attributes including multifunctionality, aesthetics, walkability, facilities, naturalness and safety promote the effective utilization of green spaces (Wan and Shen, 2015). Because recreation is often the most important use of urban parks, information on recreational use assists planners in meeting public requests and preferences (Nor et al., 2018). Enhanced knowledge of the dynamics between urban residents and parks can offer practical guidance for effective planning, design and management(Ruixue and Jing, 2020).

Thus, this study explores factors such as the spatial distribution, service areas, functional qualities and trends of the utilization of the public parks. A deeper exploration of these factors will contribute to better understanding of how public parks can better serve the urban populations and offers a foundation for more informed and just urban planning decisions.

1.2. Research Gap

The focus on spatial equity in urban parks has increased over the past twenty years. Most studies (Luo et al., 2022; Qiang et al., 2018; Tahere and Abbas, 2022; Zhiming et al., 2021) have focused on assessing the spatial distribution of parks based on time and mode of travel. Other Studies (Ran et al., 2021; Shu et al., 2019, 2019; Tahere and Abbas, 2022) have focused on the disparities in GSs provision among different social groups. These studies provide insights into accessibility and equity, even though they lack analysis that integrates service area overlaps, and per capita park access.

Furthermore, in Sub-Saharan African cities, including Addis Ababa, studies on spatial equity are notably scarce. For example, Sisay and till (2020) examined the distribution and accessibility of three types of public recreational parks, while Sileshi and Hailu (2020) assessed the proximity and service areas of urban parks. These studies primarily focused on evaluating the level of accessibility. However, they did not address the concept of spatial equity related to the park distribution.

Additionally, the methodologies employed in studies to measure spatial equity frequently vary depending on their objectives. Some of them include network analysis ((Gu et al., 2022; Nicholls, 2001), two-step floating catchment area (2SFCA) (Xue et al., 2023; Yuhan et al., 2024; Zhicheng et al., 2020; Zhiming et al., 2021). Such methods lack to show the spatial disparities of park distribution. Moreover, many studies (Khamannatun et al., 2020; Nicholls, 2001; Qiang et al., 2018; Rashid and Haruka, 2021) rely on traditional methods, including buffer techniques which is criticized for oversimplifying accessibility indices i.e. per-capita density by assuming that residents only use parks within their districts, disregarding cross-boundary usage and overlapping service areas.

Even though there is advancement, attention has not been given to multi-scale assessments and how spatial equity might vary across different spatial units, such as districts or municipalities (Puay and Rosita, 2016). Furthermore, the influence of overlapping park service areas on equity and user choice remains underexplored.

On the other hand, there are several studies have explored the recreational aspects of GSs globally which includes the rapidly urbanizing sub-Saharan African cities. For instance, research has assessed recreational facilities (Parita and Evaristus, 2022), the benefits of public parks to urban residents (Umunnakwe, 2021), and general perceptions of green spaces in South Africa (Shackleton and Blair, 2013). Other studies emphasize urban green infrastructure and ecosystem services (Marié et al., 2018; Sarah et al., 2018) or address access to national urban parks (Donaldson et al., 2016; Leani et al., 2020). Social dimensions, such as the role of public parks in fostering community interaction, have also been explored (Umunakwe et al., 2018)

Similarly in the urbanizing cities of Ethiopia such as Addis Ababa and Hawassa, most of the previous studies conducted have given attention to the recreational values of urban parks (Tensaye, 2017), utilization of UGI (Molla et al., 2018), challenge on the management and governance of green spaces related to policy formulation and implementation (Bosena et al., 2022; Matt et al., 2018; Shibire et al., 2021). However, limited attention has been given to examining functional quality of the parks as well as utilization trends of public parks related to the user's profile, leaving a critical gap that this study aims to address.

1.3. Problem statement

In recent decades, urban areas have dealt with growing population density challenges (Ruixue and Jing, 2020). In 2014, 54% of the global population concentrated in urban environments. By 2030, it is expected to reach approximately 62%. The projections indicates further increase to 70% by the year 2050 (UN DESA, 2022, p. 3). And José et al. (2018) highlighted that, by 2030, around two-thirds of urban areas will need to be constructed sustainably. It's also important to acknowledge that urban parks play a huge role in urban redevelopment and fulfil the people's needs for leisure, socializing, and nature (Woldegerima et al., 2017).

Cities within developing countries such as sub-Saharan Africa rapid urbanization, population growth, and inadequate spatial planning have led to a reduced proportion of GSs (Collins, 2014). Besides, one of the major challenges in urban planning is achieving spatial equity in the distribution of public parks. Research has shown that parks are often unevenly distributed (Hughey et al., 2016). Urban settings in many countries exhibit inequalities in the distribution of physical

infrastructure, including parks and green spaces (Sampson, 2017). These disparities result in uneven exposure to health risks and unequal access to the benefits of nature within the cities (Tord et al., 2007)s. Furthermore it perpetuates broader patterns of social and environmental injustice (Khamannatun et al., 2020).

The capital city of Ethiopia, Addis Ababa is also characterized by a rapid population growth, which led to increased density of built spaces. The pressure on land has led to a reduction in GSs, leaving many communities without adequate access to public parks (Maru, 2014). The existing GAs in the city are inadequate in both quantity and quality to meet the recreational needs of its growing population (Tekle, 2016). The Structural Plan for 2017–2027 estimated that the city's per capita green space is just 1 square meter per person, significantly below the World Health Organization (WHO) standard of 9 square meters and the African standard of 7 square meters per person (AACPPO, 2017). To address this shortfall, the Addis Ababa City structural plan proposed creating new public parks to increase per capita green space (Sisay and Till, 2020). However, the distribution of the existing public parks lacks issue of spatial equity.

On the other hand high-quality urban green spaces are abundantly provided in sustainable cities for the satisfaction of citizens and visitors, in key areas (Jim and Wendy, 2006). However, in megacities with dense building structures like Addis Ababa , creating new green spaces in the core areas is challenging (Chen et al., 2021). Rather enhancing existing ones becomes crucial to optimize the advantages of green areas to ensure better service and maximizes the efficiency of utilization despite space limitations. However, many parks in Addis Ababa suffer from inadequate maintenance, lack of essential amenities, and safety concerns, which diminish their usability and appeal. These issues can lead to underutilization of parks.

Moreover, there is often a lack of detailed information about these spaces' types, activities and utilization. This knowledge gap hinders effective decision-making for the development and improvement of GAs. Without understanding on how they are utilized, it is challenging to make informed choices about expanding, enhancing, or repurposing these spaces to meet the community's evolving needs. Additionally, the successful design and management of recreational

GAs rely on individual demand, and satisfaction (Garcia et al., 2004; Halil, 2011). These factors play a decisive role in shaping individual park utilization (Tsurumi and Managi, 2015).

To enhance the utilization of green areas, the initial planning phase for RGA should incorporate users in general (Ives et al., 2017). However, there is often a disconnect between the availability of green spaces and the users, especially among different demographic groups (Annette et al., 2014). Understanding how deferent populations access and utilize these spaces and their unique experiences is needed for creating inclusive and equitable recreational environments (Nor et al., 2018).

Given these challenges, there is an urgent need to assess the current state of public parks in Addis Ababa in terms of their spatial distribution, quality, and utilization. Exploring these factors is vital for developing strategies that provide all residents the access to high-quality public parks, regardless of their location within the city. This study aims to address these issues and provide insights for more sustainable urban planning policies.

1.4. Research Questions

- How is the spatial equity of public parks in Addis Ababa?
    - what are the spatial distribution patterns of public parks in Addis Ababa?
    - How do the service areas of parks in Addis Ababa overlap?
    - How does per-capita access to public parks vary across different areas in the city?
- How are the functional qualities of the selected public parks in the city?
- What are the current trends in the utilization of the selected public parks in the city?
    - What and where are the main activities carried out by visitors in these parks?
    - What are the patterns of visitation to the parks in the city?
- How can the availability, quality and utilization of public parks be enhanced?

1.5. Objective

1.5.1. General objective

The general objective of this research is to assess the spatial equity, functional quality, and utilization trends of public parks in Addis Ababa and provide recommendations for their improvement to better serve the community.

1.5.2 Specific Objective

- To analyze the spatial equity of public parks in Addis Ababa.
- To examine the functional quality of public parks in the city.
- To investigate the trend of public park utilization in the city.
- To suggest valuable recommendations for enhancing the availability and quality of the public parks.

1.6. Scope of the study

The study is spatially conducted in Addis Ababa, focusing on three strategically selected green areas within the city. These areas are sub city level parks including Yeka pak, Lideta park and Sheger park which situated in different sub-cities, ensuring representation from diverse urban contexts. Cleanness

Thematically, the scope of this study focuses on the spatial equity of the parks. It analyze their accessibility and distribution, emphasizing service area coverage, overlaps, and per capita park access. It also evaluates how equitably park resources are distributed across different areas using GIS-based methods.

It also examines the functional quality of the parks in terms of spatial arrangement, diversity, walkability (functionality of pathways), flexibility, inclusivity, safety and security, maintenance, and cleanliness. This analysis provides information about the effectiveness of park design and management to the needs of users. The study also focusses on the trend of park utilization by investigating patterns of usage which includes the frequency and time of visits, users' preferences and group dynamics. It also covers the relationship between the frequency of park visits and user profiles, involving how age, gender, and residential location influence the parks visit. Additionally, it explores where activities are concentrated within the parks and their intensity by indicating areas of high and low activity as well as underutilized areas.

1.7. Limitation of the study

The limitations includes that the level of cooperation from local communities vary across the selected case areas which influence the quality of data. Some participants also declined to offer information during the data collection process. Moreover, observation for park utilization is

inherently limited by the time of observation and the specific locations studied, which may not capture seasonal variations.

1.8. Significance of the study

Effective management of GSs essential for promoting the well-being of the city's residents. The quality of GAs is also important to deliver recreation services for the public (Philip et al., 2020).(Philip et al., 2020) discussed that responding to the demands of the public is critical to increase the role of UAGs in providing social and recreational benefits.

In this context, the study has significance for deferent stakeholders. The findings inform urban planning policies and strategies for the city government and local authorities to enhance sustainable development of GSs that align with the growing population's needs. Additionally, understanding public preferences can guide the government in making informed land use planning and management decisions.

Furthermore, the study is very useful for researchers and planners. Researchers can contribute better understandings into the issues of spatial equity and utilization in urban GAs, helping in the development of evidence-based recommendations. Urban planners can use the study's findings to enhance existing green spaces, plan for new ones, and create policies that ensure efficient land use for public recreation, improve park accessibility, functionality, and sustainability.

In summary, this research is significant for addressing the challenges caused by rapid urbanization and promoting an enjoyable urban environment for city's residents.

1.9. Organization of the paper

The study involves three chapters. The first chapter is the introduction which consists background of the study followed by research gap which discuss the limited attention given to spatial equity and utilization coverage in previous studies. Then, problem statement, research question and objectives of the study are clearly outlined. The scope including thematic and spatial extent is described. Finally, significance of the research is underscored.

The second chapter delves into a review of relevant literature, structured in line with definitions and key concepts. Then theoretical and conceptual review is addressed. Finalize by outlining the

conceptual framework of the study. Chapter three outlines the methodology used to investigate the research objectives. This includes ethical considerations, research design, the selection criteria for case areas, description of the study area the, data types and sources, data collection and analysis methods, presentation techniques. Finally, methodological frame work is depicted.

Chapter four presents the results and discussion of the study by covering the findings from the data analysis and then followed by an interpretation of these results in relation to the study's objectives and the existing literature. Chapter five concludes the study by summarizing the main findings, present recommendations for park improvements and urban planning practices and suggest areas for future research.

Chapter Two : Review of Related Literature

2.1. Definitions and Key Concepts

Urban Green Space (UGS)

Different literatures provide diverse definitions of urban green space. The term "Urban green" is frequently employed to emphasize green spaces within urban environments intended for human use (Karsten et al., 2017). UGSs is regions in urban settings that were originally natural or semi-natural but transformed into urbanized environments due to human influence (Bayram and Ercan, 2012). Serap and Sema (2016) discussed UGSs as spaces that enhance individuals' physical and mental well-being as well as reinforcing community identity (Serap and Sema, 2016).

Public Parks

Public parks are open GSs in urban areas that are accessible to all members of the community (Law Insider). They provide spaces for physical activity, social interaction, and environmental preservation (Reeves et al., 2000). They include facilities such as playgrounds, walking paths, sports fields. They offer a natural environment within the built environment (UN-Habitat, 2018).

Spatial Equity

Researchers in the social sciences have approached spatial equity from various angles, with differing definitions and objectives, as well as varying indicators used to measure it (Tsou et al., 2005). Focusing on public parks, Spatial equity is the fair and just distribution of parks across urban areas, ensuring that all residents, regardless of their socioeconomic status, geographic location or demographic characteristics, have equal access to quality green spaces (Rashid and Haruka, 2021).

Utilization

Oxford Learner’s Dictionary defines utilization as the act of utilizing something, particularly for a practical purpose. In terms of park context, it refers to the extent to which parks are used by individuals for various activities. It includes both the frequency and nature of park usage (Bedimo-Rung et al., 2005).

Quality of Public Parks

Quality of parks refers to the overall condition and features of public parks, including factors such as maintenance, safety, available amenities, aesthetic appeal and the ability to meet the recreational and social needs of users (NRPA, 2018).

Recreation

Various definitions have been provided for public recreation. It refers to the activities individuals engage in during their free time. Additionally, recreation is often perceived as a component of leisure (Patmore, 1983). Rukiye, (2015) also stated that, it include pleasure, relaxation, and satisfaction.

Sustainable Design

It means creating a system to minimize the negative impact on the environment and human health, (Kaos, 2023). It includes social aspects that projects contribute positively to the well-being of communities (Wallisdown, 2023).

2.2 Theoretical Review

2.2.1 Equity Planning Theory

Equity planning theory developed primarily in the context of urban environments. This theory challenges traditional planning approaches that often prioritize economic growth and efficiency over social justice (Reece, 2018). It advocates for intentional interventions to address and correct systemic inequalities in the distribution of public good (Robert, 1969). Equity theory, while highly relevant to addressing inequities in economic, legal, interpersonal, and intergroup relationships, seems inadequately equipped to tackle broader social issues (Stacy and Sara, 1975).

Equity planning aims to expand options for those with limited choices and to redistribute resources, political power, and participation toward lower-income, disadvantaged city residents. Initially, several cities implemented equity plans through their official planning agencies (Krumholz and Kathryn, 1990). The theory argues that planners have a responsibility to advocate for those who are least powerful and most affected by inequitable urban development (Metzger, 1996).

Effective equity planning requires a unified goal and vision, with urban planning playing a role in shaping this collective vision for communities and regions. A shared sense of purpose is essential

for gaining political support and successfully implementing policies. Even before adopting decisions like the Cleveland Policy Plan, which aimed to expand choices for those with few, planners must have a sense of purpose. Furthermore, planners need technical tools, in addition to a clear vision, to effectively advance equity. As equity planning expands into areas like sustainability and health, collaboration is key for gaining the technical skills needed to integrate equity into policies (Zapata and Bates, 2015).

Planners must play a more active role in offering meaningful lifestyle choices for the rising population. This involves firming up public engagement, especially among marginalized groups, using accessibility as a key metric, enhancing analytical abilities to improve decision-making and developing measurement tools that connect social equity with the built environment (Krumholz and Kathryn, 1990).

Several cities have embraced equity planning in their development efforts. Cleveland, in the 1970s, was a pioneer in this practice, followed by Chicago under Mayor Harold Washington in the 1980s. Cities like Boston, Denver, Hartford, Jersey City, Berkeley, and Santa Monica also adopted equity-focused planning, advocating for fair-share regional housing, improved public transit access, rent control, increased citizen participation, and other initiatives to support lower-income residents (Krumholz and Kathryn, 1990).

By applying the principles of equity planning, urban planners can work to create more inclusive cities where public facilities contribute to reducing social disparities (Reece, 2018).

2.2.2 Environmental Justice Theory

Despite the recent increase in efforts to achieve "environmental justice," relatively little has been done to define the "justice" of environmental justice especially in the context of social movement demands. The environmental justice movement started in the 1970s when the low-income communities of color in the United States were disproportionately exposed to environmental hazards like power plants and landfills (Paul et al., 2009).

The majority of interpretations of environmental justice center on the question of equity, or how environmental advantages and drawbacks are distributed (Schlosberg, 2004). The movement has

also bridged the gap between nature and society by encouraging environmentalists to focus not only on protecting wilderness and natural systems but also on the ecological health of human communities, particularly those that are poor, minority, and indigenous (Cannavo, 2008).

Academics have produced a great deal of theoretical work regarding environmental justice (EJ) issues pertaining to parks and recreation within the past 20 years (Rigolon et al., 2019).

Environmental Justice is defined as a concept that goes beyond the fair distribution of environmental benefits and burdens, incorporating three key components: distributional, procedural, and interactional justice (Kabisch and Haase, 2014). Distributional justice refers to a condition where individuals have equal spatial access to environmental amenities and face the same level of exposure to environmental hazards, regardless of their demographic characteristics. Whereas procedural justice entails providing marginalized groups with meaningful representation and inclusion in decision-making processes. Interactional justice describes how well someone interacts with others and how they feel in public areas. It focuses on the perceptions and interactions that marginalized people have with public spaces, such as parks and recreational areas (Low et al., 2005; Rigolon et al., 2019).

To develop a conceptual model of environmental justice for recreation Rigolon et al. (2019) , builds upon existing work by integrating the three components of environmental justice with the layers found in ecological models of health behavior, including active recreation.

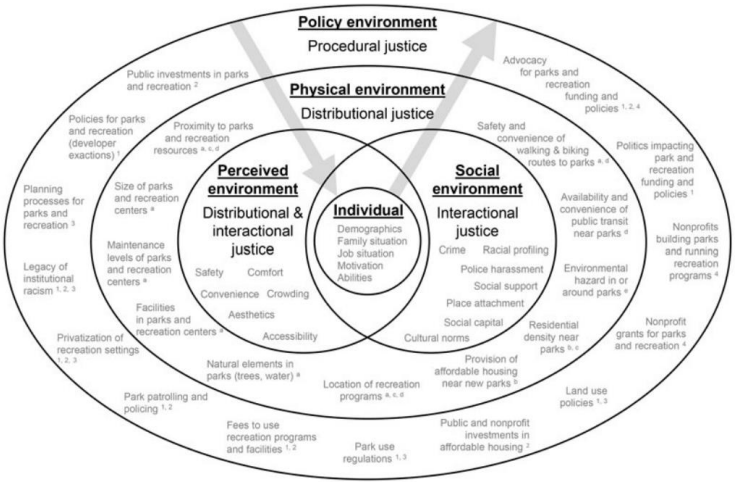


Figure 2.1Environmental justice model
Source: (Rigolon et al., 2019, P. 5)

2.2.3 Leisure Constraints Theory

Leisure constraints are factors that prohibits individuals' ability to involve in leisure activities, spend more time on them or use leisure services. These constraints are seen as having negative impacts on quality of life (Spiers and Walker, 2008). Leisure constraints are factors that restrict the development of leisure interests and limit participation and enjoyment in leisure activities (Kono and Ito, 2023).

Leisure constraints were categorized into three types according to White (2008): intrapersonal constraints, which are individual psychological traits that influence leisure preferences such as shyness; interpersonal constraints, which are social factors affecting leisure preferences i.e. lack of companions; structural constraints, which are external factors that impact the transition from leisure preferences to actual participation including lack of money or time (White, 2008).

Research indicates that overcoming leisure constraints through the practice of leisure skills, social interaction, and a sense of accomplishment during leisure activities predicts greater leisure satisfaction. And it has become evident that constraints are not always fixed barriers to participation; instead, they can be addressed or negotiated (Chick et al., 2015).

2.2.4 Landscape Urbanism

Landscape urbanism is a fairly recent concept that combines both theoretical and practical methods. It is a framework that integrates the principles of landscape architecture with urban planning (Vera, 2017). It is deferent from traditional urban planning approaches which treat GSs as secondary. Landscapes such as parks, rivers, and green corridors is seen as primary foundation that shapes the urban environment (Steiner, 2011).

The tenet of landscape urbanism is that, rather than being only a reaction to the construction of structures, it should be planned with an emphasis on ecological processes and the natural environment. This theory advocates for the incorporation of extensive GS into the urban fabric, which can improve the overall quality of residents (Tewari, 2019).

Landscape urbanism is a field focused on spatial patterns and the organization of space. Parks designed under this framework are not just recreational spaces but seen as vital components of a

sustainable urban ecosystem. Cities can create environments that are more conducive to human well-being by integrating GS (Balon et al., 2023).

2.2.5 Place Attachment Theory

It explores the emotional bonds and connections that individuals and communities develop with specific locations (Morgan, 2010). This theory advises that people form strong emotional attachments to places that hold personal significance. It influences how they perceive, and value these spaces. Sense of place is a broad attitudinal concept made up of three dimensions: place attachment, place dependence, and place identity. Place dependence also means how well a particular setting supports the achievement of goals compared to other available options. (Jorgensen and Stedman, 2001).

The old nature versus nurture controversy is replaced in this transactional model of human development. It is more sophisticated concept in which human development is impacted by the complex interplay between genetic and environmental influences within the framework of attachment bonds (Morgan, 2010). Understanding people's emotional and behavioral responses to place loss should guide effective organizational change management strategies (Inalhan et al., 2019). Users may rely on specific GSs for recreational activities, because of their uniqueness. It emphasizes the importance of designing and maintaining places to create strong connections between users and the space (Kyle et al., 2005).

2.2.6 Theoretical frame work

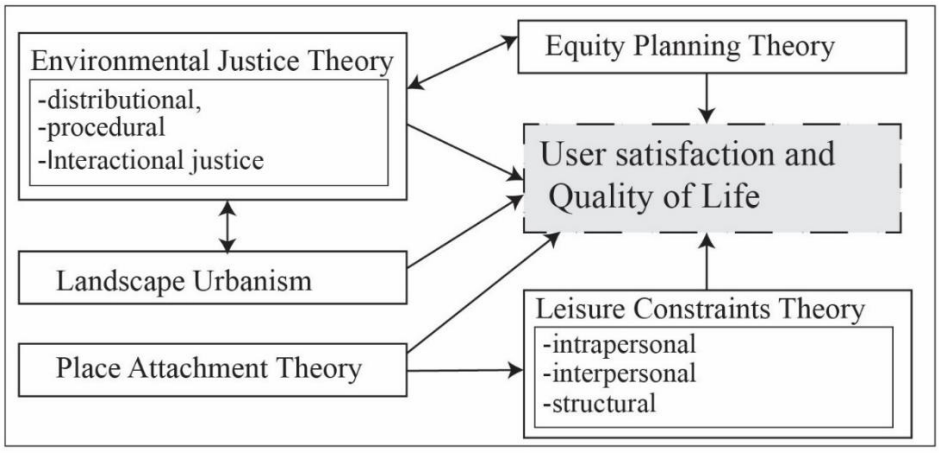


Figure 2.2Theoretical framework of the study
Source: own computation (2024)

2.3 Conceptual Review

2.3.1 Historical Development of Public Parks

Sociologist Galen Cranz distinguished four distinct stages in the evolution of parks in the comparative analysis of park planning, design, and management in Chicago, San Francisco and New York between the 1850s and the 1980s. These phases reflect the changing social and environmental priorities of urban populations over time, as well as the changing role of parks in city life (Cranz and Boland, 2004).

The pleasure Ground era spans from 1850 to 1900. It was characterized by the creation of large landscaped parks. These parks, such as Central Park in New York, were influenced by the ideals of the Romantic movement. They emphasized the importance of nature in promoting health and well-being. During this period, parks were seen as moral and social refuges where the urban poor could find break from the harsh realities of industrialized city (Taylor, 1999).

The Reform Park phase (1900–1930) emerged in response to that urban parks need to serve not only as spaces for relaxation but also as places for active recreation and social reform. This period saw the introduction of playgrounds, sports fields, and other facilities designed particularly for children and working-class families. The design of Reform Parks was more utilitarian and focused on providing structured activities. It reflects the Progressive Era's emphasis on public health and social improvement (Loughran, 2020). The Recreation Facility era (1930–1965) made a shift towards more specialized and multifunctional parks. During this period, parks became more formalized, with an emphasis on providing recreational opportunities for all age groups. It also integrates parks into the other urban infrastructure (Tate, 2018).

The Open-Space System phase (after 1965) reflects the modern understanding of parks which is the integral components of urban ecosystems. This period was the rise of awareness on the ecological functions of parks. This includes park’s role in managing stormwater, enhancing biodiversity, and mitigating the urban heat island effect. This approach views parks as part of a larger, interconnected system of public spaces (Cranz, 1982).

The understanding of parks has increased, where the role of parks has expanded beyond their traditional functions in the twenty-first century. It is recognized as interdependent components of

the city itself. Modern urban parks are now highly valued for the many benefits they offer. As cities continue to grow, the importance of parks has become more pronounced in the pursuit of sustainable development (Tate, 2018).

2.3.2 Role and Functions of Public Parks

Many literatures have tried to discuss on the role of urban parks playing massive roles that contribute to the overall well-being of communities. These roles encompass rejuvenation of the mind and body, cultural and intellectual input, and even food provision (Antonios et al., 2021). They back the enhancement of quality of life models by providing physical comfort, fostering psychological and emotional relaxation, and promoting social interaction (Mensah et al., 2016).

Regarding the positive effects on public health, Cecil et al. (2014) categorized as direct and indirect. The former one includes promoting public health by mitigating stress and mental disorders, enhancing the impact of physical activity, reducing health inequalities, and positively influencing the perception of life quality and self-reported general health. The later include creating spaces and opportunities for physical activity, enhancing satisfaction with the living environment and facilitating diverse forms of recreation (Cecil et al., 2014; WHO, 2016).

Besides, these areas are recognized for their role in fostering social cohesion through the creation of spaces that facilitate social interactions (Haq, 2011). Important social exchanges mostly take place in settings like parks, schools and churches (Volker et al., 2006). These communal areas create a chance for community engagement, recreational activities, and shared experiences. It contributes to the interconnectedness of urban residents (Antonios et al., 2021).

On the other hand Urban parks and GAs serve as essential recreational hubs which provide spaces for a multiple leisure activities including sports, picnics, jogging, and other outdoor pursuits (Jari et al., 2010).

Alev and Ghaida (2023) argued that, UGSs serve as more than local recreational settings. They also attract visitors from outside the city and draw diverse audiences, contributing to the city's appeal and accessibility to a wider regional or tourist population. This has role on supporting the eco-tourism of the country (Alev and Ghaida, 2023). A city with sufficient GSs and landscaping are appealing to both inhabitants and investors. It increase the property values , support local businesses and accelerate economic growth (Volker and Marco, 2008).

Additionally, UGSs absorb air pollutants and filter particulate matter which improvs the air quality of the urban. They are also natural filters that reduce runoff and aiding in water purification (Bayram and Ercan, 2012). It is known that urban areas often experience higher temperatures due to the heat island effect, so GAs counteract this effect by providing shade and evaporative cooling, and adapting to climate change (Per and Sven, 1999). Susanna et al., (2023), discussed that such areas can emerge as crucial focal points for the conservation of biodiversity within the urban landscape because of their frequent abundance in habitat diversity which brings advantages not only for faunas but also for humans.

2.3.3 Spatial Equity in Public Parks

Although there are many definitions of spatial equity, they often center on two ideas, socioeconomic status and spatial distribution. The former one is defined as fair and just distribution of public services and resources for the communities regardless of their socioeconomic status, race, or ethnicity. Whereas the latter is to have equitable access across different geographic areas (Chao et al., 2018). Buhangin (2013) also discussed in terms of physical space, it means the fair development and use of land. From a socio-economic perspective, it can refer to the fair distribution of goods and services across different geographic areas.

Lucy (2007) briefly discussed five key concepts of equity which are essential for understanding how to achieve fairness in the allocation of urban resources and services. The first one is equality which is centered on providing the same level of service to everyone. It ensures that each community has access to an equal number of parks and also similar amount of GS per capita. The other concept is need, which emphasizes that services should be allocated based on the specific requirements of the communities. The goal is to decrease differences by providing resources to where they are mostly needed.

The third concept is demand. It considers the expressed use of services by a community. This approach prioritizes service allocation where it is much needed. The other one is preferences, which take into account the desires and priorities of different peoples regarding local services. The last one is willingness to pay which says services should be distributed according to individuals'

willingness and ability to pay. It raises the equity concerns which lead to the exclusion of low-income populations from accessing such services (Lucy, 2007).

Spatial equity in public parks involves analyzing the geographic distribution of these spaces. Several methodologies have been developed and used in deferent research to measure spatial equity. These methodologies involve spatial analysis, statistical techniques, and geographic information systems (GIS) to analyze spatial data and visualize disparities. GIS analysis uses spatial data to map and analyze the distribution of public parks (Nicholls, 2001).

Accessibility measures are mostly used methodologies to assess spatial equity. This approach focuses on how far residents can reach public amenities. These measures consider the distance or time it takes to travel from a population center to a facility. It uses metrics like Euclidean distance, travel time, or network distance. The aim is to evaluate whether all residents have similar access to these services. Tools like GIS are used to calculate these distances and visualize access disparities on a map (Jared, 2001).

Population-based ratio methodology is also used to calculating ratios such as the number of amenities per capita within a specific geographic area or demographic group (Puay and Rosita, 2016). Another methodology is the buffer analysis, which measures the proximity of residents to specific amenities within a certain distance, typically used to determine accessibility by walking or public transport. This technique helps identify gaps in service coverage and can inform decisions on where new services should be located to maximize accessibility (Kabisch and Haase, 2014; Shu et al., 2019).

Additionally, equity indices are used to quantify spatial equity by combining multiple indicators. It involves income levels, racial composition, and service availability, into a single measure. These indices help compare equity across different areas and track changes over time (Ning et al., 2024; Shuying et al., 2021; Tusar Kanti Roy et al., 2022).

Overall, the concept of spatial equity in public parks is about creating a balanced urban landscape where every resident has equal access to the benefits of GSs. Each of the methodologies offers

different strengths and limitations which makes them suitable for different types of spatial equity assessments.

2.3.4 Utilization of Public Parks

2.3.4.1 Factors Influencing Park Utilization

Many studies recognized that people's perceptions and satisfaction with UGSs is important to increase utilization and livability. Policymakers and urban planners also assisted by knowing preferences of urban residents on public GSs which guides to provide and manage these areas (Wan and Shen, 2015).

Rukiye (2015) noted that, specific and interconnected elements can play a role in influencing public involvement in UGSs. It includes personality, user requirements, socio-economic status, physical and social capabilities, cultural identity and personal objectives. Some Investigations have focused on evaluating the reasons behind individuals' visits. This helps to reflect their needs and expectations (Chiesura, 2004; Shan, 2014).

Research by Lo and Jim (2011) has also delved into how residents assess the advantages linked with urban parks whereas a study by Annette et al. (2014) has showed deferent individuals' preferences regarding qualities of parks, including aspects such as cleanliness, tranquility, natural surroundings, and the availability of facilities. Such multifaceted discoveries answering the how physical attributes of the park impact people's utilization (Annette et al., 2014).

On the other hand Elin and Märit (2020) discussed the influence of different age groups. Demographic factors such as age, gender, socioeconomic status, and cultural background influence patterns of park utilization (Deborah et al., 2007). In providing a more inclusive outdoor public space, all groups of society including Children, youths, and elderly people must view the green space as inviting and have the chance to utilize it following their needs and desires. Studies by Halil (2011) also showed the backgrounds of individuals have high impact for shaping their aesthetic views and how they experience spaces. It is vital that UGSs are responsive to visitors' requirements and should be designed with consideration for people from different social and cultural backgrounds (Nor et al., 2018).

Park utilization also varies based time of day, season, and day of the week. Research shows that parks are frequently used during weekends and holidays. Proximity to green space is also considered a key factor in its utilization in which the nearer a GS the more frequently it is used (Björk et al., 2008). Seasonal variations also matter in utilization. For example park usage often peaks during spring and summer when the weather is more freindly to outdoor activities (Bertram and Rehdanz, 2015; McCormack et al., 2010).

The activities that people engage during park use can also show different patterns. Common activities include walking, jogging, picnicking, playing sports, and socializing. The type of activity often depends on the amenities available in the park (Jim and Wendy, 2006).

2.3.5 Relation Between Recreation and Park Quality

In the previous sections UGS is dicussed as essential venues for public recreation, contribute to the physical and mental well-being of urban dwellers. Studies have consistently emphasized the interconnectedness between green area quality and the level of satisfaction and engagement among recreational users (Ter, 2011).

Gehl, (2011) determined that, outdoor activities conducted in public spaces can be categorized into three groups: necessary, optional, and social. Each category imposes distinct requirements on the surrounding physical environment. He also mentioned that optional activities occur exclusively under favorable external conditions when the weather and environment are inviting and conducive to outdoor pursuits, in other words, the quality of the outdoor space. Public recreation falls within this realm of activities.

Derived from Chen et al., (2021), key factors impacting the utilization of urban green spaces involve the environment's internal and external features. UGS and urban park internal features reflect their overall quality, which is determined by factors such as planning, design and management of park maintenance.

Research by Senetra et al. (2018) shows the direct link between the aesthetics of GSs and the cultural ecosystem services. The visual quality, design elements, and overall ambiance of a GA impact the experiences of visitors. Aesthetically pleasing landscapes, well-maintained facilities

and well-designed pathways contribute to a positive user experience (Senetra et al., 2018). Acoustics and thermal comfort are also crucial factor in selecting an outdoor activity space (Cheung and Jim, 2018).

Well-designed environments can encourage physical activity. This includes providing parks, sidewalks, and recreational facilities. These features promote a conducive atmosphere for exercise and active living (McCormack et al., 2010).

2.3.6 Criteria Used to Evaluate Park Quality

Evaluating the quality of public parks is essential for understanding the space's limitation and positive aspects. Deferent criteria have been used in various studies to assess park quality by focusing on different dimensions (Annette et al., 2014). One of the most common criteria for evaluating park quality is the presence and condition of physical features and facilities such as playgrounds, sports fields, walking paths, benches, picnic areas, and restrooms (Deborah et al., 2007). Parks with well-maintained playgrounds and sports facilities can attract families and individuals interested in active recreation (Ayala-Azcárraga et al., 2019).

Environmental quality is another aspect of park quality. Elements such as greenery, tree cover, landscaping, water features, and aesthetic appeal are included in this aspect. Parks that offer a pleasant natural environment with diverse vegetation and scenic beauty are more likely to be used by the public (Giles-Corti et al., 2005, 2005).

Safety and security are critical aspects of evaluating park quality. People's sense of safety, shaped by the presence of other visitors and the absence of crime or disruptive behavior, strongly influences how they perceive a park (Nevenka et al., 2016). Moreover, regular maintenance and cleanliness are also basic factores to provide high-quality parks. Well-maintained parks with clean facilities and lawns are more attractive and they are inviting to users (Madureira et al., 2018). User satisfaction and perception are subjective criteria that reflect individual experiences and attitudes toward park quality. Surveys and interviews with park users often gather data on their preferences and satisfaction with park characteristics (Bahriny and Bell, 2020).

2.3.7 Challenges in Urban Green Space Management

Now a days, the management of urban parks has gained significant prominence, particularly concerning matters related to urban open spaces and their impact on society and the environment (Rukiye, 2015). It is a multifaceted process that necessitates a variety of abilities, multitasking, and interdisciplinary collaboration (Chan et al., 2015). The value of a public or green space will diminish over time, regardless of its initial design and implementation quality, if it lacks effective management (Carmona and Magalhaes, 2006).

Knowing the significance of UGSs management, it faces a myriad of challenges (Aly and Dimitrijevic, 2022); governance issues pose a significant obstacle, with fragmented decision-making and unclear responsibilities often impeding effective park management (Carmona and Magalhaes, 2006). The lack of cohesive policies and guidelines at the city level can exacerbate these challenges, leading to inconsistencies in GA development and maintenance practices. Local authorities accountable for the management and provision of services in UGSs should adopt a comprehensive approach to enhance the efficiency of policy implementation and safeguard budget allocations (Hernández et al., 2018).

On the other hand Policy implementation emerges as a critical challenge in the effective management of urban green spaces. (Rizwana and Jon (2019) highlighted that as the disparity between regulatory standards and their enforcement increases, the resource undergoes a decline, either through degradation or a diminishing attractiveness to the public. Despite the existence of well-formulated policies, translating them into tangible actions on the ground remains a daunting task. This implementation gap can result from a lack of financial resources, inadequate enforcement mechanisms, or insufficient capacity within municipal agencies (Sheila, 2011).

Consequently, the benefits of green space policies may not be fully realized, impacting the overall quality and accessibility of these recreational areas (Sheila, 2011). Public engagement constitutes another dimension of the challenges faced in urban green space management (Hernández et al., 2018). The successful development and maintenance of green spaces depend on the active involvement of the local community. However, fostering meaningful engagement can be

challenging due to varying community interests, socio-economic disparities, and communication gaps between governing bodies and residents (Rizwana and Jon, 2019).

2.3.8 Public Parks in Addis Ababa

The public parks in Addis Ababa starts in early 20th century, in the city's modernization efforts. Green spaces were mostly created during the Italian occupation (1936-1941), when the colonial administration established many parks as part of their urban planning initiatives (AACPPO, 2017). The majority of Addis Ababa's parks were established in the 1970s which is a time of intense urban development. Notable example from this period is Meskel Square area. It was designed as a public gathering space which is also used as recreational areas (Tensaye, 2017)

In Addis Ababa, parks provide social and recreational activities, such as hosting weddings, birthday parties, and public gatherings. There are currently 18 recreational parks in the city to meet the social and recreational needs of the locals (Kumelachew, 2015). This includes two different kinds of parks: privately run parks and public parks. Beautification, Parks and Cemetery Development and Administration Agency is in charge of overseeing and managing the public parks (Tensaye, 2017).

Parks, gardens, amenity green spaces, and corridors are just a few of the categories that the Ministry of Urban Development and Construction used to group green and open spaces (MoUDH, 2015). Besides, the Addis Ababa municipal plan classifies parks according to their unique functions and recreational uses. Recreational parks are categorized based on their size at the city, sub-city, neighborhood, and woreda levels, whilst special function parks are set aside to conserve wildlife habitat (Yirga et al., 2022). According to Tekle (2016), functional recreational parks span 69 hectares . The 18 recreational parks sizes rangs from 0.6 to 14.3 hectares, offering services to residents.

The availability of public parks per capita in the city is notably low which increases the gap between the existing GSs and the needs of the population. A study by Azagew and Hailu (2020) shows that the total area of public parks in Addis Ababa is approximately 168.7 hectares which serves a population of over 4.5 million peoples. This results in a per capita park availability of 0.37 square meters. This figure is significantly below both national and international standards.

According to the Ethiopian Urban Green Infrastructure Standard (UGIS), the recommended per capita availability of parks is 15 square meters, while the World Health Organization (WHO) is 9 square meters per person. It shows a critical need for more accessible recreational areas (Azagew and Hailu, 2020).

2.3.9 Sustainable GA Development Strategies for Increasing Utilization

An activity cannot be considered effective if it is designed at a place that is difficult to access and challenges users. Individuals often prefer occupying benches adjacent to a playground rather than involving aroung unwelcoming park space (Rukiye, 2015). Weiting et al. (2022) highlighted that when individuals favor a GSs, they spend more time in it. As a result, the efficiency of land utilization increases (Weiting et al., 2022).

Aleen et al., (2020) has pinpointed three ways to maximize the utilization of green space: reinforcing socio-cultural aspects, promoting environmental sustainability, and reinforcing socio-cultural aspects, promoting environmental sustainability, and advancing infrastructure development. It is crucial to incorporate a diversity in physical features, activities, amenities, and usage options in urban parks. Additionally, these parks should possess an appealing and aesthetic quality in order to Create a sense of relaxation for the visitors (Rukiye, 2015).

2.3.10 Conceptual frame work of the study

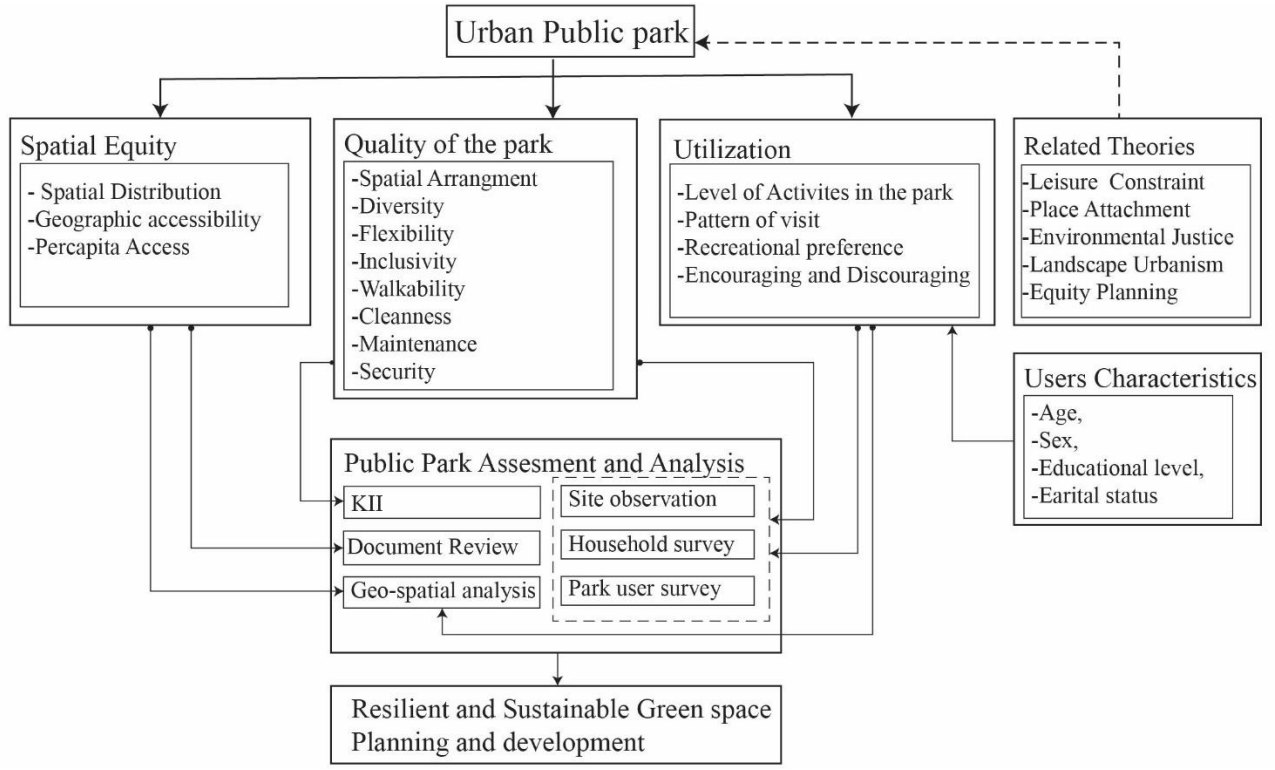


Figure 2.3 Conceptual framework of the study
Source: Own computation (2024)

Chapter Three : Research Methods and Materials

This chapter outlines the research methods and materials employed to achieve the study's objectives. It details the study's design, description of the study areas, data types, and sources, as well as the sampling framework and data collection methods. Furthermore, the chapter explains the techniques used for data analysis and presentation. It concludes with a methodological framework that integrates the components of the study.

3.1 Ethics approval

According to Pritha (2021), in ethics approval all participants in surveys or interviews should provide their informed consent, and participation should be entirely voluntary. It ensures that the research aligns with ethical principles and safeguards the rights and well-being of the participants involved in the study (Pritha, 2021). Therefore, the researcher is committed to maintaining the t ethical standards during the investigation. All data is securely kept, and participant identities is safeguarded to maintain confidentiality.

3.2 Research Design

Exploratory Method: This method is applied to investigate of the distribution and quality of public parks as well as users' perception related to public parks. This involves qualitative data collection methods such as key informant interview to explore the deferent perspectives and uncover potential issues. This method is also employed to capture interactions on the case areas that may not be apparent through quantitative approaches alone.

Explanatory method: is used to explain the relationships between different variables identified in the study. This method is employed for understanding causality, such as how the physical characteristics of parks influence their usage patterns and to provide a basis for interpreting survey data, interviews, and spatial analyses

Descriptive Method: this method is employed to provide a clear and detailed account of the spatial and functional characteristics of the case areas. It is also used to describe the park user's experience and preferences. This method is used employed to systematically presenting quantitative and qualitative data, such as park size, and user feedback, to create a detailed profile of the study area.

3.3 Description of the Study Areas

3.3.1 Location

The study area is the capital city of the Federal Democratic Republic of Ethiopia and the home of the African Union, Addis Ababa. Its Location is at 9° 2′ 0″ N and 38° 42′ 0″ E in the horn of Africa with an administrative area of 423 km^2.

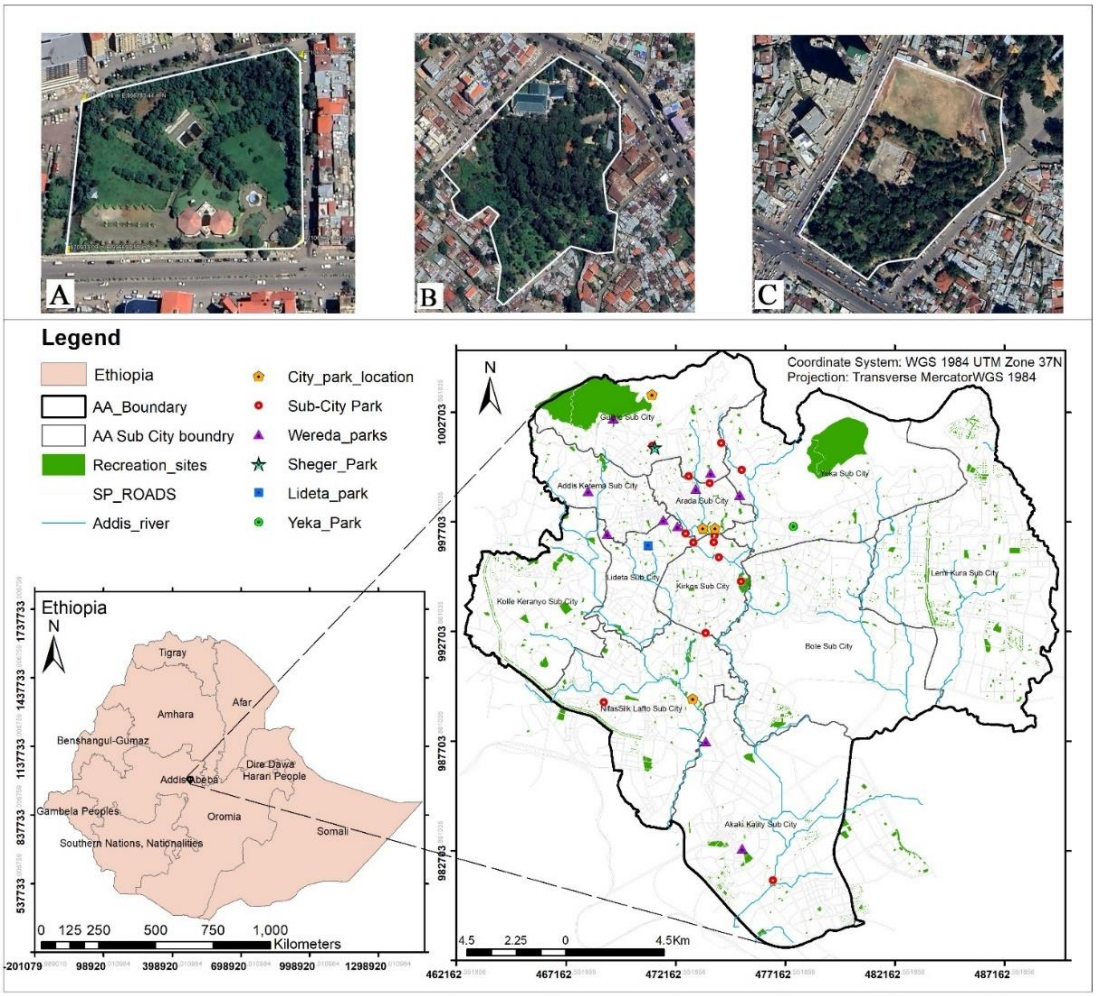


Figure 3.1 Location map of the Addis Ababa and selected case areas (A) Ldeta park, (B) Sheger park, (C) Yeka Park
Source: Computed by the author (2024)

As of 2022, the city is administratively divided into 11 sub-cities, and 116 districts locally referred to "Wereda" (Figure 3.1). Currently, the city has become one of the world's fastest-growing cities, serving as both the country's commercial and political hub (Abebe et al., 2022).

3.3.2 Study area Selection criteria

In Urban Green spaces come in diverse forms, sizes, and functions, often categorized by factors like the type of vegetation, size, intended purpose, surrounding landscape, Location, shape, and scale. Existing Addis Ababa green space typologies are based on morphology and ecological function (Kumelachew, 2015).

Hence, the focus for the case study's area selection prioritizes on sub city level parks . The city currently has 16 sub-city parks, varying in size from 0.7 to 7.7 hectares (Annex 2). Three parks were purposively selected which is 20 percent of the total number of sub-city parks. criteria for selection of the representative of these parks are as follows:

- ***Location***: parks that are located in different sub-cities within Addis Ababa is chosen to include diverse sub-cities.
- ***Park size and capacity***: parks with larger area coverage and higher user capacity are prioritized /larger than 1 hectare/.
- ***Closed parks***: parks with controlled access points and organized management are preferred for accurate data collection on user demographics and activities.
- ***Accessibility***: proximity for main road, availability of pedestrian pathways and public transportation.
- **Proximity to Residential Areas:** parks that are located close to residential zones to understand the perception of nearby residents.

3.3.3 Land use of Addis Ababa

Generally, the land use of Addis Ababa is classified into in to two types. They are Non-built-up lands that are used for ecological purposes and built-up regions include a variety of urban land use categories which has a specific function (Woldesemayat and Genovese, 2021). The land use of city includes various functional categories. The dominant type is mixed residence. It is divided into high, medium, and low-density areas (Figure 3.2).

Commercial areas are concentrated in the city center and along highways including high-rise buildings. Municipal services include spaces for abattoirs, emergency services, cultural centers, cemeteries, and public plazas.

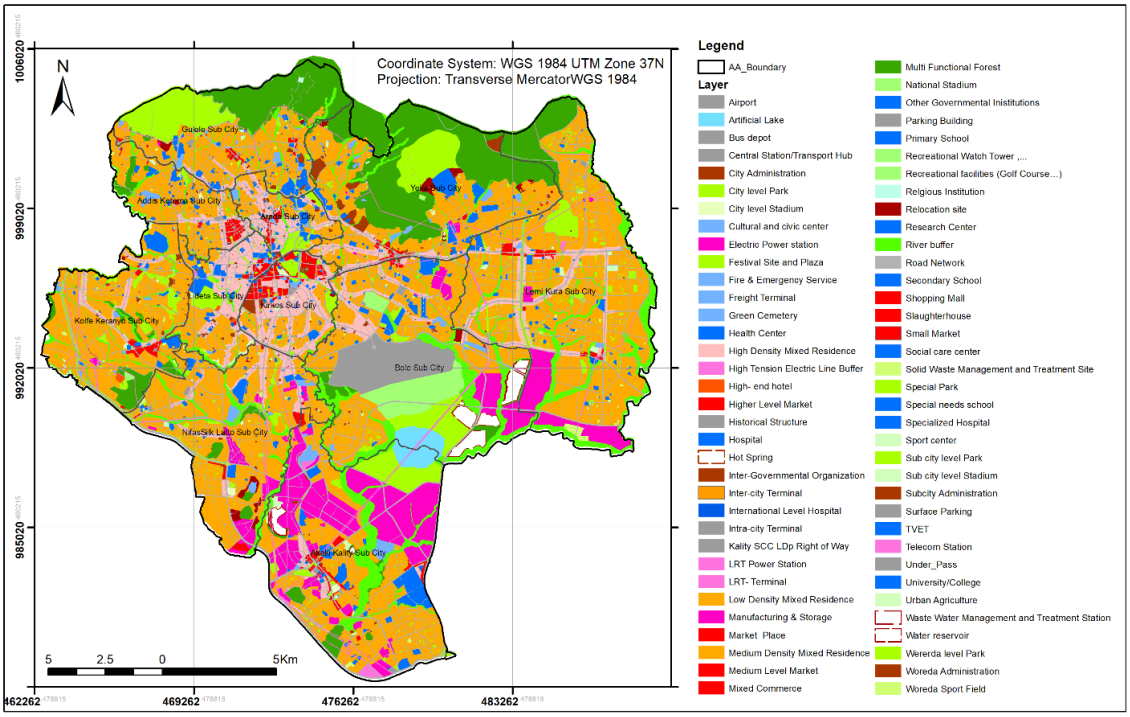


Figure 3.2 Land use map of Addis Ababa. Source: Addis Ababa City Planning Commission (AACPC)

Social services areas host hospitals, schools, research centers, stadiums, and other civic facilities. Transport zones includ terminals, depots, and parking facilities, excluding roads. Finally, administration areas house government and intergovernmental institutions at various levels.

3.4 Data types and Sources

The study includes primary and secondary data types to achieve the study objectives. The primary data is collected from park users, local residents, park administration, sub-city and city administration. Primary data is derived from in-depth interviews, structured surveys, and systematic observations of park features, user patterns, and park management practices. It providing insights into utilization trends, user satisfaction, and challenges related to park access and quality.

Additionally secondary data is involved. These include google map images, GIS datasets containing park locations, service area buffers, and population density. Official reports, research articles, and government publications related to urban parks and planning in Addis Ababa

supplement these datasets. Additional sources, such as census data and urban development plans, is used to provide contextual information on the city's demographics and spatial planning.

3.5 Sample size determination

Simple random sampling technique is employed to collect data from park users. The on-site survey during peak usage times (morning, afternoon, evening) on weekdays and weekends is administered to capture responses from park visitors. The researcher position at strategic locations within the selected parks. It includes park entrances, seating, gathering and circulation areas, playground and other amenities. Then approached visitors, explaining the purpose of the survey, and request their participation. Yamane's formula is used for calculating sample size, which is simple particularly when dealing with a finite population (Adam, 2020).

$n= N/1+N(e^2)$

n: Required sample size, N: Total population size, e: Desired margin of error 0.1 for 90% confidence level

Table 3.1. Sample size for Park user survey

No.	Recreational Site	Average No. of visitors/day	No. of participants
1	Yeka Park	181	50
2	Ldeta Park	150	47
3	Sheger Park	110	42
Total respondents		139	

Source: Computed by the author (2024)

Additionally for household survey, systematic sampling method is employed to ensure representative selection of participants. The sample size is calculated based on Yamane's formula with level of confidence 90%, and margin of error 10%. Questionnaire were distributed for 172 households in total (Table 3.2).

Table 3.2 Sample size for household survey

No.	Recreational	No. of household/400m	No. of sample	Sampling interval
1	Yeka Park	307	56	5
2	Ldeta Park	348	58	6

3	Sheger Park	356	58	6
	Total	172		

Source: Computed by the author (2024).

Sampling interval is established for selection of households by dividing the total number of households in the sampling frame by the sample size (Table 3.2). The first household is randomly selected as a starting point. Then selected households was visited and invited to participate in the survey.

3.6 Method of data collection

In order to investigate the land utilization coverage and green area development in the selected case areas, a multifaceted approach to data collection was employed. This approach includes site observation, document review, key informant interviews, and user surveys.

3.6.1 Site Observation

Site observation involves direct visits to the green areas within the case study locations to collect data related to spatial and functional characteristics. Base map and observation check list is prepared (Annex 4) to facilitate the systematic site visits. This includes mapping the distribution of different land uses, the presence and condition of landscape elements and facilities. Moreover, observational mapping and counting were employed to document user activity patterns across selected parks. Data were collected over a week, encompassing both a weekday and a weekend, at different times of the day (morning and afternoon). During each observation period, the number of individuals were recorded at different locations within the parks. The data were systematically noted on site map.

3.6.2 **Document Review**

Document review involved the examination of policy documents, Structural and land use plans, historical records, and other unpublished reports pertaining to GA development. This method provides a historical context and an understanding of the regulatory framework and planning decisions.

3.6.3 Key Informant Interviews

Key informant face-to-face interviews is conducted with selected individuals using non-probability sampling specifically purposive sampling method. These informants possess valuable insights into the development and management of the green areas. They include government institution officials, park manager, park employees (Table 3.3). key informants selected from responsible institutions are Addis Ababa City Government Environmental Protection Authority (EPA), Addis Ababa Public Recreational Areas Administration corporation, Addis Ababa City Beautification and Green Development Bureau (AACBGDB).

Their expertise helped in uncovering challenges, constraints, and potential development strategies. The interviews involved semi-structured questions, remaining open to exploring additional topics or issues raised by the respondents during the discussion (Annex 7).

Table 3.3 Key Informants Selected

No.	Key informants	Description	Amount
1	Park manager	One from each park	3
2	Park employees (Gardeners)	One from each park	3
3	AACBGDB	Public relation manager	1
4	PRAAC	Executive manager	1
5	AAEPA	Executive manager	1
Total			9

Source: Computed by the Author (2024)

3.5.4 Park user survey

In addition to the above methods, park user surveys are conducted to gather data on user perception and preferences within the selected public parks to provide direct feedback from the individuals who utilize these spaces, offering a user-centered perspective on the efficiency of the green areas for public recreation. Well-structured questionnaire that includes a mix of closed-ended and open-ended questions is developed, covering key aspects such as visitor demographics, preferred activities, satisfaction levels, and opinions on the park's amenities and quality (Annex 6). 5-point

Likert scale was used to complete their review (1= extremely poor, 2 = poor, 3 = acceptable, 4 =very good, and 5 = excellent).

3.5.5 Household survey

Household Survey is conducted in addition to the park user survey, to gather insights from residents within the neighborhoods within the 400m radius of the sampled parks. It is strategically used to cover an area within walking distance from the parks. Residents within this proximity will likely have more direct and frequent interactions without interruption by highways that are not residential or by other physical obstructions (Nicholls, 2001). It was first delineated in ArcGIS 10.8 and then Google map was used to count the total number of households within the radius.

3.7 Method of data analysis

Spatial Analysis

Geospatial data, including maps and GIS datasets, undergo spatial analysis to assess spatial equity, land use and distribution of space, activities. To analyze the spatial equity of public parks in Addis Ababa, the analysis involved the step shown on the (Figure 3.3).

The first step involved creating service buffers for each park type based on structural plan of the city including sub-city parks (5,000 m), and city parks (10,000 m) to delineate their respective service areas (Table 3.4). These buffers were generated using GIS 10.8 tools to visualize the geographical reach of each park category (Annex 2).

Table 3.4 Park categories and their catchment radius

Park	Size (ha)	Catchment Radius
City Park	>10	10 Km
Sub-city park	1-10	5 km
Woreda park	0.3-1	1.5 km

Source: Addis Ababa city structural plan

Overlaps between the buffers were identified using the “Union” tool, which integrated the individual service areas into a single composite layer, ensuring that overlapping zones were clearly shown. The resulting layer was then processed using the “Multipart to Single part” tool to separate the overlapping regions into distinct parcels for further analysis. Next, a spatial join operation was

performed to associate each parcel with its respective park attributes, including park area and population density within the buffer zones. This step facilitated the calculation of the Per Capita Access to Parks.

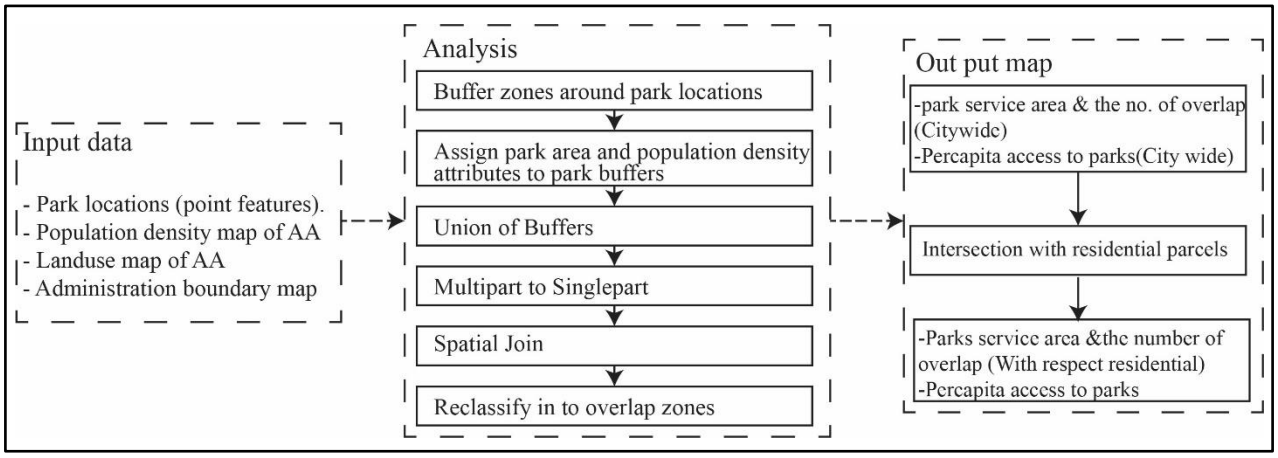


Figure 3.3 Method used to analyze Park service overlap and per-capita density

This involved dividing the total park area within each overlapping buffer zone by the respective population residing in the same area (Habibollah and Taher, 2020).

$A_j = \sum E_j$ where $E_j = S_j / \sum P_i$

where A_j represents average park area available per resident in parcel j; E_j represents park area per capita for each overlapping buffer zone; S_j denotes total Park area within the buffer zone. P_i represents population residing in the buffer zone.

On the other hand, Kernel Density Analysis is employed using GIS 10.8 to visualize the trend of park distribution density in 2014 and 2024. And also, to show intensity of activities across different areas of the parks. Kernel density estimation was applied to the mapped observation points to generate a heat map, indicating regions with high and low user activity.

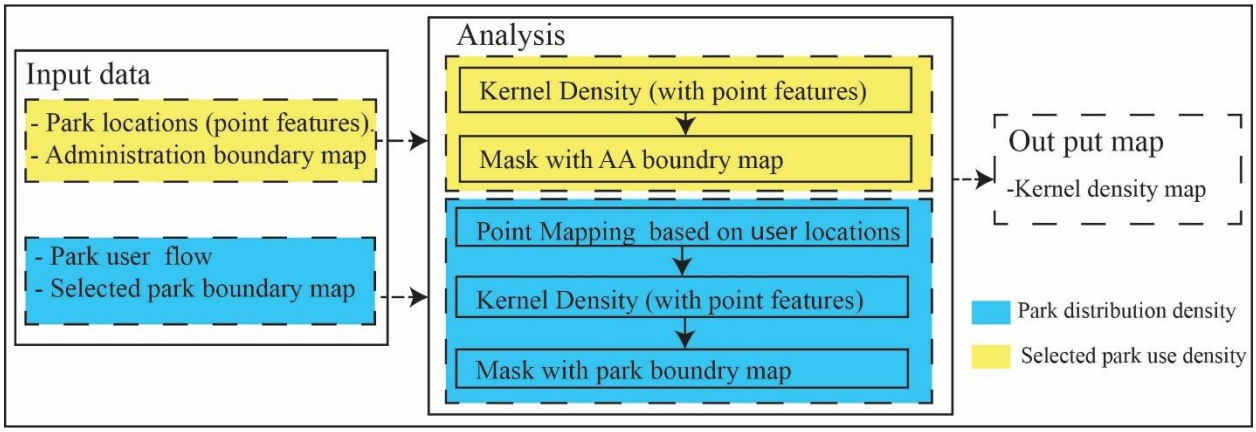


Figure 3.4 Method used for Kernel density analysis

Qualitative Analysis: is applied to analyze the data from key informant interviews. Thematic analysis is used to systematically identify and analyze the transcribed data related the quality of the public parks.

Statistical Analysis: User survey data is analyzed to understand trends in user perception, preferences and experiences. Descriptive statistics is used to quantify and interpret user responses. SPSS 27 software is used to generate statistics, such as mean, and frequency distribution. Additionally, crosstabulation is utilized to examine relationships between variables, such as the frequency of park visits and Socio-demographic characteristics, as well as the purpose of visits and age of the respondents. Pearson correlation analysis was also conducted to explore the relationships between Socio-demographic characteristics of respondent and their visitation patterns.

Comparative Analysis: comparisons across the case areas is made. It involves a side-by-side assessment of data and findings, enabling the identification of variations and similarities in land utilization, perception of the respondents as well as quality of the public parks.

3.8 Method of data presentation and interpretation

The data collected is presented using a combination of visual and tabular formats to facilitate understanding of the findings. This includes bar graphs and pie charts to illustrate quantitative data, such as visitor demographics and preferences. Spider diagrams is employed to visually represent the scores in a clear format to allow an easy identification of strengths and weaknesses.

Geographic Information System (GIS) maps is employed to visually represent spatial patterns, such as park service areas, overlaps, and per capita access indices. And also, to represent characteristics of the public park visually allowing easy understanding of the park layout. Thematic diagrams illustrating thematic concepts, such as circulation patterns, and activities is presented to visually represent key aspect related to land utilization.

Tabular formats are present detailed quantitative data, including Socio-demographic characteristics of the respondents, survey responses. Additionally, high-quality photographs are also included to visually showcase the conditions of the selected public parks.

3.9 Methodological framework

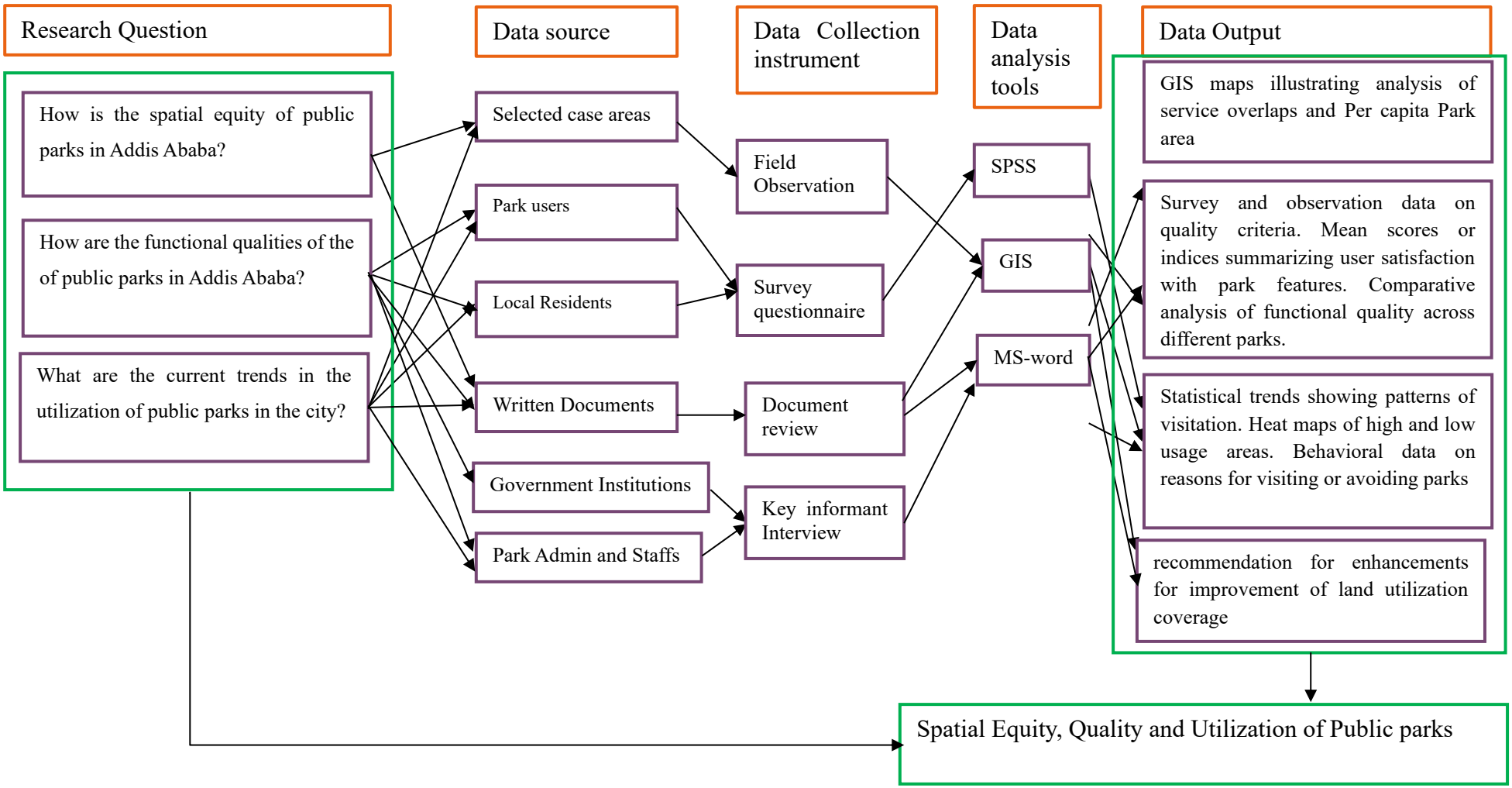


Figure 3.5 Methodological framework of the research

Chapter Four : Results and Discussion

This chapter presents the findings of the study, followed by an interpretation of the results in relation to the research objectives. The chapter is organized to address each specific objective, integrating data from various analyses, including spatial, functional, and utilization assessments. The discussion connects these findings to relevant literature, highlighting both consistencies and contrasts. Resilient and Sustainable Green space Planning and development

4.1 Results

4.1.1 Socio-demographic characteristics of Respondents

Socio-demographic characteristics of Park Users

The survey results revealed variations in the demographics of park visitors (Table 4.1). Sex distribution in Yeka Park, 60% of visitors were male and 40% were female. Lideta Park had a higher proportion of male visitors (72.3%) compared to female visitors (27.7%). Sheger Park demonstrated a relatively balanced distribution, with male visitors for 57.1% and female visitors 42.9%.

The age distribution of respondents was categorized into four groups: Young (15-24), Young Adult (25-40), Adult (40-60), and elderly (above 60 years). In Yeka Park visitors were predominantly young (15-24 years) at 40%, followed by young adults (25-40 years) at 34%. Lideta Park had a similar trend, with visitors aged 25-40 (36.2%) and 15-24 (29.8%) being the most represented. In Sheger Park, the majority of visitors (38.1%) fell in the 15-24 age group. Marital status data showed that Yeka Park 66% of the visitors were single, followed by married individuals (26%). Lideta Park had a slightly lower proportion of single visitors (51.1%), while Sheger Park reported 57.1% of visitors as single. Educational status was highest in Yeka Park, where 62% of visitors held a degree or higher. In Lideta Park, 42.6% of visitors had achieved this education level, and in Sheger Park, the figure was 42.9%.

For residential proximity in Lideta Park, where 34% of visitors lived within 400 meters, followed by 31.9% between 400 m and 1 km. In Sheger Park, 31% of respondents also resided within 400 meters. Regarding on Marital Status in Yeka Park, 66% of visitors were single, while married

accounted for 26%. Lideta Park had a similar trend, with 51.1% of visitors and Sheger Park has a high percentage of single visitors (57.1%). Married accounted for 40.5%.

Table 4.1 Socio-demographic characteristics of the respondents

Characteristics	Sub-group	No of the respondents (%)					
		Yeka Park		Ldeta Park		Sheger Park	
		Visitors	Residents	Visitors	Residents	Visitors	Residents
Sex	Male	60	45	72.3	64	57.1	69
	Female	40	55	27.7	36	42.9	31
Age	15-24	40	18	29.8	48	38.1	33
	25-40	34	48	36.2	31	33.3	33
	41-55	20	14	23.4	14	23.8	21
	56+	6	20	10.6	7	4.8	13
Marital status	Married	26	43	44.7	38	40.5	45
	Single	66	48	51.1	62	57.1	53
	Divorced	8	9	4.3	0	2.4	3
Educational status	Primary/secondary	18	36	25.5	38	35.7	50
	University/College	20	18	31.9	21	21.4	14
	Degree & above	62	46	42.6	41	42.9	36
Distance from home	<400m	13.7	-	34.0	-	31.0	-
	400m-1000m	25.5	-	31.9	-	40.5	-
	1km-5km	39.2	-	23.4	-	23.8	-
	>5km	19.6	-	10.6	-	4.8	-

Source: Computed by Author (2024)

Socio-demographic characteristics of households

Among residents in Yeka Park, sex distribution showed 45% were male, and 55% were female. Lideta Park residents were 64% male and 36% female, while Sheger Park 69% of the residents were male compared to females (31%). Age distribution for residents was more evenly spread in Yeka Park, with 48% falling in the 25-40. Lideta Park 48% were in the 15-24. In Sheger Park, the 25-40 and 15-24 groups each represented 33%.

In terms of marital status, single individuals constituted 48% of residents in Yeka Park, while married individuals for 43%. Lideta Park had 62% of residents as single, with Sheger Park showing

a similarly high percentage of single (53%). Educational status revealed that 46% in Yeka Park held a degree or higher, compared to 41% in Lideta Park and 36% in Sheger Park.

4.1.2 Spatial Equity of public parks in Addis Ababa

4.1.2.1 Public Parks distribution in Addis Ababa

This study looks at urban public parks in Addis Ababa at the city, sub-city, and Woreda levels; the catchment areas and creation dates vary (Annex 2). According to the kernel density analysis (Figure 4.1), parks in 2014 were highly concentrated in the inner-city core of Addis Ababa, with seven parks forming the highest-density cluster. A secondary high-concentration zone was observed in the northwestern part of the intermediate zone. Medium Park density extended to select areas within the intermediate zone, while the peripheral zones of the city were underserved, with only one park identified.

Before 2014, just 0.1405% were available. After 2014, around 1.4245% of the land was allocated to establishing new parks, including three city-level, five sub-city-level, and two Woreda-level parks. The Table (Annex 2) shows that in 2024, public parks occupy 676.10ha, or almost 1.5650%, of the city's total area. In the inner-city zone, four new parks were added, including two major city-level parks were added: Unity Park and Friendship Park, which further solidified this zone as the highest-density hotspot (Figure 4.1).

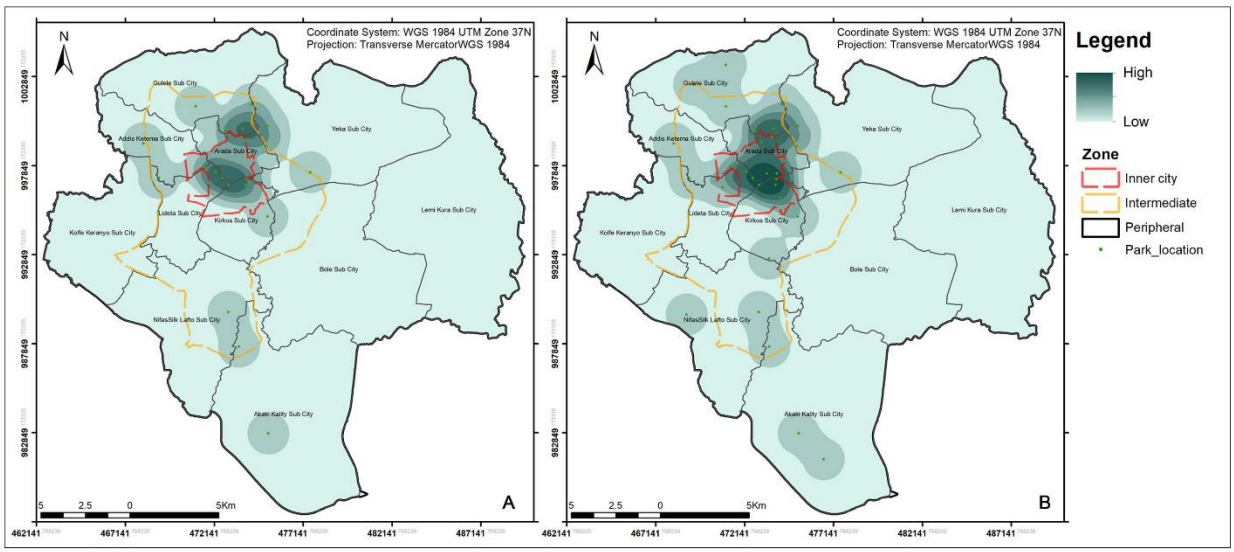


Figure 4.1 Kernel Density map of parks. (A) 2014, (B) 2024

Additionally, three parks were established in the peripheral zones. These include Entoto Park in Gullele Sub-city to the north, Kentiba W/Tsadik Park in Nifas Silk Subcity to the southwest, and Akaki Park to the south. However, no significant changes were noted in the western and eastern parts of the city, such as Kolfe and Lemi Kura Sub cities, which remain relatively underserved areas despite being newer settlements.

Furthermore, the study examined how urban land was allocated to public parks at the three tiers of government in the city, and it observed significant variation (Table 4.2). According to Table 3, sub-city-level parks received about 0.09% of all public parks' land, followed by city-level parks with 0.0368% prior to 2014. However, after 2014, city-level parks increased to 1.3866% due to the establishment three parks at the city level, five at the sub-city, and two at the Woreda level parks. Hence, both Sub-city and Woreda levels of parks experienced an increase in land allocation to 0.0347% and 0.0032%, respectively. The Table further illustrates that Addis Ababa's Park areas increased by 1.2840% in 2024.

Table 4.2 Land coverage of parks at the three spatial scales in Addis Ababa

No	Spatial Scales Park	Total percentage coverage	
		Before 2014	After 2014 (in 20124)
1	City	0.0368%	1.3866%
2	Sub-city	0.0910%	0.0347%
3	Woreda	0.0127%	0.0032%
	Sum	**0.1405%**	**1.4245%**

4.1.2.2 Park service areas and their overlaps

The GIS analysis divided the city into varying degrees of access to public parks, ranging from areas with no park service to areas with access to multiple parks (Figure 4.2). The results (Table 4.3) reveals disparities in park service coverage both across the city as a whole and focusing on residential blocks. A 16.3% or 7027.76 ha of the city and 28.2% of residential parcels (6194.85 ha) lacks any park service. Areas with access to only one park account for 10.8% of the city's land area

(4633.06 ha) and 7.2% (1578.6 ha) of the total residential land, while 13.6% of the land (5837.97 ha) and 10.3% (2253.93 ha) of residential parcels is covered by the service areas of two parks.

Three and four parks make up 10.6% (4576.13 ha) and 10.3% (4415.68 ha) of the city's land, respectively. In terms of residential parcels with access to three parks represent 8.8% (1929.58 ha), and those with access to four parks constitute 9.3% (2036.79 ha). Such lower overlaps in park areas are located in the southern and eastern part of the city (Figure 4.3).

Table 4.3 No. of park service areas overlaps and their coverage

No. of park service	park service areas (ha)							
	In terms of City-wide coverage				In terms of Residential block			
	Zone-1	Zone-2	Zone-3	Total	Zone-1	Zone-2	Zone-3	Total
No park	-	-	-	7027.76	-	-	-	6194.85
1 park service	-	-	4608.1	4608.1	-	-	1352.0	1352.0
2 parks	-	14.8	5815.5	5830.3	-	-	2163.7	2163.7
3 parks	-	42.0	4528.9	4570.9	-	16.5	1895.1	1911.5
4 parks	-	269.9	4145.8	4415.6	-	91.0	1945.8	2036.7
5 parks	-	1243.4	2066.5	3309.8	-	615.3	702.8	1318.0
6 parks	-	706.6	1107.0	1813.5	-	358.5	238.9	597.36
7 parks	-	670.3	2512.4	3182.7	-	446.3	936.0	1382.2
8 parks	-	633.9	525.3	1159.1	-	433.8	170.5	604.37
9 parks	-	750.8	158.9	909.75	-	444.4	87.2	531.56
10 parks	0.0	1209.2	18.9	1228.0	-	836.5	8.7	845.19
11 parks and	1272.0	2985.3	675.0	4932.3	342.8	2044.8	324.3	2711.9

Source: computed by the author (2024).

Higher overlaps in park services such as areas with access to five parks constitute 7.7% (3309.84 ha) of the land, six-park overlaps cover 4.2% (1813.59 ha). Whereas five-park overlaps account for 6.0% (1318.06 ha) of residential land, while six-park overlaps covering 2.7% (597.36 ha).

Parcels with seven-park overlaps account for 7.4% (3182.75 ha), and those with eight-park overlaps represent 2.7% (1159.17 ha). The highest overlaps access to nine parks or more are

relatively rare but still significant and are located in the northern part of the city (Figure 4.2). Nine-park overlaps cover 2.1% of the city's land (909.75 ha), ten-park overlaps account for 2.9% (1228.01 ha), and areas with eleven or more overlapping parks constitute 11.5% (4932.32 ha) of the city. In terms of residential blocks access to nine parks make up 2.4% (531.56 ha), ten-park overlaps cover 3.8% (845.19 ha), and parcels with eleven or more park overlaps represent 12.3% (2711.9 ha) (Table 4.3).

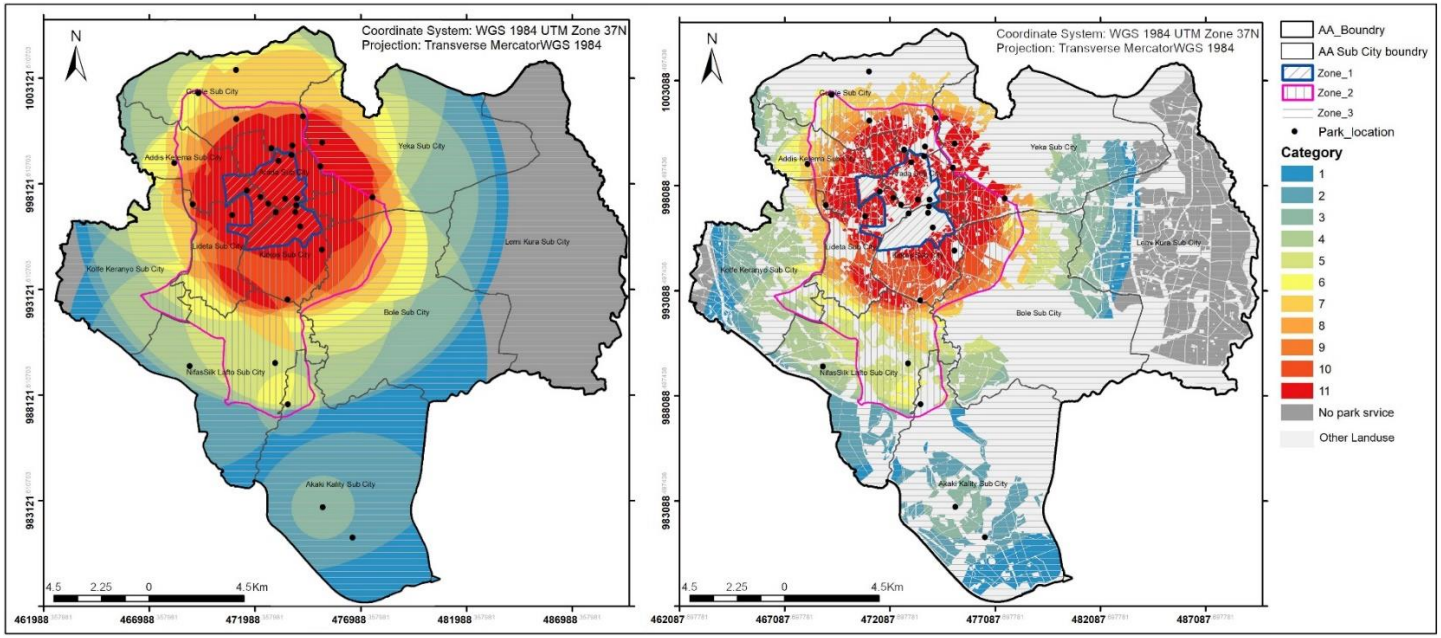


Figure 4.2Park service areas and their overlaps (A) City wide; (B) With respect to residential block

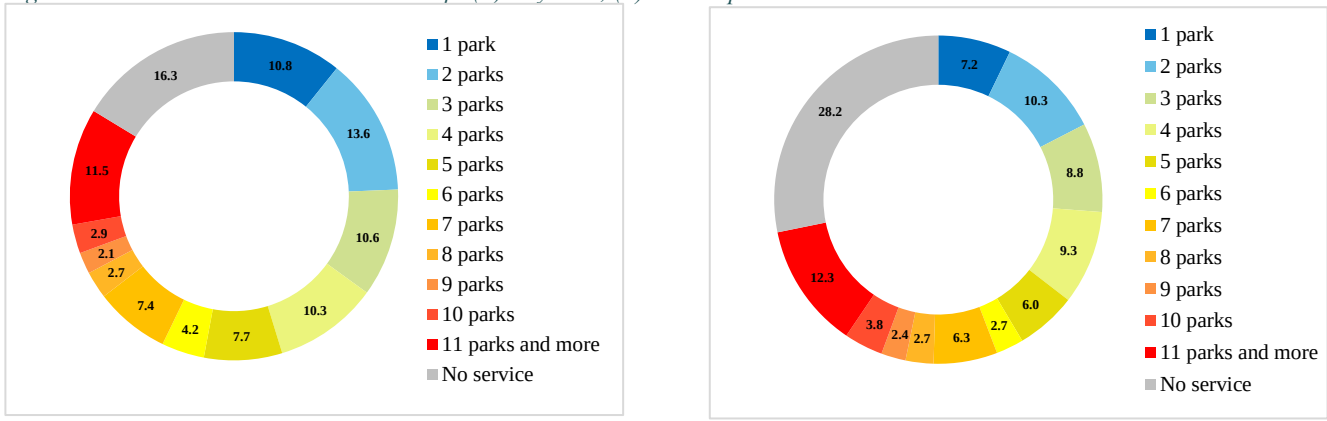


Figure 4.3 Percent coverage of Park service area overlaps. (A) City wide; (B) With respect to residential block

The GIS analysis also reveals spatial variations in park accessibility across the three major zones: Zone 1 (inner zone), Zone 2 (intermediate zone), and Zone 3 (outer zone). Regarding on City-Wide perspective, every area of Zone 1 benefits from overlapping service areas of eleven or more parks. This ensures reliable accessibility in the inner city (Figure 4.4).

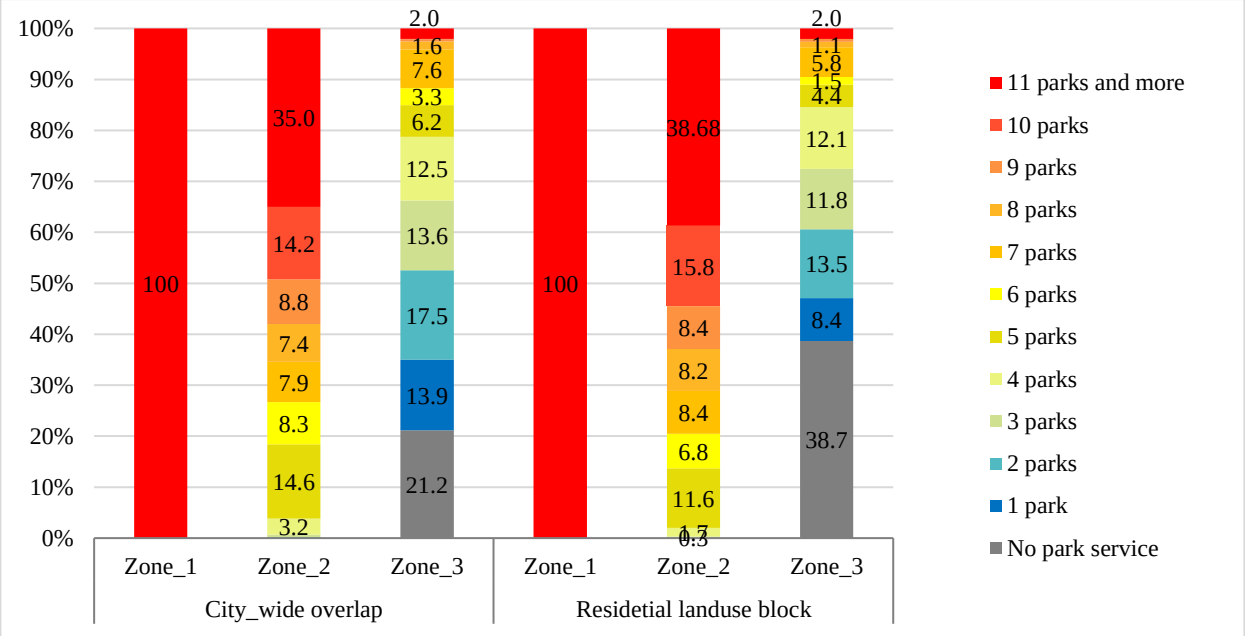


Figure 4.4 Percent coverage Park service area overlaps based on the three major zones

In Zone 2, 14.6% has access to five parks, while 14.2% also experience service overlaps of 10 parks, seven parks (7.9%), and six parks (8.3%). However, some areas have minimal access, with smaller overlaps such as two parks (0.2%) or no park access. In Zone 3 it sharply declines with 21.2% of the zone has no park service, while 17.5% has access to only two parks. Overlap of more than four parks is rare, with 13.6% accessing three parks and 0.1% having access to 10 parks.

When focusing on residential land use only, the disparities become even higher. Zone 1 achieves 100% access to 11 or more parks. In Zone 2, residential areas exhibit better access compared to the city-wide average. The highest proportion (15.8%) of residential areas benefits from 10 parks. 11.6% also have access to five parks and 8.4% seven parks. In contrast, Zone 3 indicates accessibility challenges for residential areas. 38.7% of residents live in areas with no park service, and 13.5% only have access to two parks. Access diminishes further, with 0.1% benefits from 10 parks.

4.1.2.3 Per-capita access to parks

The analysis of per-capita access to parks in Addis Ababa (Figure 4.3) shows the variation in access to green spaces across both city-wide and in residential parcels. Across the city, the results show that 16.3% of the total land area (7027.76 ha) falls under zones with no park access located on western part of the city. Per-capita access ranging from 0-2 m² cover 17.7% of the land (7625.66 ha), representing minimal access viewed on the southern part of the city (Figure 4.5). Areas with 2-5 m² of per-capita access constitute 16.5% of the city (7104.6 ha), while 11.6% of the land (4993.42 ha) provides 5-9 m² per person (Figure 4.6).

Land with higher accessibility is concentrated on the norther part of the city (Figure 4.5), between 9-15 m², covers 15.3% of the total area (6588.51 ha). The highest category of access, 15-31 m² per person, represents 22.5% of the city's land area (9686.08 ha), suggesting that a relatively small fraction of the city enjoys optimal park access (Table 4.4,Figure 4.6).

Table 4.4 Per-capita access to parks

Per-capita access to the parks	Areas (ha)							
	In terms of City-wide coverage				In terms of Residential block			
	Zone-1	Zone-2	Zone-3	Total	Zone-1	Zone-2	Zone-3	Total
No service	-	-	7027.76	7027.76	-	-	6196.85	6196.84
0-2	-	-	7625.66	7625.66	-	-	2492.65	2492.65
2-5	-	296.81	6807.6	7104.6	-	106.53	3075.7	3182.31
5-9	-	841.17	4152.25	4993.42	-	612.64	2125.71	2738.35
9-15	-	3163.12	3361.19	6588.51	-	1990.55	881.57	2872.12
15-31	1272.01	4905.06	4780.99	9686.08	342.79	2577.31	1584.04	4500.14

When focusing on residential blocks 28.2% of residential land (6196.85 ha) has no park service, which is significantly higher compared to the overall city-wide figure. Areas with 0-2 m² of per-capita access constitute 11.3% of residential parcels (2492.65 ha), while 14.5% of the residential land (3182.31 ha) provides 2-5 m² per person.

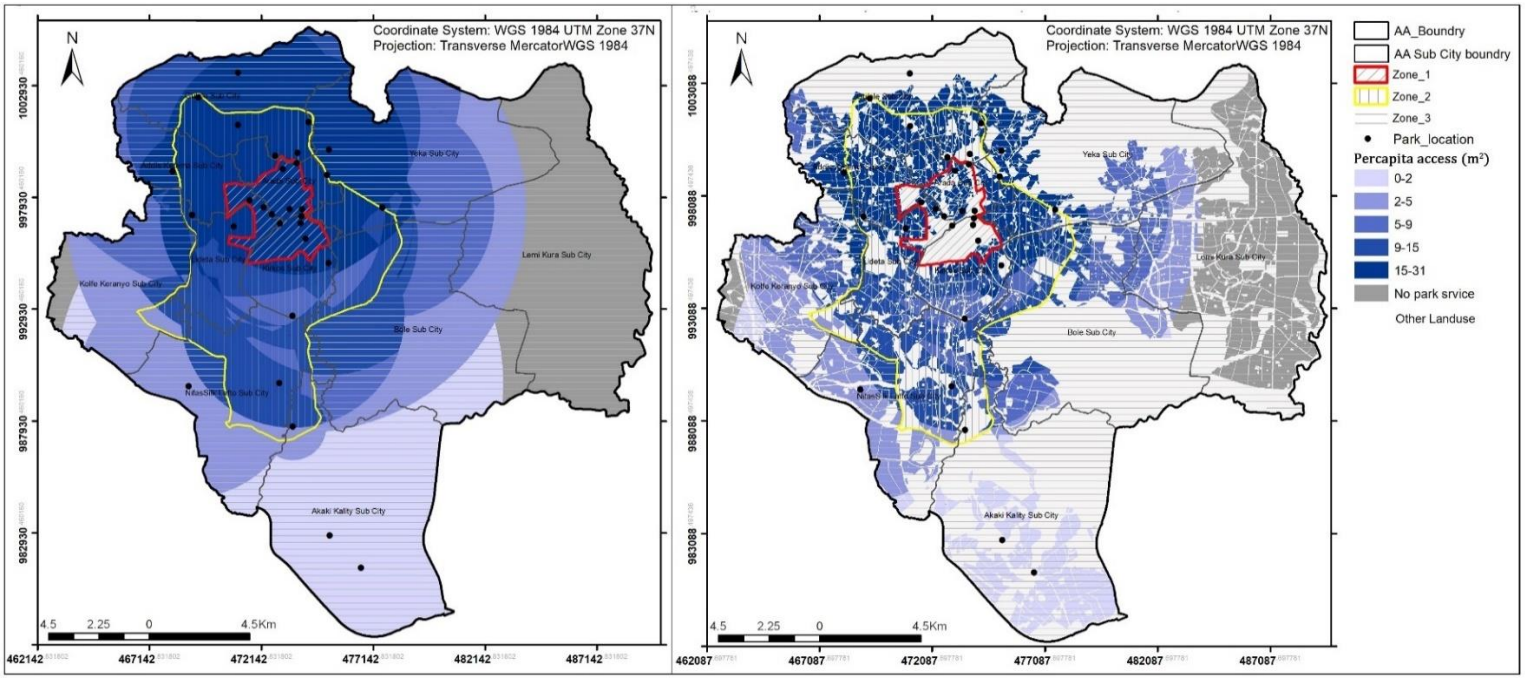


Figure 4.5 Per-capita access to parks (A) City wide; (B) With respect to residential block

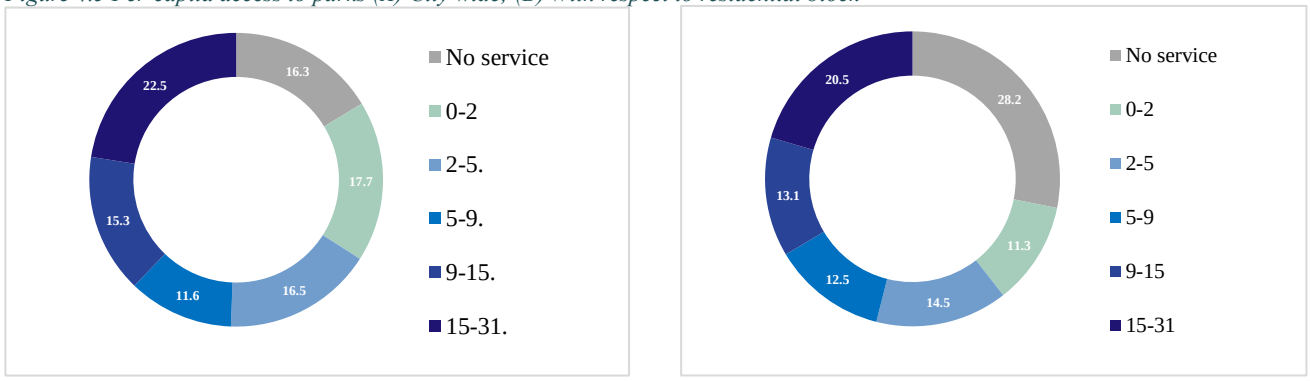


Figure 4.6 Percent coverage of. Per-capita access to parks. (A) City wide; (B) With respect to residential block

Parcels with access between 5-9 m² account for 12.5% (2738.35 ha), and those with 9-15 m² cover 13.1% (2872.12 ha) of residential areas. The highest level of access, 15-31 m², is available in 20.5% of residential parcels (4500.14 ha), which is slightly lower than the city-wide.

The analysis also shows variations (Figure 4.7) among the three zones. Zone 1 demonstrates the highest levels of park accessibility, with 100% of its area falling within the 15-31 m² per capita. In contrast, Zone 2 shows moderate access with 53.3% of its area achieved the highest per capita range. 34.4% are in the 9–15 m² and 5–9 m² (9.1%) ranges. Zone 3 shows the lowest per capita access, with only 14.2% of its area in the 15–31 m² range and a considerable portion falling below 9 m², including 20.2% in the 2–5 m² category and 22.5% with less than 2 m².

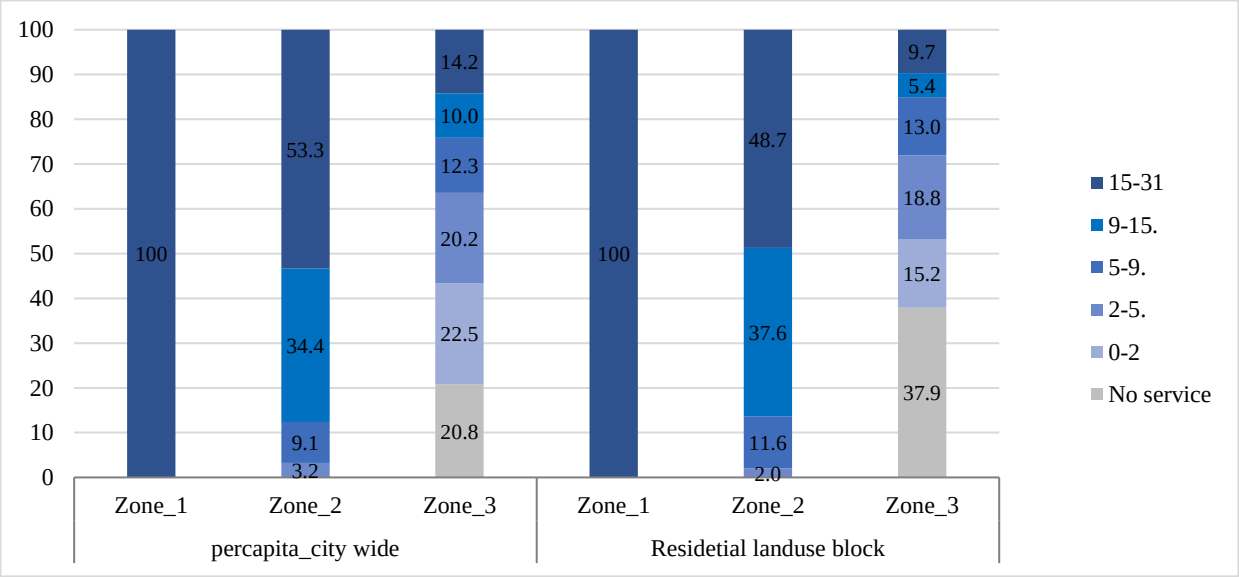


Figure 4.7 Percent coverage of Per-capita access to parks based on the three major zones.

A similar trend is observed within residential land use blocks. Zone 1 maintains superior access, with all blocks achieving over 15 m² per capita. Zone 2 fares moderately, with 48.7% of its blocks in the highest category, 37.6% fall into the 9–15 m² and 5–9 m² (11.6%) ranges. In Zone 3 only 9.7% is in the highest range, and a majority (18.8% and 15.2%) within the 2–5 m² and 0–2 m² categories, respectively.

4.1.3 Functional qualities of public parks in Addis Ababa: emphasis on the selected Sub-city level parks

4.1.1.1 Spatial Arrangement

Based on observations, the spatial arrangement of Ldeta Park is relatively well-structured. The park is characterized by a clear layout with most programs and facilities situated in a logicaly. For instance, there are distinct entrances for vehicles and pedestrians which avoid congestion. When entering through the main entrance, users are greeted by a fountain surrounded by seating areas. It created a welcoming atmosphere and also served as a transitional zone to proceed other areas of the park. The spatial adjacency within Ldeta Park is also superior compared to Sheger and Yeka parks. The parking area and cafeteria are highly connected, and the amphitheater and aesthetic pool share good visual and physical connections. However, the children's playground lacks integration with other functions (Figure 4.8).

In contrast, the spatial arrangements of Yeka and Sheger parks are somewhat fragmented, lacking coherent zoning. For example, in Sheger Park covering 3.9 hectares, offers multiple entrances which facilitates access to various park sections. Though the sports field is disconnected from other facilities such as cafeterias. Additionally, the children's playground is isolated from other areas, preventing parents from engaging in activities while their children play. The park's pathways, characterized by two major paths. They span over 200 meters each intersected by minor paths. They lack seating benches limiting opportunities for visitors to rest and enjoy the surroundings. Nevertheless, certain minor paths are not simple, potentially causing user confusion (Figure 4.8).

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Figure 4.8 Spatial Arrangement of the parks (A) Yeka Park; (B) Lideta park; (C) Sheger park.

Source: Computed by the researcher

According to the interview made with Sheger park manager, the park also contains government building (CRRSA) that does not relate to the park which disturbs the activities in the park contradicting the basic objectives of a recreational space (Figure 4.8). Yeka Park, covering a total area of 2.4 hectares, also features two entrances, with only one access to the public. A major pathway dominates the site's navigation, extending from the entrance to the northeastern part, with minor pathways leading to dead ends equipped with seating benches. However, some minor paths around the southwest area (Figure 4.8) lack clarity, causing confusion for users.

The majority of the park's seating benches (75%) are positioned along the main pathway, while the remaining benches (26%) are not directly accessible from the path. The scattering of staff buildings affects the park's visual quality (Figure 4.9).



Figure 4.9 Staff building disturbing the visual quality (A) service block around walkway (B) scattered blocks

Based on the survey results Yeka Park, Ldeta Park, and Sheger Park reveal variations in user perceptions on the spatial arrangement. In Yeka Park, a majority of respondents rated it positively, with 48% rating it as very good and 16% as excellent. A smaller proportion of respondents rated it as acceptable (24%), while a combined total of 12% rated it as either poor (10%) or extremely Poor (2%) (Figure 4.10).

Ldeta Park, on the other hand, had a more mixed reception. 48.9% of respondents rated the spatial arrangement as acceptable, indicating a general sense of adequacy without being exceptional. However, 31.9% of respondents rated it as "Poor" and 2.1% as extremely Poor. Only 17% rated it as Very good, and a minimal 2.1% rated it as excellent.

Sheger Park received relatively balanced feedback. The largest group of respondents (35.7%) rated the spatial arrangement as acceptable followed by Poor (31%). A smaller percentage (23.8%) found it Very good or Excellent (7.1%), indicating that while some users are quite satisfied, a notable portion are less content. Additionally, 2.4% of respondents rated it as Extremely Poor (Figure 4.10).

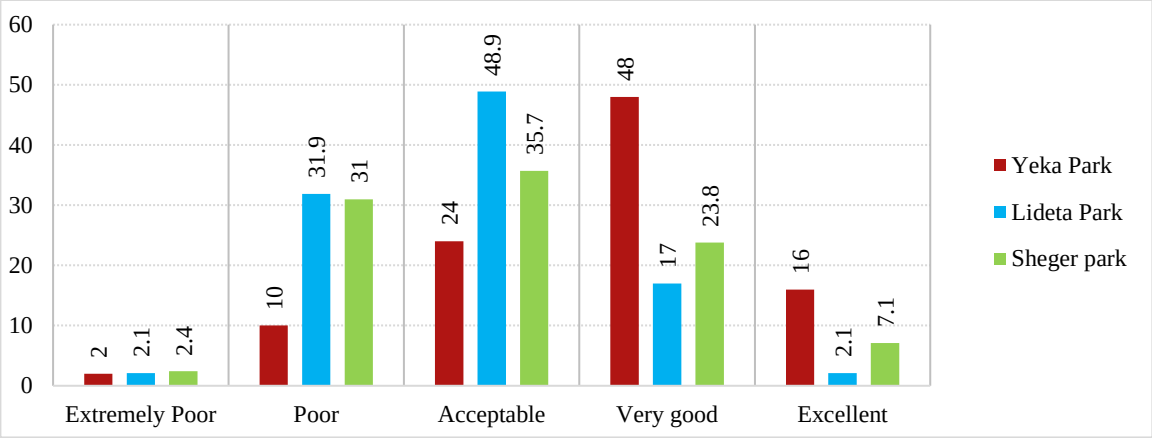


Figure 4.10 Perception of the respondents on the spatial arrangement of the park

4.1.1.2 Diversity of spaces within the park

The survey results on the diversity of space in Yeka Park indicate a moderate level of satisfaction. 20% of respondents rated the diversity as "Very good" and 4% rated it as "Excellent," a significant portion found it lacking, with 30% rating it as "Poor" and another 30% as "Acceptable" Notably, 16% rated it as "Extremely Poor". Ldeta Park's diversity of space received the most critical feedback among the three parks. A significant 31.9% of respondents rated it as "Extremely Poor" and 36.2% as "Poor." Only 25.5% rated it as "Acceptable," while a mere 6.4% considered it "Very good," and no respondents rated it as "Excellent." (Figure 4.11).

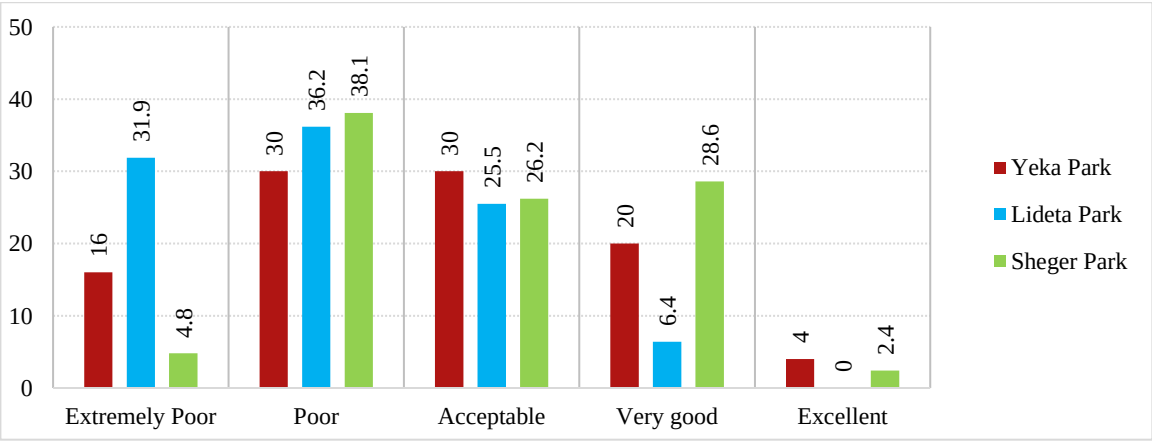


Figure 4.11 Perception of the respondents on the diversity of spaces within the park.

Sheger Park, in contrast, shows a more balanced distribution of responses. While 28.6% of respondents rated as "Very good," only 2.4% rated it as "Excellent." A larger portion found it

lacking, with 38.1% rating it as "Poor" and 26.2% as "Acceptable" Additionally, 4.8% rated it as "Extremely Poor".

4.1.1.3 Walkability

Based on field observation and interview made with park administration, the pathways in Sheger Park offer relatively good connectivity between various spaces. Steps have been introduced along the major routes to address the high slopes, facilitating easier navigation for users. However, some paths are hindered by serious obstacles that disrupt user circulation and create discontinuity. Additionally, the improper connection of junctions and the presence of very narrow, non-functional paths detract from the overall usability. Some pathways also lack clear definitions and destinations, further complicating navigation (Figure 4.12).



Figure 4.12 The condition of pathways in Sheger park. (A) Tree disrupting the circulation, (B) Steps to tackle the slope, (C) improper connection of junctions, (D) very narrow, non-functional paths.
Source: Site observation, Photo taken by the researcher, 2024

Similar to Sheger Park, the pathways in Ldeta Park also provide good connectivity and ease of navigation throughout the site. The paths are simple, well-defined, and equipped with appropriate signage, making it easier for new users to navigate. There are seating areas along the paths for users to rest, and ramps are available to provide access for individuals with disabilities (Figure 4.13).



Figure 4.13 The condition of pathways in Ldeta park. (A) ramps around main entrance, (B) Signage (C) Seating bench around fountain, (D) Seating benches along the path
Source: Site observation, Photo taken by the researcher, 2024

In contrast, Yeka Park offers poor connectivity for users, characterized by high fragmentation and dead ends without functional purposes. Interview conducted with the park gardeners and observation indicated that much of the site is inaccessible due to the lack of proper pathways, leading to underutilization of various spaces. Additionally, informal user footpaths to some areas need better pathway design and connectivity.



Figure 4.14 The condition of pathways in Yeka Park. (A) informal footpaths (B) Disrupted pathways
Source: Site observation, Photo taken by the researcher, 2024

As the questionnaire survey result showed, 4.0% of Yeka Park users rated the pathways as extremely poor, and 20% rated them as poor, indicating significant dissatisfaction. However, 44% found them acceptable, while 30% rated them as very good, and 2% rated them as excellent. These ratings suggest a mixed perception, with users recognizing enhancement.

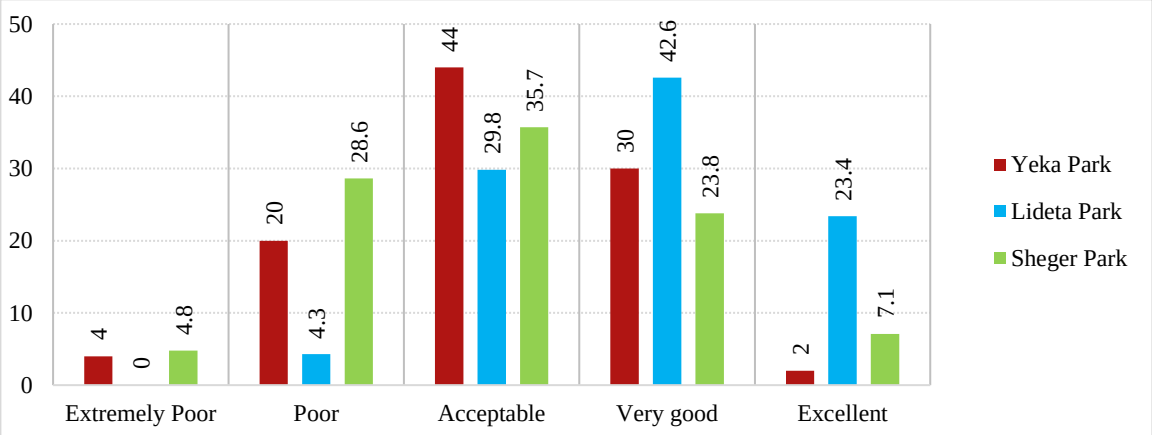


Figure 4.15 Perception of the respondents on the walkability

Ldeta Park received positive feedback. None of the respondents rated as extremely poor. Instead, 29.8% found them acceptable, a substantial 42.6% rated them as very good, and 23.4% considered them excellent. Where as in Sheger Park, 4.8% of respondents rated as extremely poor and 19.0% rated them as poor, indicating some dissatisfaction. 33.3% found it acceptable, while 35.7% rated them as very good, and 11.9% excellent (Figure 4.15).

4.1.1.4 Flexibility

As indicated in the Figure 4.16, Yeka Park received relatively low ratings for flexibility. About 24% considered it Poor. The majority, 56%, found the park's flexibility to be Acceptable, indicating moderate satisfaction. However, only 20% of respondents rated the flexibility as Very Good, and no respondents rated it as Excellent.

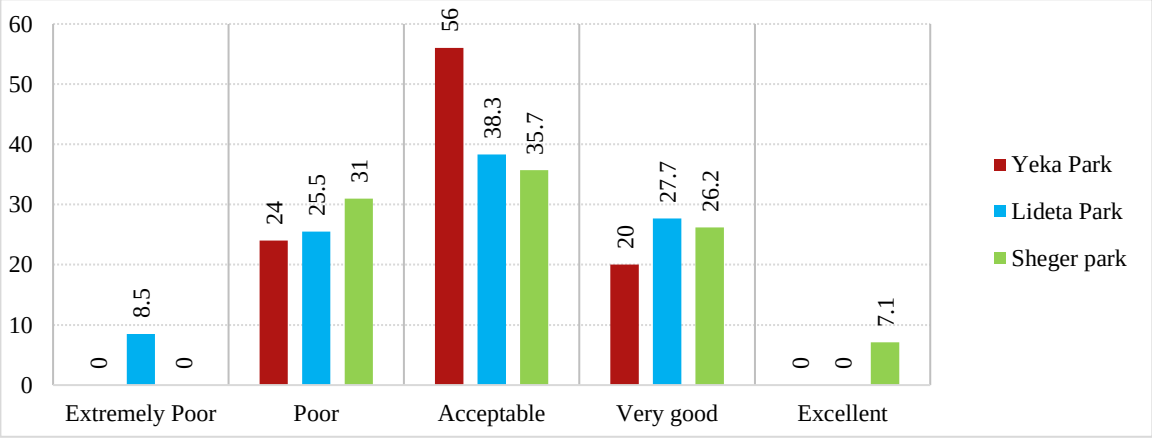


Figure 4.16 Perception of the respondents on flexibility of spaces within the parks.

In contrast, Lideta Park received better ratings for flexibility. A small portion (8.5%) rated it as Extremely poor, but the majority rated the park as Acceptable (38.3%) or Very good (27.7%). Sheger Park also performed well. None of the respondents rated it as Extremely Poor . About 35.7% rated its flexibility as Acceptable, while 26.2% considered it Very Good and 7.1% rated it as Excellent. These ratings indicate that Sheger Park offers considerable adaptability.



Figure 4.17 Flexible space for various public events in sheger park.

4.1.1.5 Inclusivity

According to the interview made with park manager of Yeka Park, it struggles to cater diverse users due to limitations in facilities. The survey data also reveals 18% of respondents in Yeka Park rated inclusivity as Extremely Poor, while nearly half (48%) considered it Poor. Only 26% rated it as Acceptable, and a small proportion (8%) as Very Good. No respondents rated as Excellent.

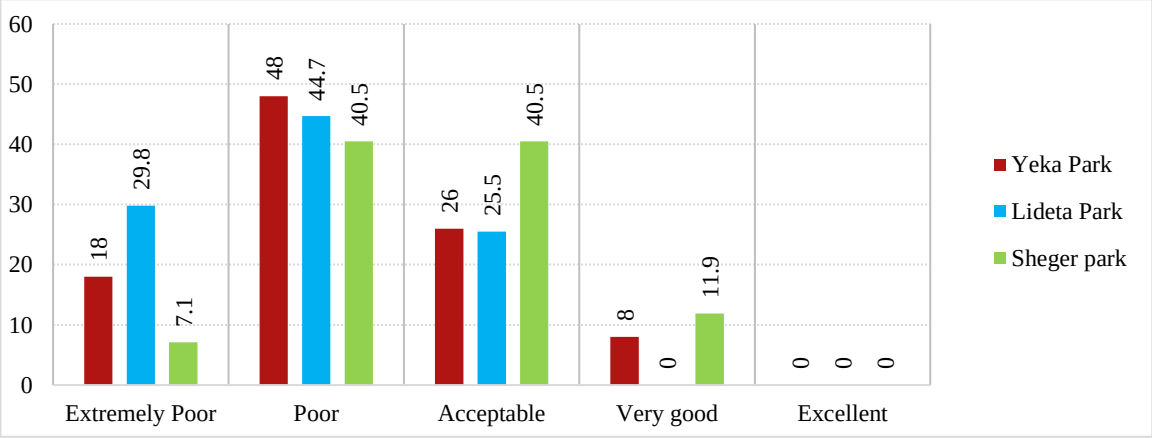


Figure 4.18 Perception of the respondents on Inclusivity of the parks.

Lideta Park also faces substantial challenges in providing an inclusive environment. Ratings for Lideta Park were also suboptimal as 29.8% of respondents rated it as Extremely Poor, and 44.7% as Poor. About 25.5% rated it as Acceptable, and no respondents rated it as Very Good or Excellent.



Figure 4.19Recreational facilities in Sheger park (A) children play ground; (B) Game zone for adults

Sheger Park performed slightly better than the other two parks but still displayed notable gaps in inclusivity. 7.1% of respondents rated as Extremely Poor, while 40.5% rated it as Poor. An equal 40.5% rated it as Acceptable, and 11.9% considered it Very Good. Interview with the park administration revealed that efforts have been made to enhance the park's inclusivity such as incorporating children play ground and game zone for adults (Figure 4.15) but these measures remain insufficient.

4.1.1.6 Safety and security

Based on the interview with Yeka Park manager and gardeners , Yeka Park faces different challenges in providing a safe environment. It has a history of crime in and around the park such as theft, looting, pick-pocket. some inter intervention is being made such as constructing security towers on key places and improving the attention related this matter. Informal activities such as smoking and chewing chat are also the challenges creating uncomfortable environment for the park users.

The questionnaire survey reveals negative feedback. 44% of respondents rated the park's safety as Extremely Poor, while 42% deemed it Poor. Only 14% considered it Acceptable, and no respondents rated as Very Good or Excellent. In Lideta Park, perceptions of safety and security were more favorable. No respondents rated it as Extremely Poor and 38.3% of respondents rated as Acceptable, while 42.6% rated as Very Good. These ratings indicate that Lideta Park is perceived as a relatively safe and secure compared to Yeka Park.

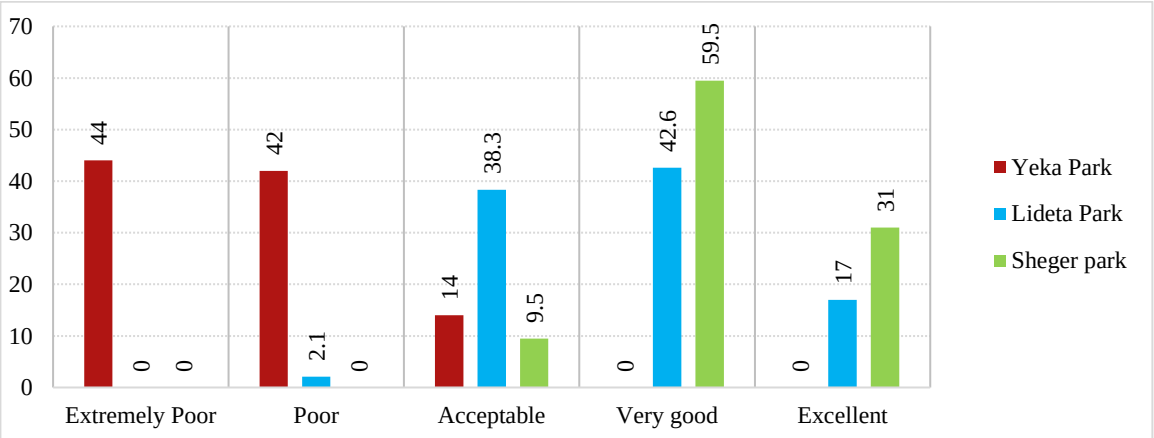


Figure 4.20 Perception of the respondents on the Safety and securuty

Sheger Park emerged as the safest among the three parks, with no respondents rating its safety as Extremely Poor or Poor. The majority (59.5%) considered it Very Good, and 31% rated it as Excellent.

4.1.1.7 Maintenance

Maintenance is a severe challenge for all three parks based on observation and interview conducted with park managers and gardeners, it heavily impacted its usability and overall appeal. Yeka Park received highly negative feedback regarding its maintenance with 58% of respondents rated it as Extremely Poor, and 36% rated it as Poor with no respondents giving ratings of Very Good or Excellent.



Figure 4.21Condition of the facilitates in the parks. (A)Broken bench (B) Fallen shade, (C) Outdated unfunctional bench (D)Disrupted pathway

Source: Site observation, Photo taken by the researcher, 2024

Lideta Park showed slightly better maintenance outcomes than Yeka Park but still faced considerable criticism. 14.9% of respondents rated its maintenance as Extremely Poor, while a substantial 48.9% rated it as Poor. No respondents rated it as Excellent. Sheger Park demonstrated the best maintenance ratings among the three parks, although challenges persist. 16.7% of respondents rated its maintenance as Extremely Poor, and 40.5% as Poor. Meanwhile, 33.3% found it Acceptable, and 9.5% rated it as Very Good.

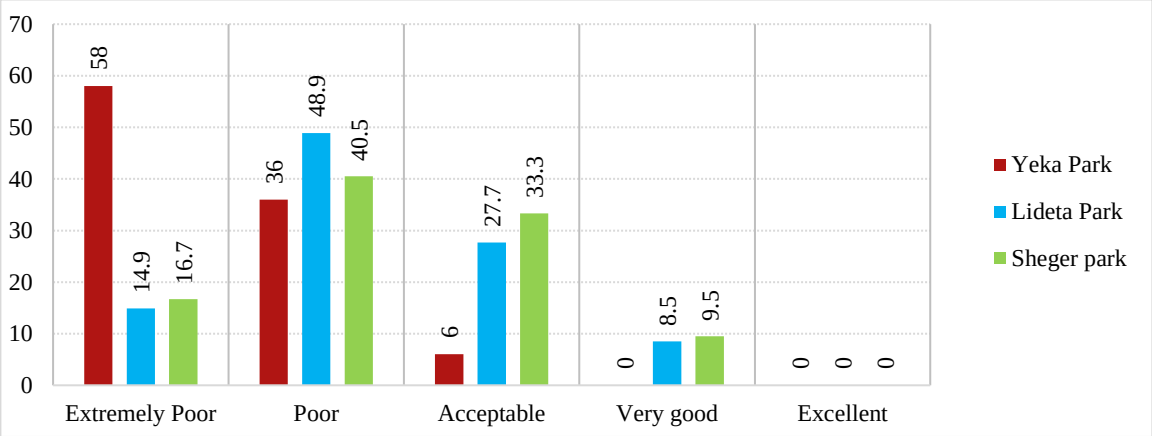


Figure 4.22 Perception of the respondents on the Maintenance of the parks

4.1.1.8 Cleanliness and Aesthetics

The perception of cleanliness and aesthetics in Yeka Park leans toward a less favorable evaluation. 32%, rated the park as "Poor," while 8% deemed it "Extremely Poor." Despite these negative evaluations, 42% of respondents found the park to be "Acceptable," and 16% of the respondents rated the park as "Very Good". In contrast, Lideta Park stands out with highly favorable evaluations. A majority of respondents, 55.3%, rated its cleanliness and aesthetics as "Very Good," while 36.2% rated it "Excellent." Only 8.5% of respondents found it "Acceptable," with no ratings of "Poor" or "Extremely Poor."

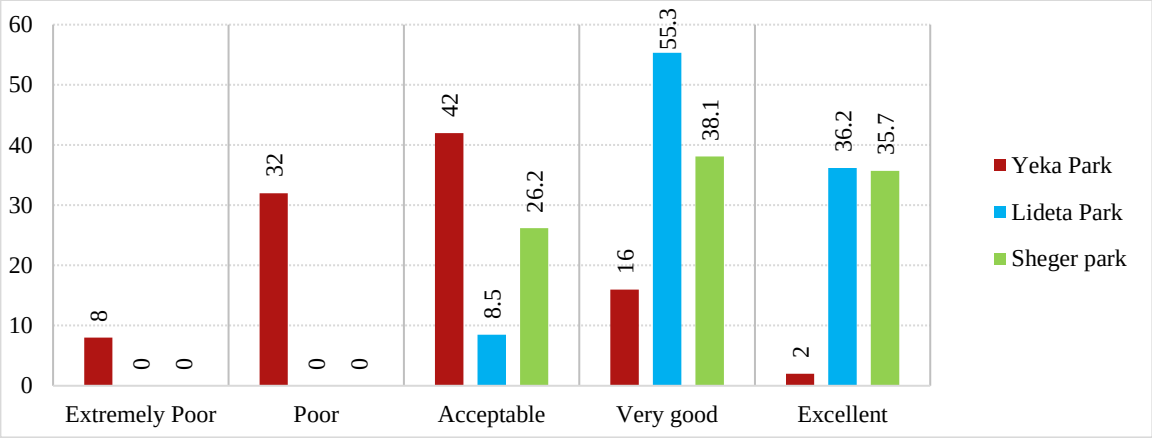


Figure 4.23 Perception of the respondents on the Cleanliness of the parks

Sheger Park also received a positive evaluation. 38.1% of respondents rated the park as "Very Good," and 35.7% deemed it "Excellent." However, 26.2% rated it as "Acceptable," some areas still require attention.

4.1.1.9 Comparison of Mean Scores on Functional Qualities

The mean scores of user responses regarding the eight functional qualities of the three parks reveal distinct strengths and weaknesses (Figure 4.24). Ldeta Park leads in spatial arrangement with a mean score of 3.81. Yeka Park follows closely with a score of 3.66, Sheger Park, with the lowest score of 3.02, indicates a relatively less satisfactory spatial arrangement.

In terms of the diversity of space, Sheger Park leads with a mean score of 2.86, reflecting a moderate level of satisfaction. Yeka Park's mean score is slightly lower at 2.66, while Ldeta Park scored the lowest at 2.06. Ldeta Park excels in walkability with a mean score of 3.85, whereas Yeka Park and Sheger Park score similarly, with mean scores of 3.06 and 3.00, respectively.

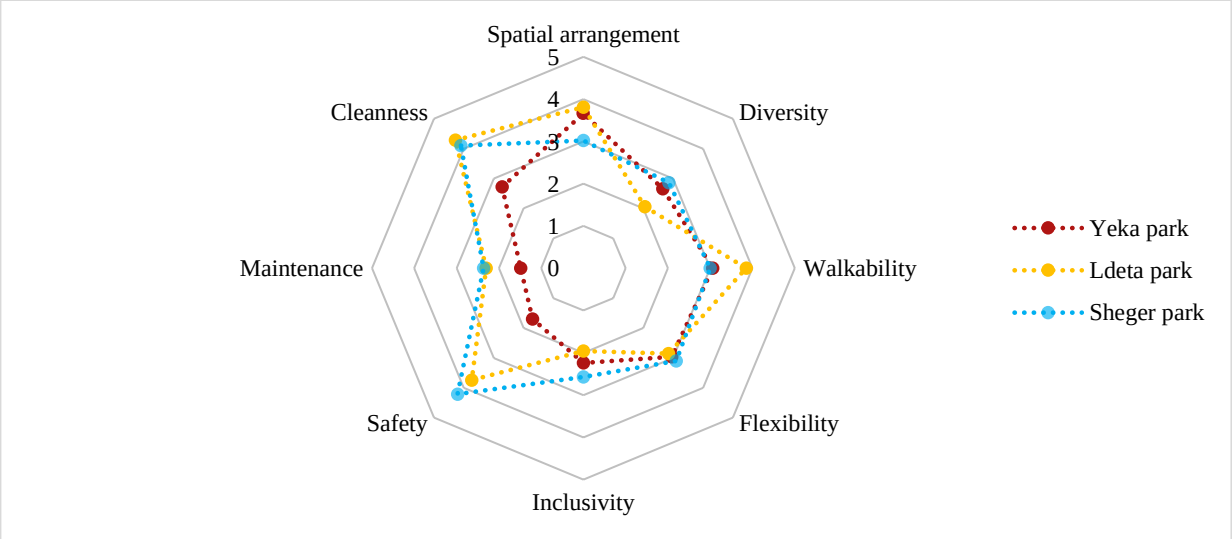


Figure 4.24 Comparison of mean scores on functional qualities

When it comes to flexibility, Sheger Park has the highest mean score of 3.1. Yeka Park's score of 2.96 and Ldeta Park's score of 2.85 suggest moderate levels of flexibility. Inclusivity is perceived as relatively low across all three parks, with Sheger park scoring the highest at 2.57. Yeka Park follows with a mean score of 2.24, and Ldeta park scores the lowest at 1.96 (Figure 4.24).

In terms of Safety and Security Sheger park stands out with the highest score for safety and security (4.21), reflecting well-implemented safety measures. Lideta park also performed well in this aspect, scoring 3.74, while Yeka Park lagged behind significantly with a low score of 1.7, highlighting safety concerns. Scores for maintenance were relatively low overall. Sheger Park scored slightly better (2.36), followed closely by Lideta Park (2.30).

Yeka Park received the lowest score (1.48), indicating inadequate maintenance practices. Lideta Park emerged as the cleanest park with the highest mean score (4.28), followed closely by Sheger Park (4.10). Yeka Park scored notably lower (2.72), indicating less satisfactory cleanliness conditions.

On the other hand, interview from executive manager of AAEPA indicate research is being conducted to give directions for the park administration which involves improvement on the quality of parks. The level of overall satisfaction varies significantly among the three parks (Figure 4.25). Yeka Park has the highest percentage of dissatisfaction, with 22% of respondents being

extremely not satisfied and 32% not satisfied. Only 8% reported being very satisfied, and none were extremely satisfied.

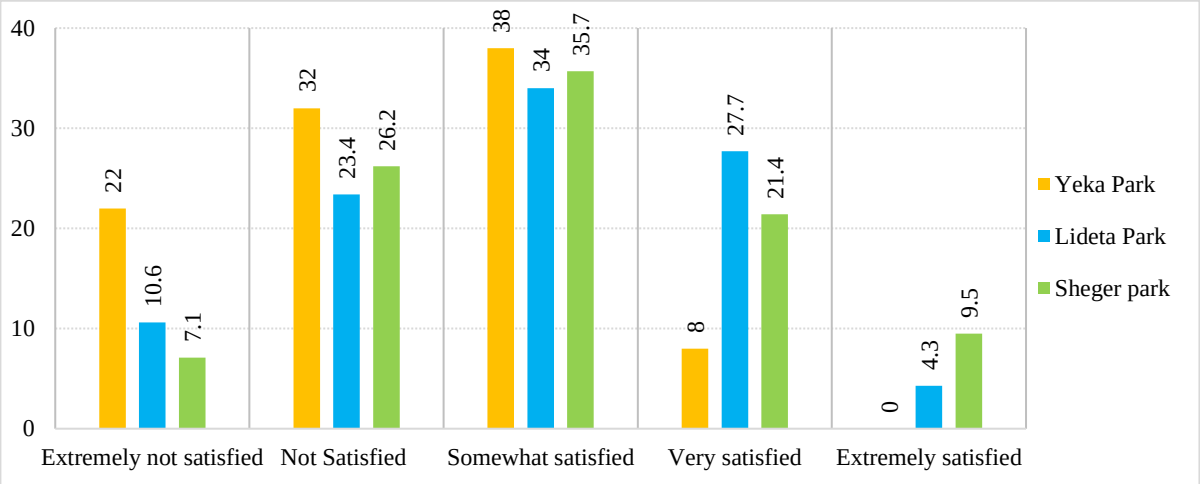


Figure 4.25 Overall satisfaction with the parks

In contrast, Lideta Park shows a more balanced satisfaction level, with 27.7% very satisfied and 4.3% extremely satisfied, while 34% were somewhat satisfied. Sheger Park has the highest proportion of satisfied users, with 21.4% very satisfied and *9.5% extremely satisfied, though 26.2% remained not satisfied. These results reflect varying perceptions of park quality and experiences among users.

4.1.4 The trend of public park utilization in the city

4.1.4.1 Activities in the Parks

Based on observations and mapping, the majority of activities in Ldeta Park are concentrated around the amphitheater and pathways, which are characterized by sitting benches and trees that create a cool environment. Users often choose these areas to sit and talk with their friends or families. According to the Kernel density analysis on GIS (Figure 4.27), the pathways fall under the moderate activity zone. The areas identified as high activity zones include the amphitheater, bookstore, coffee area, and the area around the shop (Figure 4.26). The amphitheater, which is adjacent to the pool, is a popular spot where people gather to experience the vibrant open space. Interview made with the park's administration the bookstore and coffee area attract high activity levels because many users spend their time reading books and enjoying the services offered by the coffee shop.



Figure 4.26 Ldeta park (a) walking path and sitting bench, (B) Amphitheater (C) Children play ground

Similarly, the area around the shop, with a few seats next to it, is also a high activity zone. This area is frequently visited by people meeting friends and chewing chat. However, interview with the Lideta park manager highlighted, these activities are not authorized and are considered informal, often causing discomfort to other users, especially children.

Contrarywise, areas such as the game zone, café, parking area, open field, playground, and densely vegetated regions fall under the low activity zone. The parking area is completely inactive because the vehicular entrance is not functional and remains closed all the time, preventing people with vehicles from parking there.

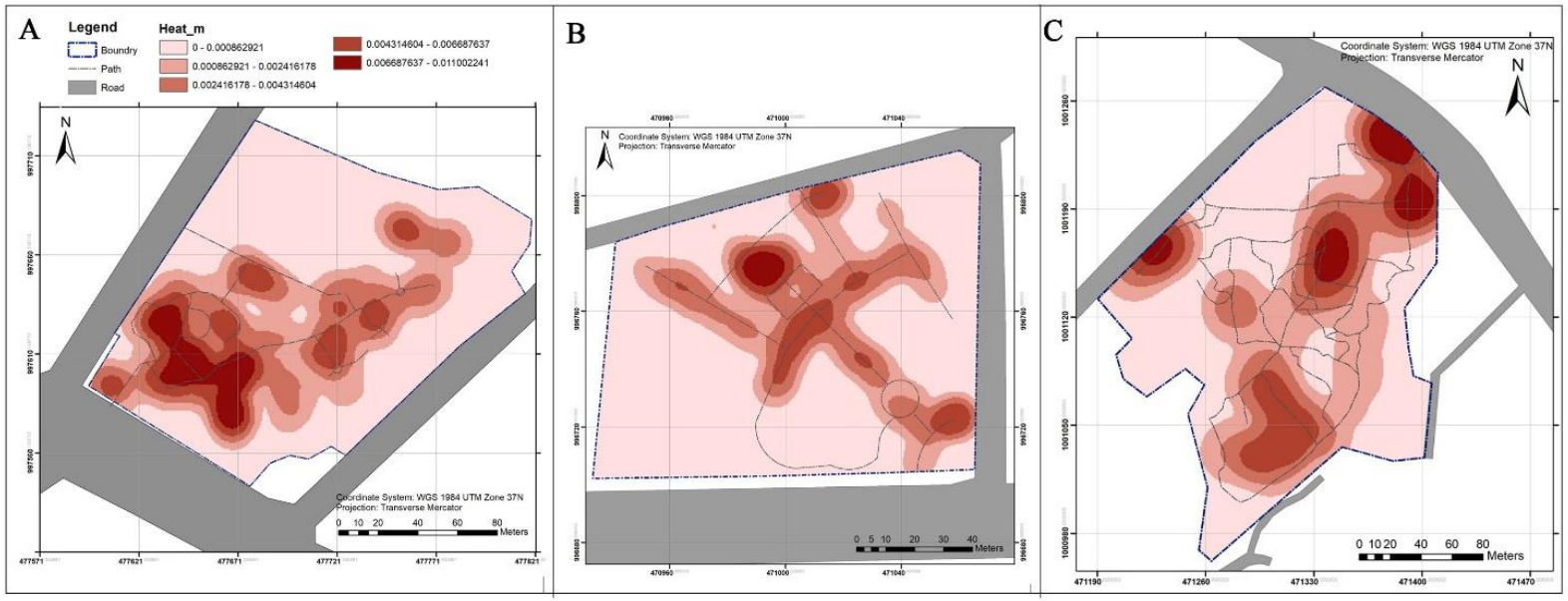


Figure 4.27 Park uses density map (A) Yeka Park, (B) Ldeta park (C) Sheger park

Table 4.5 Extent of land Utilized for reactional activities

Land utilization	**No of the respondents (%)**		
	Yeka Park	**Ldeta Park**	**Sheger Park**
Very poor	20	2.1	14.3
Poor	40	27.7	31.0
Acceptable	28	36.2	38.1
Very Good	10	29.8	14.3
Excellent	2	4.3	2.4

Similarly, the game zone and cafeteria are not operational, even though there is a high demand for these facilities among users. The children's playground is also a low activity zone due to substandard playing equipment and improper development.

In yeka park, the paved areas characterized by group benches, the children's playground, and the open field fall under the high activity zones where as the pathways fall under moderate activity zones. Conversely, areas adjacent to the river, around the fence. According to interview with Yeka park gardener, these zones are less frequently visited due to limited accessibility, lack of safety and cleanliness.



Figure 4.28 Yeka Park (A) Paved areas; (B) Adjacent to the river; (C) Children play ground

Kernel density map of Sheger park (Figure 4.27) shows the bookstore and cafeteria, game zone, sports field, children's playground, and open field are considered as high activity zones. These areas draw users due to the availability of engaging facilities, and appealing areas. The game zone and sports field cater to youth and sports enthusiasts. Pathways in the park fall under the moderate activity zones. Low activity zones are concentrated in densely vegetated areas, around the fence, adjacent to the river, and in high-sloped sections of the park. Interview with Sheger park manager and indicated that these areas remain underutilized due to their inaccessibility and lack of facilities.



Figure 4.29Sheger park (A) Game zone; (B) Children playground; (C) Open field

The perceived land utilization for recreational activities varied significantly between the parks (Table 4.5). Yeka Park received the most negative feedback, with 60% of respondents rating its utilization as "very poor" or "poor." Conversely, Ldeta Park garnered the most positive responses, with nearly two-thirds (66%) finding its land utilization acceptable or better. Sheger Park fell in the middle, with slightly more than half (45.3%) of respondents rating its utilization as poor or worse. This suggests that Ldeta Park offers the relatively better utilization of space for recreational activities, while Yeka Park require significant improvement in how its land caters to user needs.

On the other hand, the survey revealed underutilized areas in the parks. While no park had respondents report a significant issue with the entrance area, a substantial portion of respondents identified underutilization in other areas.

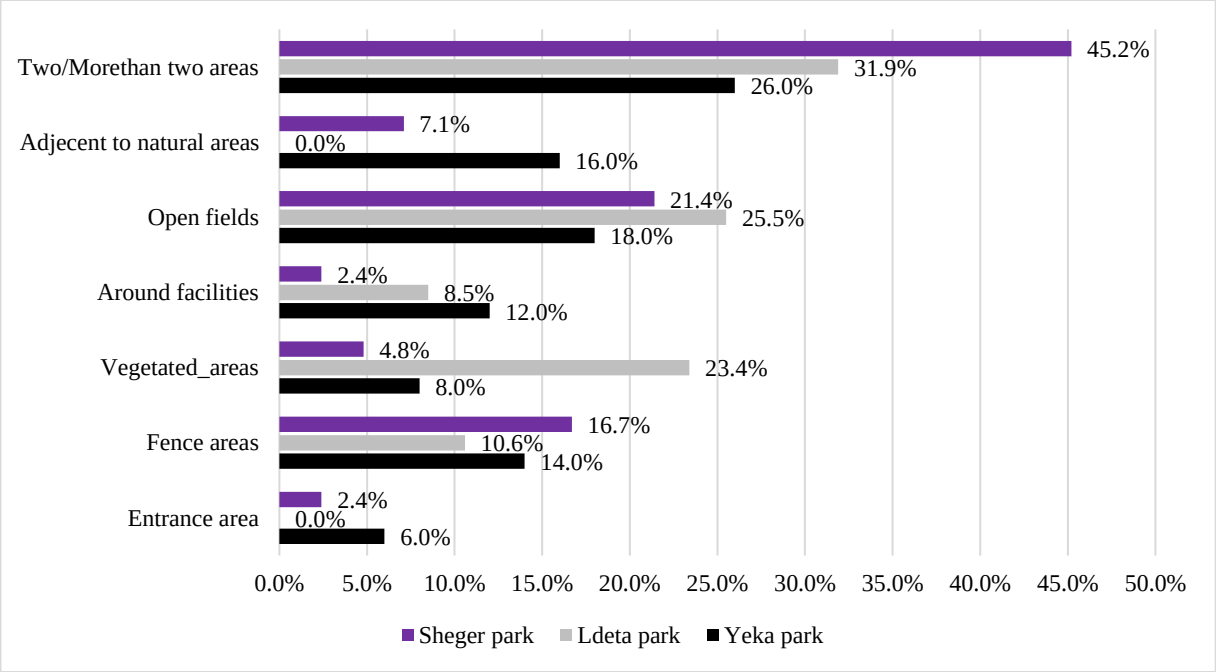


Figure 4.30 Respondents perception on underutilized areas within the parks

Fence areas were a concern in all parks, ranging from 10.6% to 16.7% of respondents perceiving them as underutilized. Vegetated areas were seen as underutilized in Ldeta Park (23.4%) and Yeka Park (8%), but not as much in Sheger Park (4.8%). Open fields, potentially prime locations for recreation, were underutilized in all parks (18% to 25.5%). Areas adjacent to natural areas were only a concern in Yeka Park (16%), suggesting a disconnect between natural features and visitor preferences. 26% to 45.2% of respondents in all parks identified two or more areas as underutilized,

4.1.4.2 Pattern of visit

The survey results indicate a distinct pattern in the days when users visit the parks. At Yeka Park, the majority of visitors, 70%, prefer to visit on weekends, with only 30% visiting during weekdays. This trend is similarly observed at Sheger Park, where 71.4% of users visit on weekends compared to 28.6% on weekdays. Where as in Ldeta Park more balanced distribution, though weekends still see a higher number of visitors (Table 4.6).

More over the time of visit reveals that mornings and afternoons are the most popular times across all parks: In Morning Lideta Park has the highest proportion (42.6%), followed by Sheger Park

(38.1%) and Yeka Park (34.0%). In the Afternoon Sheger Park is most visited (45.2%), followed by Yeka Park (38.0%) and Lideta Park (31.9%). Fewer visitors were recorded during mid-day and late afternoon in all parks, with Lideta Park slightly higher during late afternoon (14.9%).

Additionally, most respondents reported visiting the parks occasionally. 1-5 visits in the last 6 month are the most frequent category across all parks, with Lideta Park (36.2%) and Sheger Park (38.1%) slightly exceeding Yeka Park (44.0%) (Table 4.6). Whereas 5-20 visits, Sheger Park and Lideta Park both scored equally (38.1%) for this category, while Yeka Park had 24.0%. More frequent visits (20-50 visits) are higher at Yeka Park (20.0%) compared to the other parks, and more than 50 visits is least common, with Lideta Park leading (10.6%).

Table 4.6 Pattern of the visit by the park user

Characteristics	**Sub-group**	**No of the respondents (%)**		
		Yeka Park	**Ldeta Park**	**Sheger Park**
Day of visit	Weekdays	30.0	42.6	28.6
	weekends	70.0	57.4	71.4
Time of visit	Morning	34.0	42.6	38.1
	Mid-day	18.0	10.6	7.1
	Afternoon	38.0	31.9	45.2
	Late afternoon	10.0	14.9	9.5
Frequency of visit in the last 6 month	Not at all	0	0	0.0
	1-5	44.0	36.2	38.1
	5-20	24.0	27.7	38.1
	20-50	20.0	25.5	16.7
	More than 50	6	10.6	7.1
Length of stay in the park	< 30min	12.0	12.8	2.4
	30min-1hr	40.0	51.1	23.8
	1hr-2hr	30.0	23.4	47.6
	2hr-3	14.0	8.5	14.3
	More than 3hr	4.0	4.3	11.9

No of accompanies during visit	Alone	16.0	27.7	11.9
	1	36.0	42.6	23.8
	2-3	30.0	25.5	45.2
	More than 3	18.0	4.3	19.0

Source: Computed by the Author (2024)

In terms of Length of Stay Sheger Park is associated with longer stays compared to the other parks. The majority of respondents at Sheger Park stay for 1-2 hours (47.6%), the highest among the parks. 30 minutes to 1 hour is the most common duration for Yeka Park (40.0%) and Lideta Park (51.1%). A small percentage of visitors stay for more than 3 hours, with Sheger Park again leading (11.9%) compared to Yeka Park (4.0%) and Lideta Park (4.3%).

Visiting with one companion is the most common at all parks, with Lideta Park having the highest proportion (42.6%), followed by Yeka Park (36.0%) and Sheger Park (23.8%). Visitors in larger groups (2-3 people) are most frequent at Sheger Park (45.2%) and Yeka Park (30.0%), while Lideta Park is slightly lower (25.5%). Visitors who come alone are most common at Lideta Park (27.7%) compared to Yeka Park (16.0%) and Sheger Park (11.9%).

4.1.4.3 The relationship b/n frequency of visit with the Socio-demographic characteristics of the respondents

It was analyzed using cross-tabulation. The findings for three parks reveal notable trends. Such as Age in Yeka Park Young (aged 15-24) predominantly visit the park 1-5 times (60%). Middle-aged (aged 25-40) visit more frequently, with 35% reporting 20-50 visits and 6% visiting more than 50 times. The Adult and elderly show a higher frequency, with 56+ accounting for 33% of 20-50 visits and 67% of >50 visits. In Lideta Park the 15-24 age group has the largest share of 1-5 visits (50%). The 25-40 age group shows balanced visitation, with 41% visiting 5-20 times and 29% visiting 20-50 times. And 41-55, 55% visit the park 1-5 times. In Sheger Park the 15-24 age group tends to visit the park 5-20 times (44%) or 20-50 times (25%). The 25-40 age group reports the highest visitation, with 50% visiting 1-5 times and 36% visiting 5-20 times. Respondents aged 41-55 show a decline in visitation frequency, with 30% visiting 5-20 times and only 10% visiting >50 times.

In terms of sex in Yeka Park male visitors have a more even distribution with 20% visiting each category from 1-5 visits to >50 visits. Female respondents show a sharp decline in visitation as frequency increases, with 80% reporting 1-5 visits and no respondents reporting >50 visits Where as in Lideta park male visitors have a balanced visitation trend, with 32.4% reporting 1-5 visits and 14.7% reporting >50 visits. In Sheger Park: Male visitors are evenly distributed, with 41.7% visiting 5-20 times and 12.5% visiting >50 times and female respondents show a decline in higher frequencies, with 61.1% reporting 1-5 visits and 33.3% visiting 5-20 times (Figure 4.31).

On the other hand, marital status in Yeka Park: Married respondents are well-represented across all frequencies, with 31% visiting both 1-5 and 20-50 times. Single respondents visit 1-5 times (48%) and gradually decrease with increasing frequency. Divorced respondents show a distinct pattern, with 50% reporting >50 visits. In Lideta Park Married respondents dominate the 1-5 visit group (48%) but decrease at higher frequencies. Single respondents are evenly distributed, with 29% reporting both 1-5 and 5-20 visits. Sheger Park reveals married respondents are most prevalent in the 1-5 visit group (47%) and decrease at higher frequencies. Single respondents show more balanced visitation, with 42% reporting 5-20 visits and 21% reporting 20-50 visits. Divorced respondents almost exclusively visit either 20-50 times (100%) or >50 times (Figure 4.31).

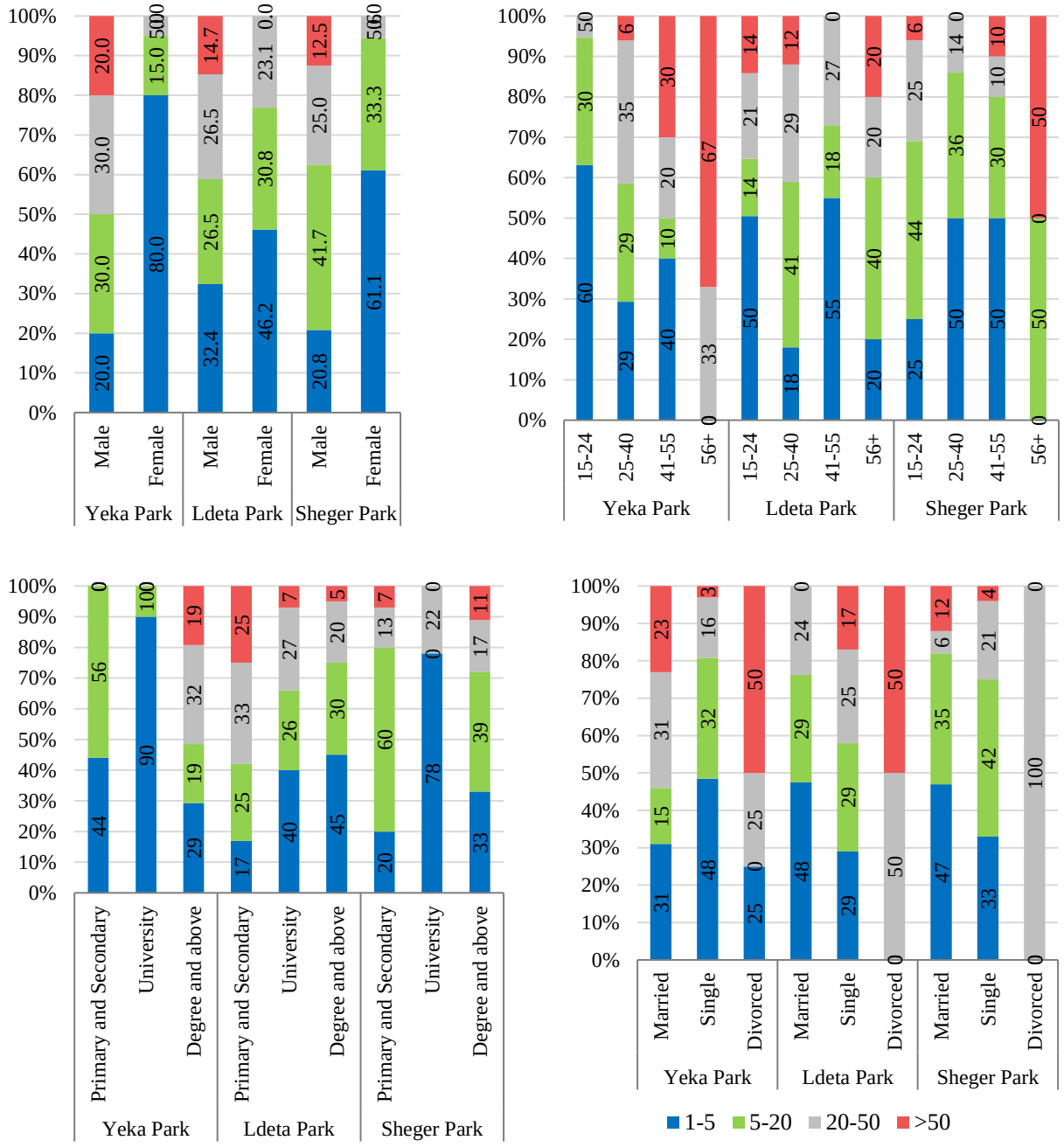


Figure 4.31 Crosstabulation between frequency of visit in the last 6 month and (a) Sex; (b) Age; (c) Educational status (d) Marital status

Educational Status in Yeka Park shows respondents with primary and secondary education visit less frequently, with 44% visiting 1-5 times and none reporting more than 20 visits. University students predominantly visit 1-5 times (90%). Respondents with a degree and above are distributed across all frequencies, with 32% visiting 20-50 times.

Where as in Lideta Park, respondents with primary and secondary education are evenly distributed, with 33% reporting 20-50 visits. University students visit less frequently, with 40% reporting 1-5 visits and 7% reporting >50 visits. In Sheger Park, respondents with primary and secondary education predominantly visit 5-20 times (60%). University students visit mainly 1-5 times (78%) and decline sharply at higher frequencies. Respondents with a degree and above have a balanced distribution, with 39% reporting 5-20 visits and 11% reporting >50 visits.

On the other hand, the result of the cross tabulation between Distance to the park and frequency of visits shows distinct patterns. Yeka Park shows a generally higher percentage of visits among those living within 1km-5km and >5km distances, particularly in the lower frequency categories. Unlike Yeka Park, Ldeta Park sees a more balanced distribution with higher frequencies of visits closer to the park (<400m), but a significant number in the 5-20 visits category across all distances. Sheger Park has the highest percentage of frequent visits in the <400m and 400m-1000m ranges, with a noticeable drop in frequency of visits from longer distances (>5km).

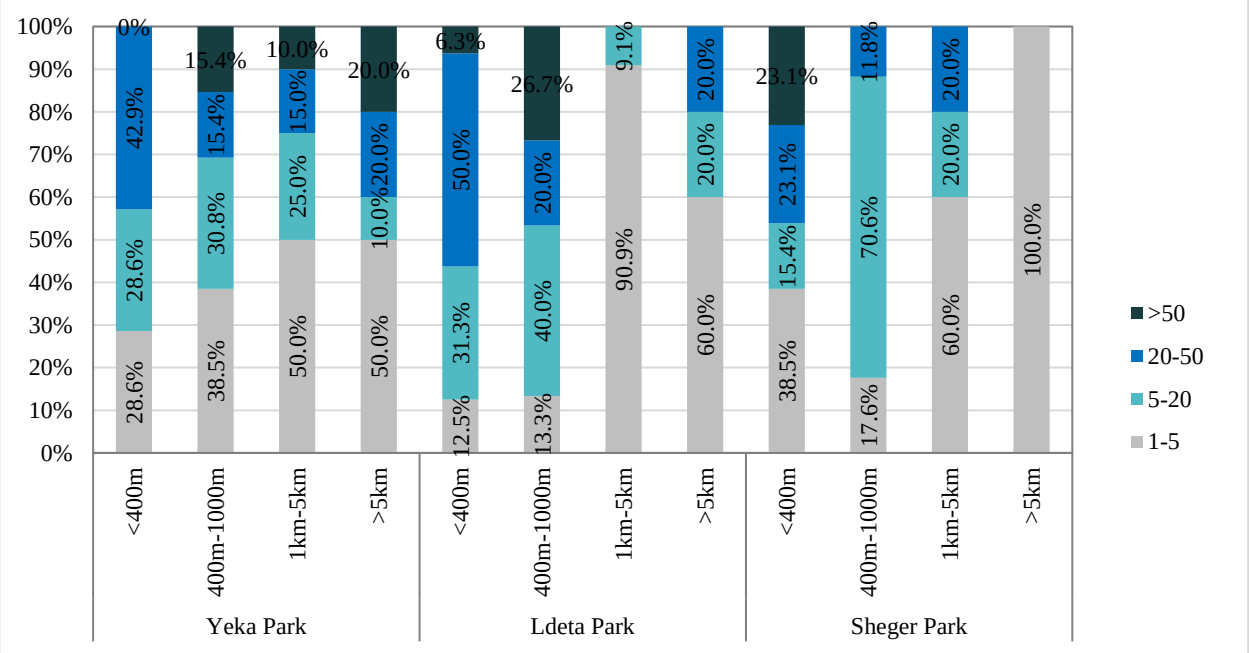


Figure 4.32 Crosstabulation between Distance to the park and frequency of visit

4.1.4.4 Person Correlation Between Socio-demographic characteristics of the respondents with Pattern of visit

The statistical analysis using Pearson correlation revealed several interesting connections between Socio-demographic characteristics and their visit patterns (Table 4.7). Notably, in Yeka Park, a visitor's age and educational background were significantly correlated with the day of their visit. This suggests younger or more educated individuals might have preferred visiting on specific days. Conversely, for Ldeta Park, gender was the only significant factor related to the day of visit. Sheger Park, however, showed a more complex relationship, with both gender and distance from home influencing the day of visit. Interestingly, time of visit only correlated with distance from home in Ldeta Park, suggesting those living farther away may have chosen specific times.

Table 4.7 Two-tailed Person Correlation Between Socio-demographic characteristics of the respondents with Pattern of visit

Variables	Park Name	Age		Gender		Marital status		Educational status		Distance from home	
		Corr.	Sig.	Corr.	Sig.	Corr.	Sig.	Corr.	Sig.	Corr.	Sig.
Day of visit	Yeka	-0.44**	0.001	0.267	0.061	0.102	0.48	-0.359*	0.011	0.087	0.547
	Ldeta	-0.223	0.131	0.34*	0.019	-0.006	0.966	0.075	0.617	0.265	0.072
	Sheger	-0.092	0.562	0.335*	0.03	-0.057	0.722	-0.128	0.42	0.508**	0.001
Time of visit	Yeka	0.19	0.185	-0.19	0.186	-0.134	0.352	0.068	0.64	-0.243	0.089
	Ldeta	-0.103	0.491	0.271	0.065	0.119	0.427	-0.105	0.484	-0.299*	0.041
	Sheger	0.013	0.935	-0.212	0.178	-0.159	0.314	0.081	0.61	-0.007	0.966
Frequency of visit	Yeka	0.538**	0	-0.579**	0	-0.068	0.638	0.413**	0.003	-0.04	0.784
	Ldeta	0.006	0.971	-0.205	0.166	0.368*	0.011	-0.308*	0.035	-0.475**	0.001
	Sheger	-0.004	0.979	-0.461**	0.002	0.14	0.375	0.006	0.968	-0.363*	0.018
Length Of stay	Yeka	0.51**	0	-0.269	0.059	-0.388**	0.005	0.314*	0.026	0.123	0.395
	Ldeta	0.164	0.27	-0.112	0.455	0.221	0.136	-0.061	0.682	-0.09	0.549
	Sheger	0.223	0.155	-0.283	0.069	-0.114	0.472	0.242	0.123	-0.06	0.707

Frequency of park visits demonstrated the most consistent correlations across parks. Age, gender, and educational background were all significantly linked to visit frequency in Yeka Park, while

marital status, education, and distance from home were significant factors in Sheger Park. Similarly, both gender and distance from home played a role in visit frequency at Ldeta Park. Additionally, length of stay within the parks correlated with age, marital status, and educational background in Yeka Park.

Moreover, Pearson correlation matrix made for pattern of visit revealed interesting connections across the three parks (Table `4.8). The analysis found there is no significant correlations between the day of visit and other factors (time of visit, frequency, length of stay) for any of the three parks. This suggests that the factors influencing the day of visit might be independent of when people choose to go, how often they visit, or how long they stay. Whereas frequency of Visit showed the most interconnectedness. It was significantly correlated with the day of visit for all three parks. This suggests that factors influencing how often someone visits are likely linked to the day they choose to go.

Table `4.8 Person correlation matrix of Pattern of visit

		Day of visit		**Time of visit**		**Freq. of visit**	
		Corr.	Sig.	Corr.	Sig.	Corr.	Sig.
Day of visit	Yeka						
	Ldeta						
	Sheger						
Time of visit	Yeka	0.068	0.640				
	Ldeta	-0.082	0.585				
	Sheger	-0.239	0.127				
Frequency of visit	Yeka	-.660**	0.000	0.110	0.447		
	Ldeta	-.503**	0.000	.313*	0.032		
	Sheger	-.629**	0.000	0.068	0.668		
Length Of stay	Yeka	-0.144	0.319	0.136	0.345	.340*	0.016
	Ldeta	-0.041	0.784	0.162	0.276	0.240	0.105
	Sheger	0.062	0.696	-0.116	0.466	0.008	0.961

Additionally, Ldeta Park showed a significant correlation between frequency of visit and time of visit showing that people who visit more frequently also have a preferred time of day for their visits. Similar to the day of visit, length of stay didn't show any significant correlations with other

factors for Ldeta or Sheger Park. However, Yeka Park exhibited a unique connection between length of stay and frequency of visit. This suggests that at Yeka Park, people who visit more often also tend to stay longer during their visits.

4.1.4.5 Reason for visiting and not visiting the parks

The survey data also reveals varied purposes for visiting across the three parks (Figure 4.33). The analysis shows that Walking is a minor activity in all parks, with a frequency of 2.4% at Sheger Park, 2% at Yeka Park and 2.1% at Ldeta Park. Reading is a more common activity in Ldeta Park (14.9%) compared to Yeka (8%) and Sheger (7.1%) whereas meeting with friends stands out as a significant reason for visiting, especially in Ldeta Park (38.3%), followed by Sheger (16.7%) and Yeka (16%).

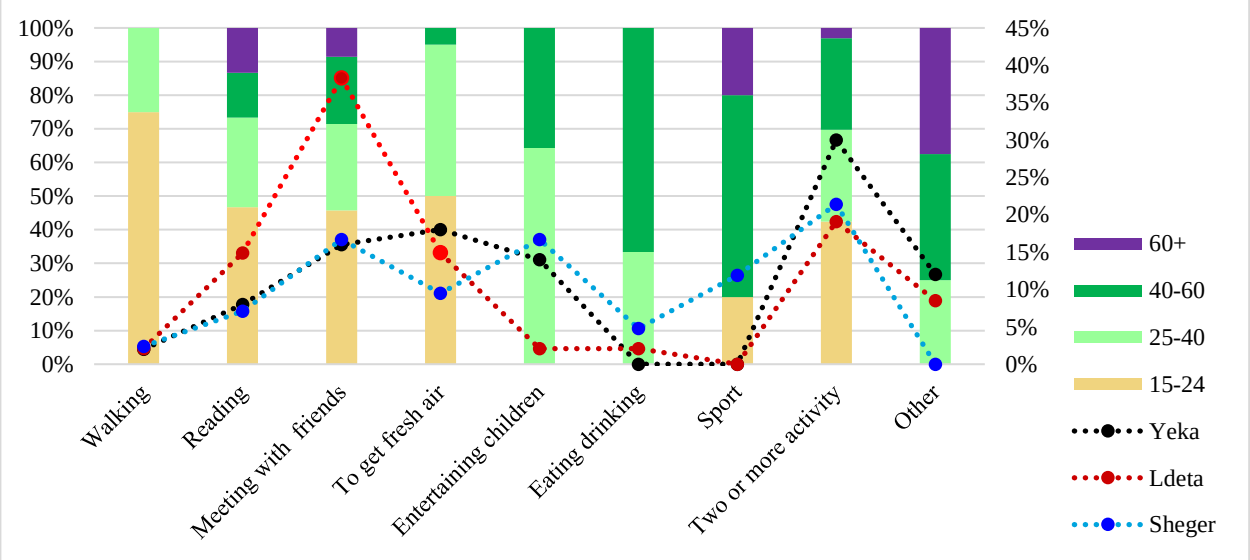


Figure 4.33 Purpose of visit

Getting fresh air is also a common purpose in Yeka Park (18%) and Ldeta (14.9%), while Sheger Park shows a lower percentage (9.5%). Additionally entertaining children is notable in both Yeka (14%) and Sheger Park (16.7%), but less so in Ldeta Park (2.1%).

Understanding the reasons for not visiting parks provides insight into barriers to park utilization. As Figure 4.34 indicates, the lack of recreational facilities is the most frequently mentioned single reason across all three parks. Lideta Park (41.2%) and Yeka Park (40.9%) share similar proportions. Sheger Park is slightly lower but still significant (37.5%). Respondents citing two or

more reasons for not visiting parks are also significant across all three parks, with 43.5% at Sheger Park followed by Yeka Park (24.3%) and Lideta Park (23.5%).

Lack of interest in parks for Lideta Park (29.4%) is significantly higher compared to Yeka Park (9.1%) and Sheger Park (6.3%). Safety is a concern primarily for Yeka Park, with 13.7% of respondents citing it as a reason for non-visitation. No respondents mentioned safety concerns for Lideta Park or Sheger Park, indicates Yeka Park has potential issues with perceived safety. Lack of awareness about parks was mentioned by 5.9% of respondents for Lideta Park and 6.3% for Sheger Park but was not an issue for Yeka Park (Figure 4.34).

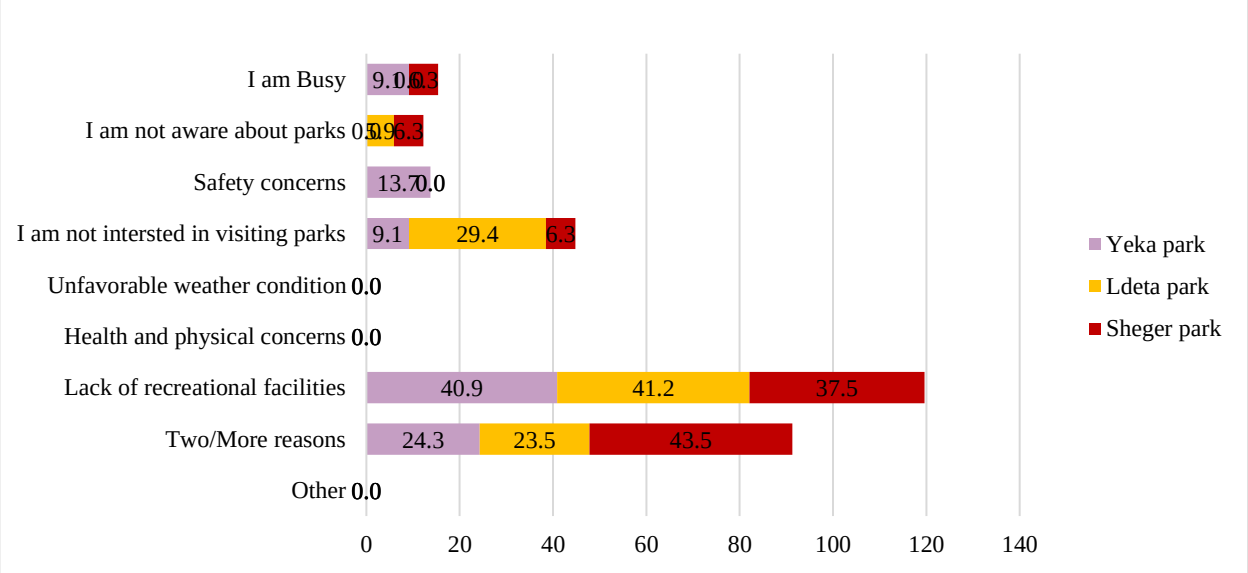


Figure 4.34 Main reason for not visiting the parks

Busy schedules were mentioned by 9.1% for Yeka Park and 6.3% for Sheger Park but were not reported for Ldeta Park. These are less impactful compared to the above and no respondents across all parks mentioned health concerns or unfavorable weather conditions, indicating these are not significant barriers.

Furthermore, interview made with executive manager of PRAAC, works have been done to improve the awareness of the public as well as economic sustainability of the parks. whereas public relation manager of AACBGDB stressed even though most of the parks are under there administration their priority has shifted to other green areas like street trees and public toilets.

The survey data for perception of the users on the need improvement in the parks indicates that certain areas require urgent attention across all three parks. The need for improved seating areas of Sheger Park has relatively the highest demand (18%) whereas Yeka Park and Lideta Park both report 11%. Recreational facilities are a prominent area for improvement. Lideta Park shows the highest demand for better recreational facilities (45%), higher than Sheger Park (20%) and Yeka Park (15%). The condition of pathways is noted as needing improvement in Sheger Park and Yeka Park both have 12% of respondents highlighting this issue. In Lideta Park, no respondents mentioned pathways.

The need for landscaping improvements is notably low across the parks: Sheger Park was the only park where 5% of respondents mentioned this, while no respondents in Yeka Park or Lideta Park identified landscaping as a pressing concern.

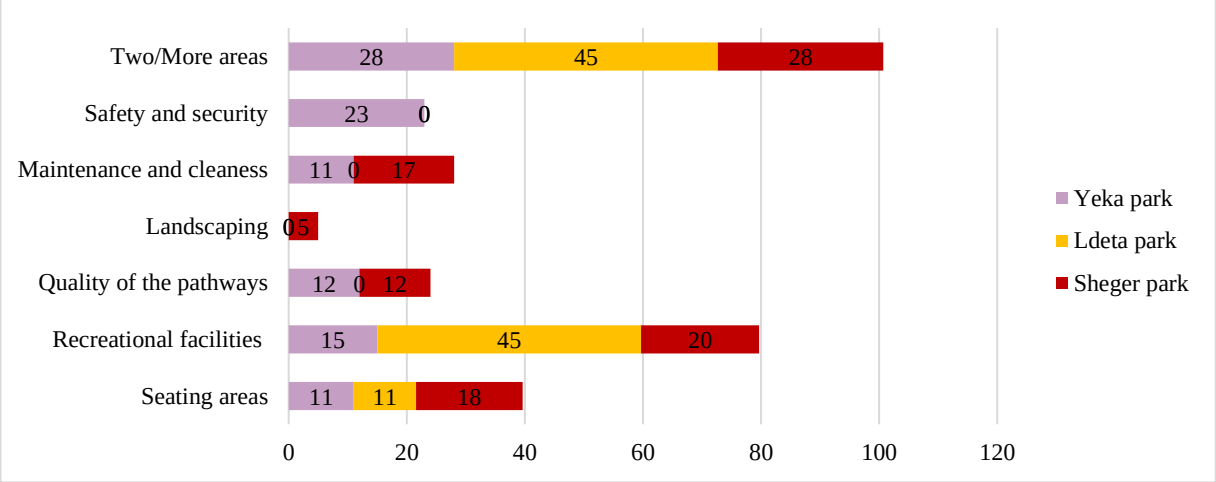


Figure 4.35 User's perception on the need of improvement in the parks

Maintenance and cleanliness were significant concerns in Sheger Park (17%) and Yeka Park (11%). Lideta Park had no respondents prioritizing this issue. Safety and security emerged as the most critical issue for Yeka Park, with 23% of respondents citing it as a major area for improvement. No respondents in Lideta Park or Sheger Park mentioned this issue.

Respondents identifying multiple areas for improvement showed similar proportions across all parks. In Lideta Park and Sheger Park each had 45% of respondents indicating multiple concerns, while Yeka Park reported 28%.

4.2 Discussion

UGS contribute to ecological balance, community well-being, and the improvement of urban living standards by offering a variety of environmental and social advantages (Halil, 2011; Marion et al., 2018). In order for people to fully benefit from parks, appropriate accessibility is essential (Yuhong et al., 2017). Their equal distribution is important factor in urban development. In order for these initiatives to be successful, they need to be supported by data and metrics that precisely reflect the differences in UGS distribution among various urban settings (Marion et al., 2018).

The kernel density analysis reveals substantial progress in park distribution in Addis Ababa between 2014 and 2024. The addition of parks, particularly in peripheral zones, helps to mitigate historical disparities. Notably, the establishment of city-level parks in the inner-city core reinforces as a focal point of green space development. However, the persistent lack of park development in western and eastern areas highlights an ongoing imbalance in equitable access to green spaces. In contrast the findings of Shuying et al. (2021), studied in China, Beijing illustrate a progressive shift toward a more balanced distribution over a decade.

Major variations in the spatial distribution of public park service coverage throughout Addis Ababa were identified by the GIS analysis, highlighting the difficulties in attaining spatial equity in the provision of public parks. While certain areas benefit from extensive park overlaps, with 18.5% of residential parcels having access to nine or more parks, 16.3% of the city lacks any access to park services. This finding is consistent with the study by Habibollah and Taher (2020), which analyzed spatial equity in Ilam, Iran, and similarly found a biased distribution of parks. In their study, about one-third of the city area excluded from any park service coverage, while certain regions experienced overlaps of more than 13 park services. The findings also aligned with the observation by Shu et al. (2019), who identified a mismatch between the distribution of urban parks and urban residents in Beijing, China. Parallel findings also indicated that some areas are overserved due to the proximity of multiple parks, while others are underserved entirely because of their distance from park locations (Khamannatun et al., 2020;Rashid and Haruka, 2021).This emphasize the critical need for targeted interventions in the different part of the city, where lower overlaps are concentrated.

The three zones have further implications where Zone 1 (inner city) enjoys full coverage with access to multiple overlapping parks. This demonstrates the centrality and concentration of parks within this zone. In contrast, Zone 3 (outer zone) lacks park services entirely or having access to only one or two parks showing an imbalance in the distribution of public parks, leaving peripheral areas underserved. These findings align with patterns observed in Shanghai, China, where high accessibility to parks is concentrated near the middle ring road, while sub-districts closer to the outer ring road face limited access (Ran et al., 2021). Similarly, in Addis Ababa, the intermediate zone (Zone 2) exhibits better access compared to Zone 3 but still lags behind the inner city's coverage.

On the other hand, spatial equity in cities is importantly gauged by measuring per-capita access to parks. The equitable distribution and usability of urban green spaces are greatly influenced by elements including park size, accessibility, and the proportion of parks to population density (Rashid and Haruka, 2021).

The analysis of per-capita park access in the city shows substantial spatial inequalities in public park availability. While a 22.5% of the city, mostly in the northern areas, enjoys relatively high levels of access (15-31 m^2 per person), over 16% of the land, particularly in the eastern part of the city, lacks any park service. Similar problems are seen in Seoul, where many locals are unable to visit the city's many urban parks due to their concentration in outlying areas (Kyushik and Seunghyun, 2007). This disparity between park availability and actual accessibility highlights how spatial distribution impacts the equitable use of green spaces.

Even a sharper contrast emerges when focusing on residential parcels, where 28.2% lack park service almost double the city-wide figure. While 20.5% of residential parcels benefit from the highest access level (15-31 m^2), this remains lower than the overall city average. This stress inequities in the distribution parks among areas where people live. Habibollah and Taher (2020), further highlighted by the findings from Ilam, Iran where larger parks and lower population densities give some districts better access, but small and dispersed parks in other districts especially in the city's southern regions. Such patterns suggest a misalignment between population density and green space allocation.

Even though the GIS-based approach employed offers a robust framework for assessing park and distribution, it has certain limitations. The use of buffer distances to define park service areas assumes uniform access within these zones, which may not account for real-world barriers such as road networks, topography, or safety concerns.

The findings on the functional qualities of public parks underline that their characteristics play an important role in facilitating or impeding their use. High-quality parks provide ecological and recreational benefits as well as ensure inclusivity, accessibility, and user satisfaction (Ter, 2011). As highlighted Ayala-Azcárraga et al. (2019), the quality of green spaces is a cornerstone in determining their ability to deliver meaningful benefits to urban communities.

According to the park development manual of MUDH (2016), the layout of a site is important , as it influences how an area is used and the order in which park features are experienced by users. In this study, the findings related to spatial arrangement of the parks reveal that Ldeta park demonstrates superior spatial planning, characterized by clear zoning, well-connected facilities, and simple layouts. These qualities contribute to creating a cohesive environment, aligning with principles of effective park design that prioritize accessibility and functionality (Mike et al., 2019). However, the isolation of the children's playground require improvement, as integrating such spaces with other park functions is essential to promote interactive use (Mike et al., 2019).

In contrast, the fragmented layouts of Sheger and Yeka parks illustrate challenges in achieving spatial coherence. Sheger Park's disjointed pathways and the lack of seating along key routes detract from the visitor experience, reducing opportunities for relaxation. Poorly connected zones and unclear pathways, as seen in Yeka and Sheger parks, can deter usage and compromise the effectiveness of urban parks as recreational spaces (MUDH, 2016).

The comparison of mean scores on functional qualities indiactes their performance and user satisfaction. The survey results reflect varying levels of user satisfaction with the spatial arrangement of spaces. Ldeta Park's leading mean score of 3.81 highlights its relative strength in this area, suggesting that users perceive its layout and organization to be the most effective among the three parks despite specific areas needing improvement. Yeka Park, with a close mean score of 3.66, demonstrates its competitiveness. The high satisfaction levels previously observed indicate

that Yeka Park's layout is user-friendly, although there is a need to further enhance the user experience. Sheger Park's lower score of 3.02 points to significant challenges. This suggests that its organization are less aligned with user expectations.

On the other hand, high-quality urban parks increase the number of optional activities available. Consequently, this encourages a feeling of possession over the area and leads to increased usage and social interaction in the park (Ter, 2011). The diversity of space across the three parks reveals notable variations in user satisfaction. Sheger Park achieves the highest mean score of 2.86, indicating a moderate level of user approval suggesting that it offers relatively more engaging and adaptable spaces that meet the needs of its visitors. In contrast, Yeka Park, with a mean score of 2.66, falls slightly behind, reflecting areas for improvement. Ldeta Park, with the lowest mean score of 2.06, indicates significant deficiencies in space diversity, underscoring its limited capacity to accommodate diverse activities and preferences.

The evaluation of walkability across the three parks indicates that Ldeta Park outperforms its counterparts, achieving a mean score of 3.85. This reflects a high level of user satisfaction with the park's pathways, ease of movement, and overall pedestrian experience. This indicate Ldeta Park's ability to accommodate seamless mobility and promote active use of its spaces.

In comparison, Yeka Park and Sheger Park demonstrate moderate performance, with mean scores of 3.06 and 3.00, respectively, indicating that while walkability in these parks meets basic expectations, there is room for improvement. These findings underscore the importance of well-designed pedestrian infrastructure in fostering accessibility and encouraging greater park utilization. Study in Shenzhen have also shown that pathways are among the most significant physical features of urban parks, evoking positive emotions among users. It satisfies personal preferences for jogging and strolling (Ruixue and Jing, 2020).

Flexibility within the parks reveals that Sheger Park leads with a mean score of 3.1, indicating a moderate level of adaptability in its range of activities and user needs. Yeka Park, with a score of 2.96, and Ldeta Park, scoring 2.85. These scores reflect a more limited capacity for multi-purpose use. According to Bahriny and Bell (2020), such issues observed due to a lack of adaptable features such as open lawns, movable seating, or multipurpose pavilions .Parks with higher flexibility can

attract a wider demographic and support varied activities ranging from sports and social gatherings to solitary relaxation.

Inclusivity in urban parks ensures that all members of society, regardless of age, gender, ability can enjoy the park's benefits. It covers issues like playgrounds for parents of small children, benches for the elderly, off-leash dog walks for dog owners, and bike lanes for cyclists (Adinolfi).

The analysis of inclusivity across the three parks indicates relatively low satisfaction, with Sheger Park receiving the highest mean score of 2.57, followed by Yeka Park at 2.24, and Ldeta Park at 1.96. These scores suggest that the parks do not fully meet the diverse needs of all user groups, limiting access or comfort for the users. Parallel study in Serbia also found that there is a dearth of facilities for youth and the elderly (Nevenka et al., 2016).

The relatively low inclusivity scores in these parks highlight the need for more universally accessible features. This includes ramps, accessible pathways, and diverse recreational facilities for different age groups and abilities. Moreover, inclusivity can also extend to social aspects, ensuring that spaces are welcoming and equitable for different cultural and socioeconomic groups (Adinolfi).

Park safety/security is also another key factors in determining the effectiveness of public parks (Bahriny and Bell, 2020). Sheger Park stands out with the highest safety and security score of 4.21, indicating that it is perceived as safe. According to this high score reflects the implementation of effective safety measures which contribute to users feeling secure while visiting the park. Lideta Park also performs relatively well, with a score of 3.74, suggesting that while safety is present, there may still be areas for improvement in comparison to Sheger Park. However, Yeka Park’s significantly lower score of 1.7 highlights concerns. This score suggests that safety is insufficient. Low safety scores in urban parks discourage visitation, especially during evening hours, and may disproportionately affect vulnerable populations, including women and children (McCormack et al., 2010).

Additionally, Maintenance and cleanliness are fundamental aspects that impact user satisfaction and the functionality of the parks. the finding by Madureira et al. (2018) also indicated that on

average, and in comparison to the other criteria, two factors were selected as the most important. The results reveal stark differences where Yeka Park receiving the lowest maintenance score of 1.48, reflecting inadequate upkeep and insufficient attention to park facilities. This includes issues such as untrimmed vegetation, broken pathways, damaged benches, or litter accumulation, all of which diminish its appeal and usability. Similarly, the park's cleanliness score of 2.72 highlights a less satisfactory condition, driven by ineffective waste management.

In contrast, Lideta Park emerges as the cleanest park, with a high mean cleanliness score of 4.28. This suggest that it benefits from cleaning practices. Both parks' higher maintenance and cleanliness scores contribute to their frequent use by visitors. Poorly maintained parks often see a decline in visitor numbers, while clean and well-maintained parks promotes a sense of responsibility (Ruixue and Jing, 2020). These findings implicate continuous evaluation to address functional deficiencies in the parks. The variation in scores also suggests that each park requires context-specific improvements.

The distribution of activities within the parks demonstrates the influence of park design, facility availability, and management practices on public park utilization (Lingyan et al., 2022). In Lideta and Sheger parks high activity zones are concentrated around amenities such as the amphitheater, bookstore, game zone, sports field, which are equipped with user-attractive features like benches, shade from trees, and vibrant open spaces. This demonstrates the potential of engaging facilities to attract park user. However, the informal use of certain spaces, such as the shop area for chewing chat, may conflict with family-oriented uses, particularly for children. In contrast, low activity zones in Lideta Park, reflect challenges in operational efficiency and maintenance.

Yeka Park exhibits a slightly different trend, with high activity zones centered around paved areas with group benches, children's playgrounds, and open fields. However, the limited accessibility and perceived safety issues of areas near the river and fence contribute to their low activity levels. Ensuring the safety and cleanliness of these zones could encourage greater utilization and broaden the park's appeal to more users (Rukiye, 2015). These findings are consistent with Lingyan et al. (2022), emphasizing that park utilization is closely tied to the presence of user-centric facilities and accessible infrastructure.

In the time and days of public park utilization, Both Yeka Park and Sheger Park exhibit a clear weekend-centric usage pattern, with 70% and 71.4% of visitors, respectively, favoring weekends for their visits. This trend highlights the significance of parks as recreational spaces during leisure days, which aligns with the study in Malaysia (Nor et al., 2018). In contrast, Lideta Park shows a relatively more balanced distribution which reflects its local importance for users who incorporate park visits into their daily routines.

Regarding the time of day, mornings and afternoons are the most popular periods for park visits. Morning visits are particularly prominent at Lideta Park (42.6%). Similarly, Sheger Park records the highest proportion of afternoon visits (45.2%). Yeka Park exhibits moderate preferences for both mornings (34%) and afternoons (38%). Similarly, a study in Guangzhou, China, found that occasional visitors favored morning and afternoon visits over evenings (Jim and Wendy, 2006). Mid-day and late afternoon see consistently lower visitor numbers across all parks, with the exception of Lideta Park, which records a slightly higher proportion during late afternoon (14.9%). These periods are often less popular due to high temperatures or other competing activities during the day. In contrast study conducted in Iran highlights that evenings and nighttime are among the most popular times for park visits (Bahriny and Bell, 2020).

The analysis of visitation frequency in relation to respondents' socio-demographic characteristics reveals age demonstrates a clear trend where younger visitors (aged 15-24) dominate lower-frequency categories (1-5 visits), particularly in Yeka and Lideta Parks, suggesting occasional use. In contrast, middle-aged (25-40) and older visitors (41+) exhibit higher visitation frequencies, particularly in Yeka Park, where the elderly make up a substantial proportion of visitors reporting more than 50 visits. It aligns with Jim and Wendy (2006) in which older people, especially those over 70 used GS more often.

Beside male respondents exhibit a balanced distribution across visitation frequencies showing regular and varied use of parks. In contrast, female respondents show a marked decline in visitation at higher frequency levels, particularly in Yeka and Sheger Parks. This trend may reflect there are constraints limiting the extent of female participation in park activities.

On the other hand, the result of the cross tabulation between Distance to the park and frequency of visits in Yeka Park shows a generally higher frequency of visits among those living within 1km-5km and >5km distances, particularly in the lower frequency categories. Unlike Yeka Park, Ldeta Park sees a more balanced distribution with higher frequencies of visits closer to the park (<400m). Sheger Park has the highest percentage of frequent visits in the <400m and 400m-1000m ranges, with a noticeable drop in frequency of visits from longer distances (>5km). Similarly, a study conducted in Denmark indicates a decline with increasing distance. The findings indicate that daily usage decreases when the GS is more than 300 m from home (Schipperijn).

The analysis of reasons for visiting parks highlights Walking to be a minor activity in all the parks. In contrast, reading emerges as a more prominent activity in Ldeta Park (14.9%) than the rest. Meeting with friends is a most significant one (38%). In contrast a study conducted in Turkey revealed Picnicking and barbecuing were the most selected activities (Halil, 2011).

Getting fresh air is a common purpose in Yeka Park (18%) and Ldeta Park (14.9%), whereas Sheger Park records a lower percentage (9.5%) for this activity. Similarly, entertaining children stands out in Yeka (14%) and Sheger Park (16.7%) but is notably less common in Ldeta Park (2.1%). A study by Halil (2011) aligns with Walking is the low percentages observed in this study. Activities such as enjoying the scenery, seeking relief from stress, and getting fresh air were also minor contributors (Halil, 2011).

Beside The lack of recreational facilities is the most frequently cited reason for not visiting, with similar proportions across the three parks: 41.2% at Lideta Park, 40.9% at Yeka Park, and 37.5% at Sheger Park. This indicates a common shortcoming in the parks' amenities, limiting their appeal to potential users. It contrast sharply with research conducted in Singapore, where only 3% of respondents cited the lack of facilities as a reason for non-visitation (Leani et al., 2020). Furthermore, a notable portion of respondents across all parks cited two or more reasons, with Sheger Park having the highest percentage (43.5%), followed by Yeka Park (24.3%) and Lideta Park (23.5%).

Safety concerns, particularly for Yeka Park (13.7%), also emerged as a notable barrier. However, safety was not a concern at Lideta Park or Sheger Park, showing the contrasting safety perceptions among the parks. similarly it was only a minor issue in the Turkish study (Halil, 2011).

Furthermore, a small proportion of respondents cited lack of awareness in Lideta Park and Sheger Park. This shows a slightly higher incidence compared to Yeka Park, where it was not mentioned as an issue at all. It aligns closely with findings from Singapore, where only 7% reported being unaware of existing park programs (Leani et al., 2020). These findings point to several critical areas, such as improving park amenities, addressing safety concerns, and increasing awareness, in order to enhance park utilization across the city. Additionally, better understanding of park accessibility and distribution, relationships between functional qualities, and user experiences in parks contributes for urban planners and designers into how to create equitable GSs and identify key drivers that enhance park usability and satisfaction.

Chapter Five : Conclusion and Recommendations

5.1 Conclusion

The study aimed to evaluate the spatial equity, functional quality, and utilization trends of public parks in Addis Ababa, providing insights into their current state and potential areas for improvement. Using GIS-based analysis, survey data and comparative studies, the research highlighted key patterns in park distribution, functionality, and usage across different parts of the city.

The distribution of parks in Addis Ababa from 2014 to 2024 shows a mixed story of advancement and enduring inequity. While advancements have been made such as the inclusion of parks in peripheral zones and the creation of city-level parks in the inner city the western and eastern parts of the city remain underserved. This uneven distribution shows the challenges of achieving spatial equity in rapidly urbanizing cities.

Moreover, park service areas in Addis Ababa reveals significant disparities in the access to park services. Although, Zone 1 enjoys full accessibility with high park overlaps, Zones 2 and 3, particularly Zone 3, demonstrate limited access. This shows a clear spatial inequity in park service distribution which necessitates strategic planning and resource allocation to enhance coverage in underserved areas and optimize park distribution citywide.

Per-capita access to park analysis also reveals inequalities, both city-wide and within residential areas. The city lacks park access, with the eastern areas particularly underserved. While the northern part of the city enjoys optimal access, this high level of accessibility is lesser with respect to the residential blocks. The disparity is more acute in residential areas. This shows the misalignment between park distribution and population density, where equitable access is most critical.

On the other hand, the analysis of the functional qualities of selected parks reveals distinct differences in user satisfaction where Ldeta Park outperforms the other parks in terms of spatial arrangement, walkability, and cleanliness, with users reporting high satisfaction in these areas. In contrast, Sheger Park scores best in flexibility, safety, and inclusivity, while Yeka Park consistently receives the lowest scores, particularly in terms of maintenance and safety. This finding illustrates

that effective park management and design are key to enhancing user satisfaction and park utilization. The overall satisfaction ratings emphasize the need for improvements in each park, with specific attention to inclusivity, safety, and maintenance.

The analysis of park utilization trends highlights parks that prioritize user-centered amenities, such as amphitheaters, playgrounds, and shaded seating, are characterized by diverse and higher level of activities. However, underutilized areas within the parks are associated with inadequate maintenance, safety concerns and poor accessibility,

The patterns of park visits reveal both Yeka Park and Sheger Park show a weekend-centric usage, which shows their role as key recreational spaces for leisure days. In contrast, Lideta Park displays a more balanced distribution, which indicates its integration into daily routines. Mornings and afternoons are the most favored times, reflecting user tendencies to visit during cooler and more active periods. Sheger Park attract longer stays and group visits while Lideta Park's balanced visitation and higher frequency of alone visitors suggest a more diverse usage dynamic. Yeka Park which is popular for occasional visits, sees shorter stays and fewer group activities. This shows variations in how different parks meet user needs.

Besides, the relationship between visitation frequency and user profiles indicates how demographics shape park engagement. Age emerged us significant, with younger users favoring occasional visits, while older age groups display more frequent usage, particularly in Lideta and Yeka Parks. Gender differences reveal that male visitors have a more balanced distribution of visitation frequencies, whereas female participation declines sharply as visit frequency increases. Marital status also influences park use, with single and divorced respondents showing higher visitation frequencies compared to married individuals, who primarily visit occasionally. Educational background reflects the disparity in engagement, with those holding degrees or higher demonstrating a balanced visitation pattern, while those with lower educational levels tend toward moderate frequencies.

Distance to the park reveals that proximity highly influences visitation frequency. The closer distances generally lead to higher visit frequencies. Yeka Park stands out with higher visits from

those living further away, while Ldeta and Sheger Parks see a more pronounced correlation between proximity and frequent visits.

The results of the Pearson correlation analysis also reveal frequency of visits which appears to be the most interconnected factor, influenced by the demographic variables such as age, gender, education, marital status, and distance from home. The day of the visit seems to be largely independent of other factors, suggesting that individuals' choices of when to visit the parks may not be strongly tied to how often they visit or the duration of their stay. However, certain correlations, such as the significant link between frequency of visits and time of visit at Ldeta Park, imply that more frequent visitors tend to have specific preferences for when they visit. The connection between frequency and length of stay is also high in Yeka Park, indicating that frequent visitors tend to spend more time at the park.

Regarding on the motivations and barriers shaping park utilization activities such as meeting friends, getting fresh air, and entertaining children attract visitors, the lack of recreational facilities consistently emerges as the primary barrier to park visits. This shows a gap between user needs and park offerings, particularly in Lideta and Yeka Parks. Moreover, issues such as perceived safety in Yeka Park and lack of interest in Lideta Park highlight park-specific challenges that influence engagement.

Additionally, each park has unique issues reflecting varying user priorities. Recreational facilities dominate the demands, particularly in Lideta Park. High demand also noted for seating areas in Sheger Park and concerns about safety in Yeka Park. Interestingly, maintenance and cleanliness are pressing concerns in Sheger and Yeka Parks but not in Lideta Park, suggesting variations in management practices.

Finaly, this research offers valuable contributions to urban planning and environmental design. The findings stress the importance of integrating spatial planning with social and environmental considerations to enhance equitable resource allocation, inclusivity and functionality.

5.2 Recommendations

- The City Administration, in collaboration with urban planners, should prioritize the development of new parks in peripheral part of the city especially western and eastern zones which are characterized by high level of urbanization.
- Land suitability analyses should be conducted to identify optimal locations, ensuring accessibility for the underserved population.
- Data driven planning should be performed such as using GIS-based tools to continuously monitor park accessibility and spatial equity. And they should be incorporated into decision-making processes.
- Spatial equity should be embedded as a core principle in urban development policies such as, requiring the new residential developments to include accessible and adequate green spaces.
- Policies should be developed to prioritize park construction in densely populated residential areas with low per-capita access, to align park distribution with population density.
- The city government should also focus on creating pocket parks and community green areas to improve accessibility within neighborhoods.
- Underutilized urban spaces should be identified and repurposed for park development to maximize land efficiency, accessibility and equity.
- The city government should establish public-private partnerships to accelerate park development in underserved zones.
- Regular equity audits should be conduct to monitor park distribution and accessibility across the city to guide resource allocation, ensuring progress toward spatial equity.
- It is also recommended to address the distinct shortcomings of each park by focusing on targeted upgrades that align with their unique challenges. i.e. Sheger Park: on its spatial arrangement and walkability, Ldeta Park: on its inclusivity and recreational diversity, Yeka Park: upgrades to safety, inclusivity and maintenance.
- A city-wide park management framework which guides long-term investments and operational priorities should also be developed.

- Community input should be involved in redesigning underperforming parks like Yeka Park to better align with user needs. Regular surveys can help ensure ongoing improvements.
- Facilities that cater to user needs should be added such as amphitheaters, shaded seating and walkways, playgrounds, group activity spaces and lighting for evening visits.
- Park features that accommodate both leisure and routine visits, such as fitness zones, walking trails, and multifunctional spaces should be implemented to promote consistent utilization.
- Community-driven programs should be developed to raise awareness about the park's benefits. This includes hosting local events, such as festivals or educational programs, that encourage community involvement.

Finaly future research could expand these efforts by focusing on the assessment and detailed mapping of neighborhood parks, which are the most accessible green spaces for residents. They can provide additional insights into improving park equity at a more localized level.

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Annex

Annex 1: Publishable Article

Topic: Article Spatial distribution and service overlaps of public parks in Addis Ababa, Ethiopia

Thomas Minda [1], [*]Mulugeta Maru[1]

[1]Ethiopian Institute of Architecture, Building Construction and City Development and to the School of Graduate Studies of Addis Ababa University

Abstract

Spatial equity is one of the major research areas in Asia, including South Korea, China, Iran, and Pakistan. It is also a serious issue relating to social justice in Sub Sharan Africa and has hardly been covered by previous studies. Therefore, this paper aims to fill this gap by studying the spatial equity of urban public parks in Addis Ababa, Ethiopia, focusing mainly on service areas, overlapping, and per-capital access. A desk study was used to collect data, and Arc GIS 10.8.1 network and Kernel Density analysis assisted in analyzing the data. The land area allocated to parks in Addis Ababa showed a robust change from 0.1405% in 2014 to 1.4245% in 2024, with a 97% increase in urban land allocation. Close to 23.33% of the parks are located in the Gulele sub-city, consuming about 85% of the land allocated to urban public parks, while 16.67% are found in the Arada sub-city. The least number and land cover of the parks is observed in Addis Ketema Sub-city, with 3.33% and 0.10%, respectively. The city-wide coverage highest service area overlapping constitutes about 13.6%, with three parks overlapping, while the residential service area coverage extends to 12.3% and overlaps twelve and above parks. The per capita value with no park service area is 16.3% and 28.2%, respectively. The highest value at the city level is 15-31 m² per person, representing 22.5%, and the least is 11.6% accessible for 5-9 m² per person. On the other hand, the maximum per capita result for the residential parcel is 15-31 m², with 20.5%, and the minimum is 0-2 m² of per-capita access constitutes 11.3%. The findings indicate the need for equitable allocation of public parks, user-centric improvements and strengthened park management practices to address maintenance and safety. This study advocates for a holistic approach to urban park planning that integrates community needs and sustainable urban development.

Key word: Urban Park Distribution; Sustainable Cities; Green infrastructure; Geospatial analysis; Buffering, Density

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[*]Corresponding Author: Thomasminda26@gmail.com[1]

1. Introduction

Modern Urban parks provide a variety of social, environmental, economic and health-related needs (Chiesura, 2004). Environmentally, they contribute to biodiversity, mitigate urban heat islands, and enhance air and water quality (Rekha, 2019). Economically, they increase property values, attract tourism, and support local businesses (Nadja et al., 2015). Societally, they promote community cohesion, provide spaces for cultural and recreational activities, and enhance the overall quality of life (Per and Sven, 1999). Regarding health, access to urban green spaces promotes physical activity, reduces stress, and improves mental well-being (Tzoulas et al., 2007).

Furthermore recreation opportunities are significant for city dwellers' well-being because they live in a busy, stressful metropolitan environment (Bertram and Rehdanz, 2015). Even tiny green spaces can greatly impact human recreation in urban areas (Jari et al., 2010). Besides, recreation are more significant in today's world than in the past (Rukiye, 2015).

On the other hand, parks in cities is viewed as essential to developing sustainable cities (Arnberger, 2012). United Nations Sustainable Development Goals (SDGs), particularly SDG 11, which calls for 'sustainable cities and communities,' also discourses a pressing urban problem. It aims to provide universal access to safe, inclusive and accessible, green and public spaces (UN, 2015). Additionally, the principles adopted during the UNCED held in 1992, Rio de Janeiro highlighted that human beings are the focal point of concerns for sustainable development and have the right to live a healthy and productive life in harmony with nature (UN, 1992).

Moreover, (Barbosa et al., 2007) discoursed that urban parks are often viewed as a good measure of the standard of urban living. Their availability and accessibility are major contributors to urban environments ecological, social, and environmental justice functions. urban planners are becoming more aware of the importance of ensuring that all citizens have equitable and sufficient access to green areas (Chao et al., 2018). In order to achieve spatial equity in public parks, cities need to make sure that there are adequate parks and that appropriate space is provided for them (Rashid and Haruka, 2021).

Cities within developing countries, particularly in sub-Saharan Africa rapid urbanization, population growth, and inadequate spatial planning have led to a reduced proportion of green

spaces (Collins, 2014). Besides, one of the major challenges in urban planning is achieving spatial equity in the distribution of public parks. Research has shown that parks are often unevenly distributed (Hughey et al., 2016). Urban settings in various countries exhibit significant inequalities in the distribution of physical infrastructure, including parks and green spaces (Sampson, 2017). These disparities result in uneven exposure to health risks and unequal access to the benefits of nature, further exacerbating inequalities within cities (Tord et al., 2007)s. Furthermore it perpetuates broader patterns of social and environmental injustice (Khamannatun et al., 2020).

Addis Ababa, Ethiopia's capital, is also characterized by a rapid population growth, which led to increased density of built spaces. As the city expands, the pressure on land has led to a reduction in green spaces, leaving many communities, without adequate access to public parks (Maru, 2014). The existing green areas in the city are inadequate in both quantity and quality to meet the recreational needs of its growing population (Tekle, 2016). The Structural Plan for 2017–2027 estimated that the city's per capita green space is just 1 square meter per person, significantly below the World Health Organization (WHO) standard of 9 square meters and the African standard of 7 square meters per person (AACPPO, 2017). To address this shortfall, the Addis Ababa City structural plan proposed creating new public parks to increase per capita green space (Sisay and Till, 2020). However, the distribution of the existing public parks lacks issue of spatial equity. Hence, the objective of this research is to assess the spatial equity. Focusing on the spatial distribution patterns, service areas overlap and per-capita access to public parks.

2. Research Gap

The focus on spatial equity in urban parks has increased over the past twenty years. Most studies (Luo et al., 2022; Qiang et al., 2018; Tahere and Abbas, 2022; Zhiming et al., 2021) have focused on assessing the spatial distribution of parks based on time and mode of travel. Other Studies (Ran et al., 2021; Shu et al., 2019, 2019; Tahere and Abbas, 2022) have focused on the disparities in GSs provision among different social groups. These studies provide insights into accessibility and equity, even though they lack analysis that integrates service area overlaps, and per capita park access.

Furthermore, in Sub-Saharan African cities, including Addis Ababa, studies on spatial equity are notably scarce. For example, Sisay and till (2020) examined the distribution and accessibility of three types of public recreational parks, while Sileshi and Hailu (2020) assessed the proximity and service areas of urban parks. These studies primarily focused on evaluating the level of accessibility. However, they did not address the concept of spatial equity related to the park distribution.

Additionally, the methodologies employed in studies to measure spatial equity frequently vary depending on their objectives. Some of them include network analysis ((Gu et al., 2022; Nicholls, 2001), two-step floating catchment area (2SFCA) (Xue et al., 2023; Yuhan et al., 2024; Zhicheng et al., 2020; Zhiming et al., 2021). Such methods lack to show the spatial disparities of park distribution. Moreover, many studies (Khamannatun et al., 2020; Nicholls, 2001; Qiang et al., 2018; Rashid and Haruka, 2021) rely on traditional methods, including buffer techniques which is criticized for oversimplifying accessibility indices i.e. per-capita density by assuming that residents only use parks within their districts, disregarding cross-boundary usage and overlapping service areas.

Even though there is advancement, attention has not been given to multi-scale assessments and how spatial equity might vary across different spatial units, such as districts or municipalities (Puay and Rosita, 2016). Furthermore, the influence of overlapping park service areas on equity and user choice remains underexplored.

3. Research Methods and Materials

3.1 Ethics approval

According to (Pritha, 2021), in ethics approval all participants in surveys or interviews should provide their informed consent, and participation should be entirely voluntary. It ensures that the research aligns with ethical principles and safeguards the rights and well-being of the participants involved in the study (Pritha, 2021). Therefore, the researcher is committed to maintaining the highest ethical standards throughout the investigation and all data is anonymized and securely kept, and participant identities is safeguarded to maintain confidentiality.

3.2 Research Design

Exploratory Method: This method is applied to investigate deeper understanding of the distribution and quality of public parks as well as users' perception related to green areas. This involves qualitative data collection methods such as key informant interview to explore diverse perspectives and uncover potential issues. This method is also employed to capture real-time interactions on the case areas that may not be apparent through quantitative approaches alone.

Explanatory method: is used to explain the relationships between different variables identified in the study. This method is employed for understanding causality, such as how the physical characteristics of parks influence their usage patterns and to provide a basis for interpreting survey data, interviews, and spatial analyses

Descriptive Method: this method is employed to provide a clear and detailed account of the spatial and functional characteristics of the case areas. It is also used to describe the park user's experience and preferences. This method is employed to systematically presenting quantitative and qualitative data, such as park size, and user feedback, to create a detailed profile of the study area.

3.3 Description of the Study Areas

3.3.1 Location

The study area is the capital city of the Federal Democratic Republic of Ethiopia and the home of the African Union, Addis Ababa. Its Location is at 9° 2′ 0″ N and 38° 42′ 0″ E in the horn of Africa with an administrative area of 423 km^2.

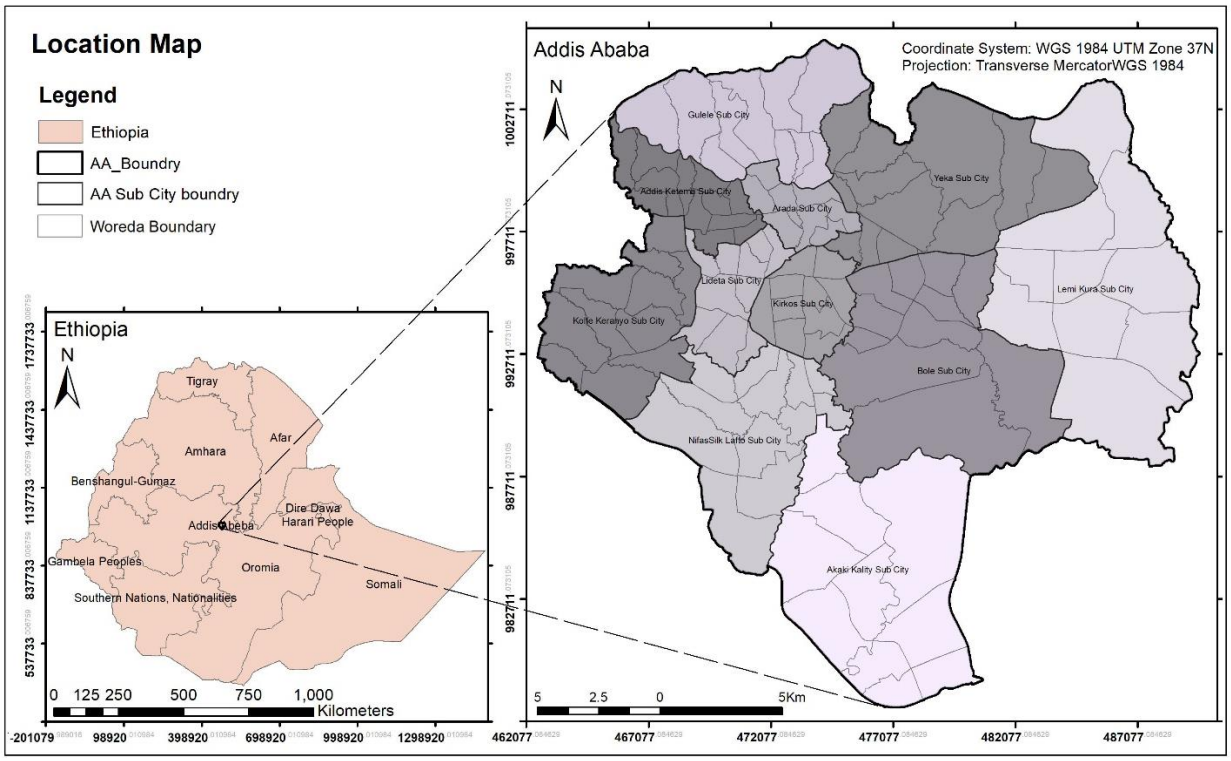


Figure 1. Location map of the Addis Ababa

Source: Computed by the author

As of 2022, the city is administratively divided into 11 sub-cities, and 116 districts locally referred to "Wereda" (Figure 3.1). Currently, the city has become one of the world's fastest-growing cities, serving as both the country's commercial and political hub (Abebe et al., 2022).

3.3.2 Land use of Addis Ababa

Generally, the land use of Addis Ababa is classified into in to two types. They are Non-built-up lands that are used for ecological purposes and built-up regions include a variety of urban land use categories which has a specific function (Woldesemayat and Genovese, 2021). The land use of city includes various functional categories. The dominant type is mixed residence. It is divided into high, medium, and low-density areas (Figure 3.2).

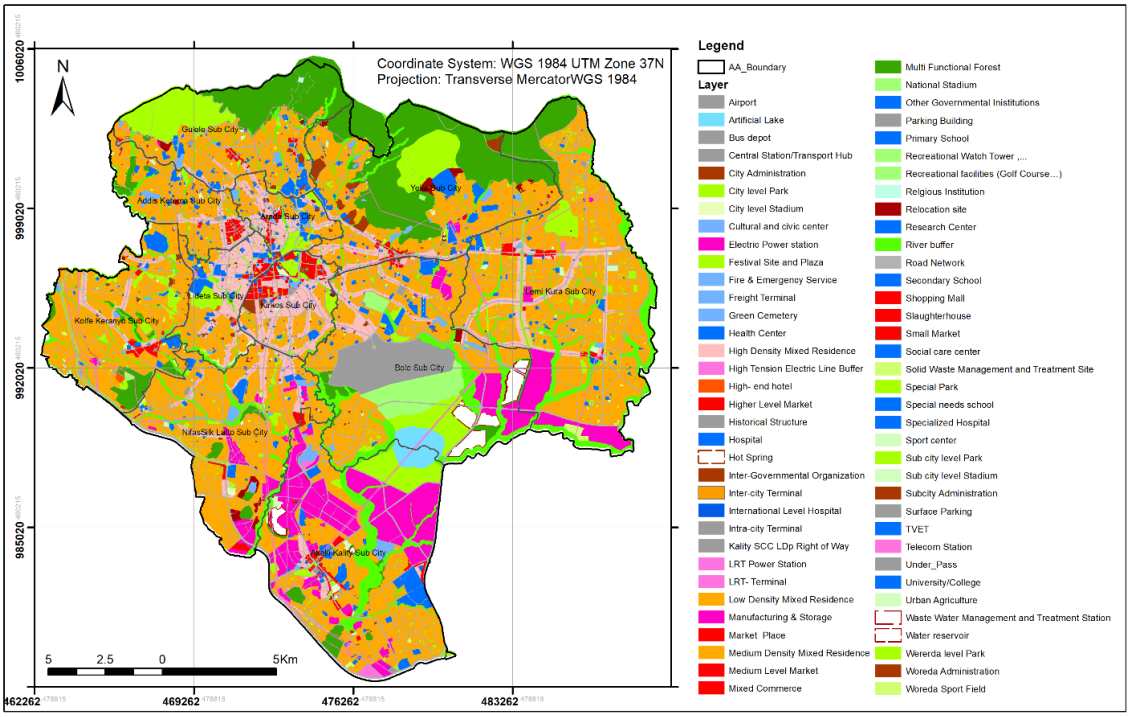


Figure 2. Land use map of Addis Ababa. Source: Addis Ababa City Planning Commission (AACPC)

Commercial areas are concentrated in the city center and along highways including high-rise buildings. Municipal services include spaces for abattoirs, emergency services, cultural centers, cemeteries, and public plazas. Social services areas host hospitals, schools, research centers, stadiums, and other civic facilities. Transport zones includ terminals, depots, and parking facilities, excluding roads. Finally, administration areas house government and intergovernmental institutions at various levels.

3.4 Method of data collection

Document review involved the examination of policy documents, Structural and land use plans, historical records, and other unpublished reports and relevant documents pertaining to GA development. This method provides a historical context and an understanding of the regulatory framework and planning decisions.

3.5 Method of data analysis

Spatial Analysis

Geospatial data, including maps and GIS datasets undergo spatial analysis to assess spatial equity, land use and distribution of space, activities. To analyze the spatial equity of public parks in Addis Ababa, the analysis involved the step shown on the (Figure 3.3).

The first step involved creating service buffers for each park type based on structural plan of the city including sub-city parks (5,000 m), and city parks (10,000 m) to delineate their respective service areas (Table 3.4). These buffers were generated using GIS 10.8 tools to visualize the geographical reach of each park category.

Table 1. *Park categories and their catchment radius*

Park	**Size (ha)**	**Catchment Radius**
City Park	>10	10 Km
Sub-city park	1-10	5 km
Woreda park	0.3-1	1.5 km

Source: Addis Ababa city structural plan

Overlaps between the buffers were identified using the "Union" tool, which integrated the individual service areas into a single composite layer, ensuring that overlapping zones were clearly shown. The resulting layer was then processed using the "Multipart to Single part" tool to separate the overlapping regions into distinct Blocks for further analysis. Next, a spatial join operation was performed to associate each parcel with its respective park attributes, including park area and

population density within the buffer zones. This step facilitated the calculation of the Per Capita Access to Parks.

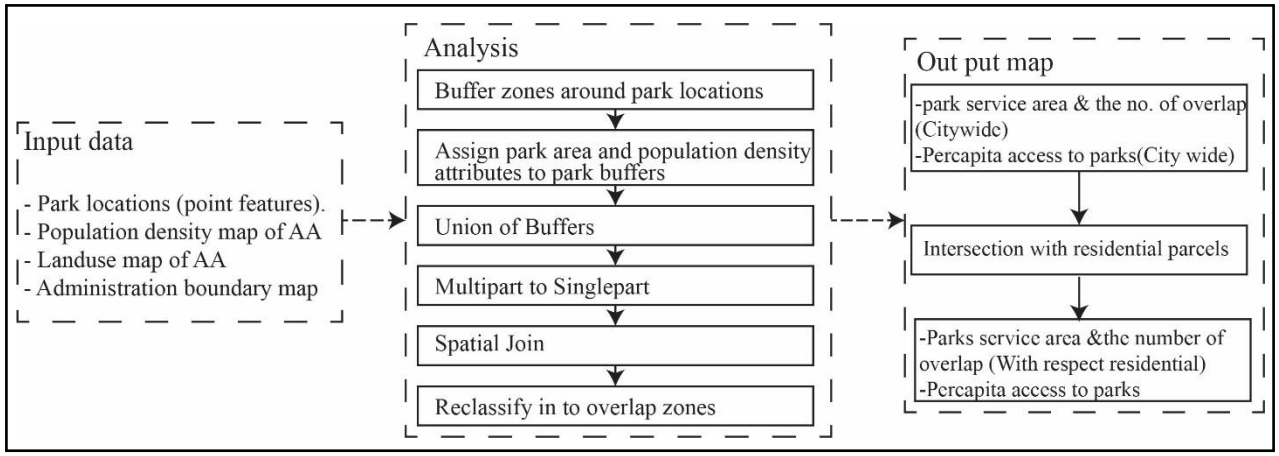


Figure 3. Method used to analyze Park service overlap and per-capita density

This involved dividing the total park area within each overlapping buffer zone by the respective population residing in the same area (Habibollah and Taher, 2020).

$A_j = \sum E_j$ where $E_j = S_j / \sum P_i$

where A_j represents average park area available per resident in parcel j; E_j represents park area per capita for each overlapping buffer zone; S_j denotes total Park area within the buffer zone. P_i represents population residing in the buffer zone.

On the other hand, Kernel Density Analysis is employed using GIS 10.8 to visualize the trend of park distribution density in 2014 and 2024. And also, to show intensity of activities across different areas of the parks. Kernel density estimation was applied to the mapped observation points to generate a heat map, indicating regions with high and low user activity.

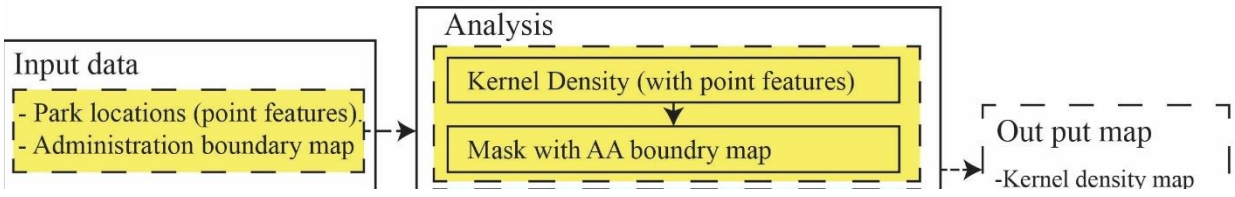


Figure 4. Method used for Kernel density analysis

4. Result and Discussion

4.1 Result

4.1.1 Urban Public Park in Addis Ababa

This study looks at urban public parks in Addis Ababa at the city, sub-city, and Woreda levels; the catchment areas and creation dates vary (Table 2). The Table shows that in 2024, public parks occupy 676.10ha, or almost 1.5650%, of the city's total area. However, before 2014, just 0.1405% were available. After 2014, around 1.4245% of the land was allocated to establishing new parks, including three city-level, five sub-city-level, and two Woreda-level parks.

Table 9: City, Sub City, and Woreda level parks in Addis Ababa.

Spatial Scale	Park name	Sub-city	Area (ha)		Percentage from the area of the city	
			Before 2014	After 2014	Before 2014	After 2014
City Level Park	Bheretsige Park	Nifasilk Lafto	15.90		0.0368%	-
	Entoto Park	Gullelle		560.00	-	1.2963%
	Friendship Park	Arada		28.00	-	0.0648%
	Unity Park	Arada		11.00	-	0.0255%
Sub-city Level Park	Africa Park- 1	Kirkos	1.10	-	0.0025%	-
	Africa Park - 2	Kirkos	0.70	-	0.0016%	-
	Akaki Park	Akaki Kality	-	1.50	-	0.0035%
	Ambassador Park	Arada	1.70		0.0039%	-
	ECA Park	Kirkos	-	4.40	-	0.0102%
	Ethio-Cuba Park	Lideta	3.60	-	0.0083%	-
	Ethio-Korea Park	Gullelle	3.60	-	0.0083%	-
	Ferensay Park	Yeka	5.00	-	0.0116%	-
	Hamle 19 Park	Gullelle	7.70	-	0.0178%	-
	Kentiba w/tsadik park	Nifasilk Lafto	-	2.70	-	0.0063%
	Ldeta Park	Lideta	-	1.20	-	0.0028%

	Lion Zoo Park	Gullelle	1.50		0.0035%	-
	NNP square Park	Kirkos	-	5.20	-	0.0120%
	Peacock/Addis Zoo Park	Kirkos	7.90		0.0183%	-
	Sheger Park	Gullelle	4.00		0.0093%	-
	Yeka Park	Yeka	2.50		0.0058%	-
Woreda Level Park	Addis ketema Park	Addis ketema	0.70		0.0016%	-
	Afinchober youth park	Arada		0.40	-	0.0009%
	Akaki Millennium Park	Akaki Kality	1.00		0.0023%	-
	Dbab parrk	Gullelle	1.00		0.0023%	-
	Gola Park	Lideta	0.90		0.0021%	-
	Gullele park	Gullele	-	1.00	-	0.0023%
	Kolfe park	Kolfe-keranyo	0.90		0.0021%	-
	Kaleb Park	Yeka	0.30		0.0007%	-
	Teklehaymanot park	Lideta	0.30		0.0007%	-
	Zera Biruk Park	Akaki Kality	0.40		0.0009%	-
		Sum	**60.70**	**615.40**	**0.1405%**	**1.4245%**
		Total coverage	**676.10**		**1.5650%**	

Table 10: Land coverage of parks at the three spatial scales in Addis Ababa

No	**Spatial Scales Park**	**Total percentage coverage**	
		Before 2014	After 2014 (in 20124)
1	City	0.0368%	1.3866%
2	Sub-city	0.0910%	0.0347%
3	Woreda	0.0127%	0.0032%
	Sum	**0.1405%**	**1.4245%**

In addition, the study examined how urban land was allocated to public parks at the three tiers of government in the city, and it observed significant variation (Table 3). According to Table 3, sub-city-level parks received about 0.09% of all public parks' land, followed by city-level parks with 0.0368% prior to 2014. However, after 2014, city-level parks increased to 1.3866% due to the establishment three parks at the city level, five at the sub-city, and two at the Woreda level parks after 2014. Hence, both Sub-city and Woreda levels of parks experienced an increase in land allocation to 0.0347% and 0.0032%, respectively. The Table further illustrates that Addis Ababa's Park areas increased by 1.2840% in 2024.

4.1.2 Urban Public Parks distribution in Addis Ababa

Regarding the spatial distribution of the parks, the study applied Kernel density analysis to the two time periods, before and after 2014, to reach the following conclusion (Figure).

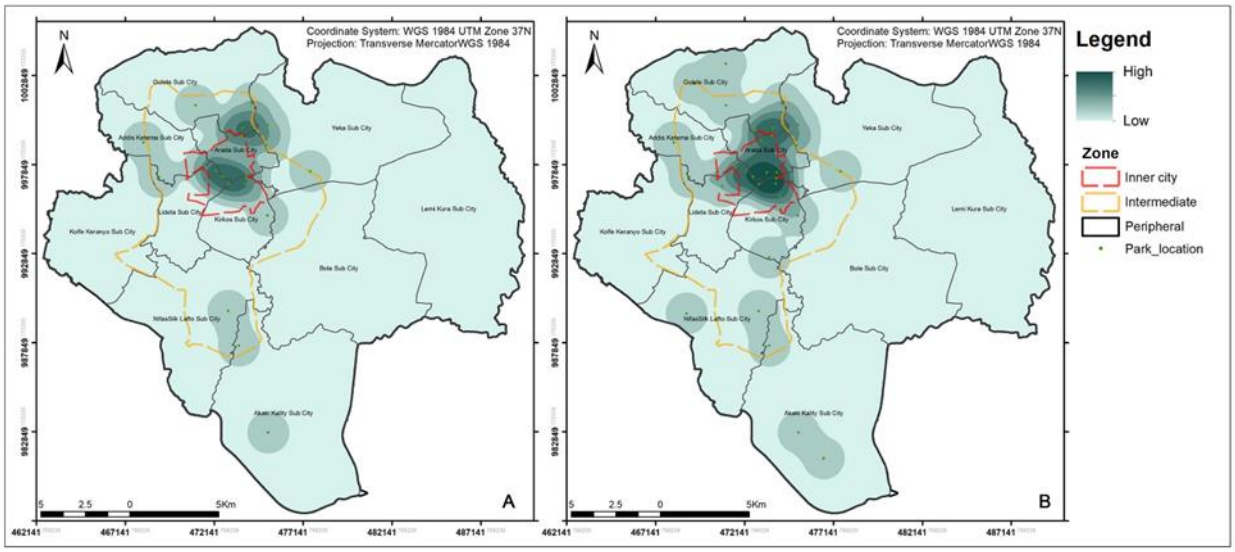


Figure 5: Spatial Distribution of Urban Public Parks in Addis Ababa: (A) before 2014, (B) after 2014

According to the kernel density analysis, parks established before 2014 are predominantly concentrated in the inner-city areas of Addis Ababa, with seven parks forming the highest cluster. The parks include….

A secondary high-concentration zone was observed in the northwestern part of the intermediate zone. Medium Park density extended to selected areas within the intermediate zone, while the peripheral zones of the city were significantly underserved, with only one park identified….

By 2024, a notable increase in park distribution was observed across the city. In the inner-city zone, four new parks were added, including two major city-level parks, Unity Park and Friendship Park, which further solidified this zone as the highest-density hotspot (Figure 4.1).

The city's second tier of government, Sub-cities, has varied urban public parks. Based on Table 4, the distribution of the urban public parks in the city is uneven across the sub-cities. Accordingly, the Gulele sub-city comprises around a quarter of the parks, followed by Kirokos, with 16.67%, and Lideta and Arada, with an equal proportion of about 13.33 %. The least number of parks is found in the Addis Ketema Sub-city, with close to 3.0 %, while Bole and Lemi Kura Sub-cities are not provided with urban public parks.

Table 11: Number and Proportion of urban public parks in sub-cities of Addis Ababa

No	Sub-city	Number of Parks			Total Parks in a sub-city	Percentage	Area (ha)	Proportion from the total park area
		City Level	Sub-City level	Woreda level				
1	Addis ketema	0	0	1	1	3.33%	0.70	0.10%
2	Akaki Kality	0	1	2	3	10.00%	2.90	0.43%
3	Bole	0	0	0	0	0.00%	0.00	0.00%
4	Arada	2	1	1	4	13.33%	41.10	6.08%
5	Gulele	1	4	2	7	23.33%	578.80	85.61%

6	Kirkos	0	5	0	5	16.67%	19.30	2.85%
7	Kolfe	0	0	1	1	3.33%	0.90	0.13%
8	Lideta		2	2	4	13.33%	6.00	0.89%
9	Nifas silk	1	1	0	2	6.67%	18.60	2.75%
10	Yeka	0	2	1	3	10.00%	7.80	1.15%
11	Lemi Kura	0	0	0	0	0.00%	0.00	0.00%
Sum		**4**	**16**	**10**	**30**	**100.00 %**	**676.10**	**100.00 %**

Gulele sub-city is ranked first in land allocated to urban public parks, consuming about 85% of the total land covered by parks, followed by Arada, which accounts for about 6%. The main reason for the massive proportion of parks in Gulele is the placement and establishment of Entoto Park in 2022, the largest park in the city. Arada also hosts Friendship and Unity Parks, which were established recently.

4.1.3 Park service areas and their overlaps

The GIS analysis divided the city into varying degrees of access to public parks, ranging from areas with no park service to areas with access to multiple parks (**Error! Reference source not found.**).

The results (Table 4.3) reveals disparities in park service coverage both across the city as a whole and specifically within residential Blocks. A 16.3% or 7027.76 ha of the city and 28.2% of residential Blocks (6194.85 ha) lacks any park service.

Areas with access to only one park account for 10.8% of the city's land area (4633.06 ha) and 7.2% (1578.6 ha) of the total residential land, while 13.6% of the land (5837.97 ha) and 10.3% (2253.93 ha) of residential Blocks is covered by the service areas of two parks. Three and four parks make

up 10.6% (4576.13 ha) and 10.3% (4415.68 ha) of the city's land, respectively. In terms of residential Blocks with access to three parks represent 8.8% (1929.58 ha), and those with access to four parks constitute 9.3% (2036.79 ha). Such lower overlaps in park areas are located in the southern and eastern part of the city.

Higher overlaps in park services such as areas with access to five parks constitute 7.7% (3309.84 ha) of the land, while six-park overlaps cover 4.2% (1813.59 ha). Whereas five-park overlaps account for 6.0% (1318.06 ha) of residential land, while six-park overlaps covering 2.7% (597.36 ha). Blocks with seven-park overlaps account for 7.4% (3182.75 ha), and those with eight-park overlaps represent 2.7% (1159.17 ha). The highest overlaps access to nine parks or more are relatively rare but still significant and are located in the northern part of the city. Nine-park overlaps cover 2.1% of the city's land (909.75 ha), ten-park overlaps account for 2.9% (1228.01 ha), and areas with eleven or more overlapping parks constitute 11.5% (4932.32 ha) of the city.

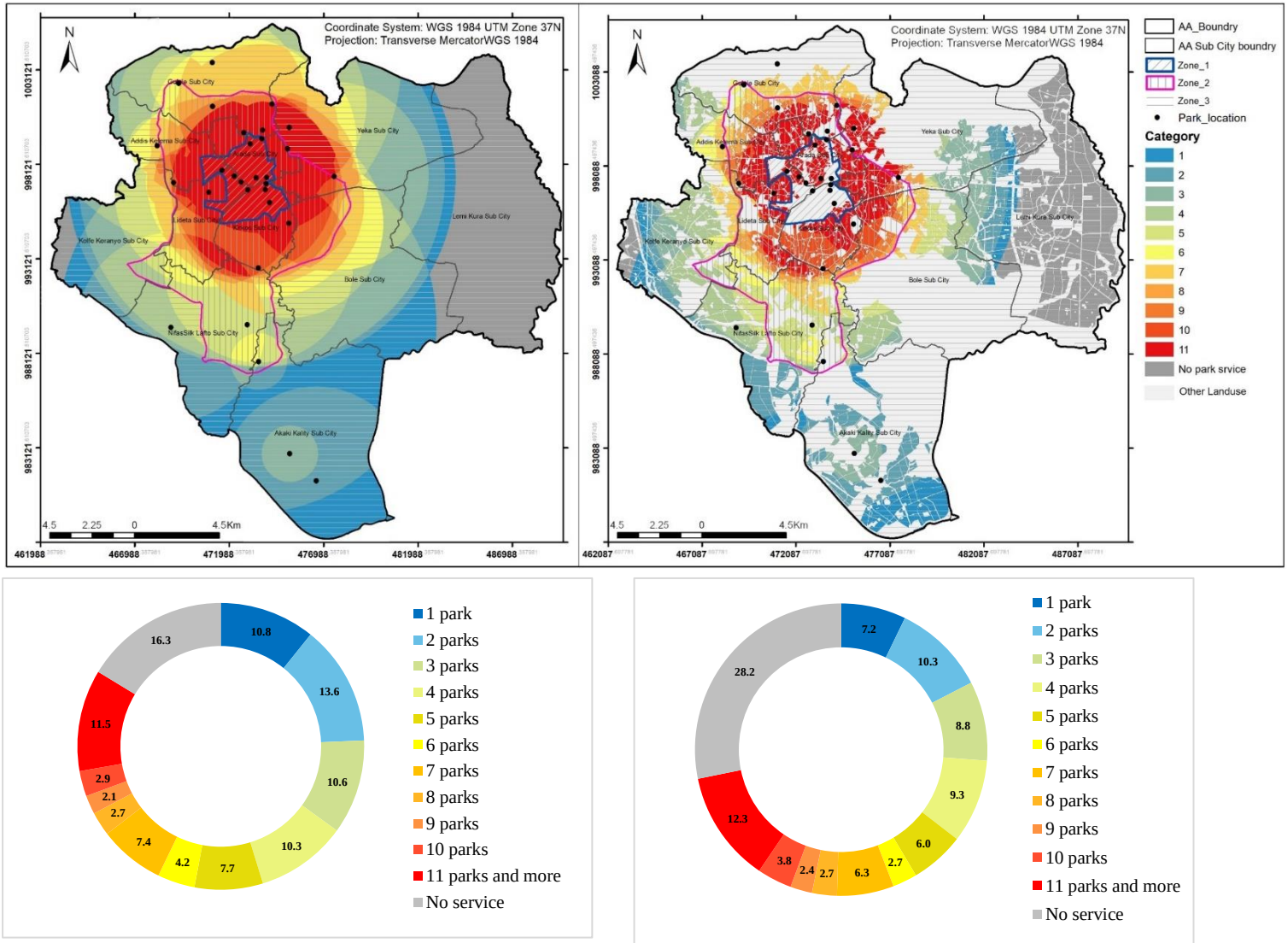


Figure 6. Park service areas and their overlaps (A) City wide; (B) With respect to residential parcels

In terms of residential Blocks access to nine parks make up 2.4% (531.56 ha), ten-park overlaps cover 3.8% (845.19 ha), and Blocks with eleven or more park overlaps represent 12.3% (2711.9 ha) (Table 4.3).

The GIS analysis also reveals spatial variations in park accessibility across the three categorized zones: Zone 1 (inner zone), Zone 2 (intermediate zone), and Zone 3 (outer zone). Regarding on City-Wide perspective, every area of Zone 1 benefits from overlapping service areas of 11 or more parks, ensuring universal park accessibility in the inner city.

In Zone 2, 14.6% has access to five parks, while 14.2% also experience service overlaps of 10 parks, seven parks (7.9%), and six parks (8.3%). However, some areas have minimal access, with smaller overlaps such as two parks (0.2%) or no park access. In Zone 3, characterized by outer city areas, accessibility sharply declines. 21.2% of the zone has no park service, while 17.5% has access to only two parks. Overlap of more than four parks is rare, with 13.6% accessing three parks and 0.1% having access to 10 parks.

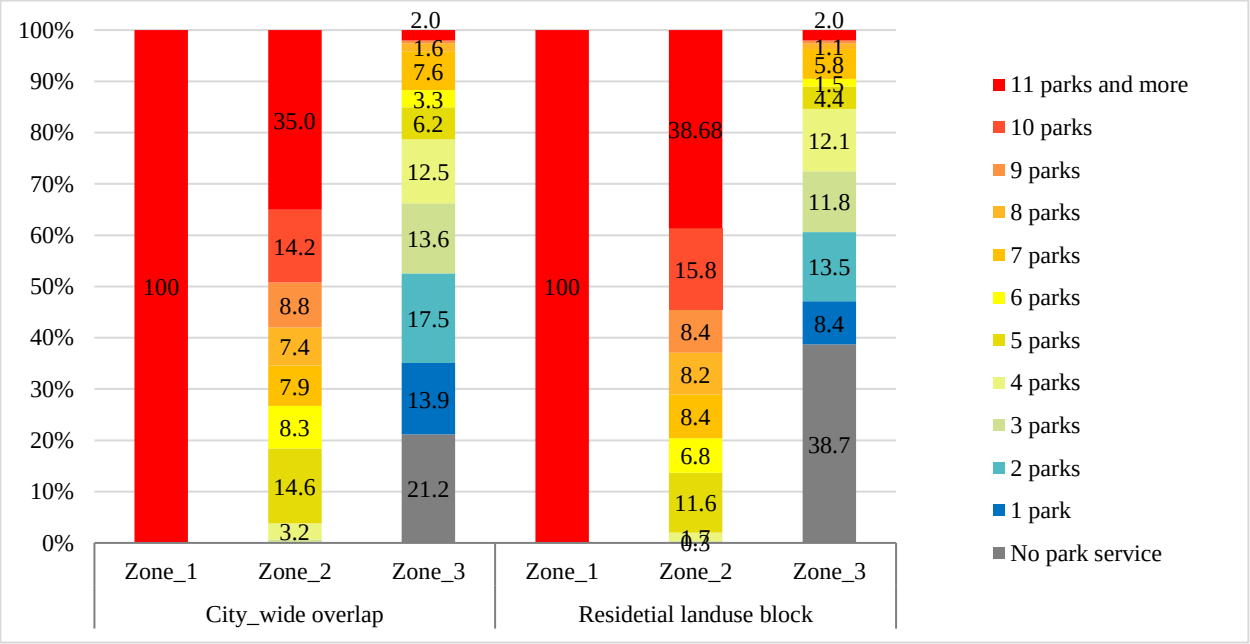


Figure 7. Percent coverage Park service area overlaps based on the three major zones

When focusing on residential land use only, the disparities become even higher. Zone 1 achieves 100% access to 11 or more parks. In Zone 2, residential areas exhibit better access compared to

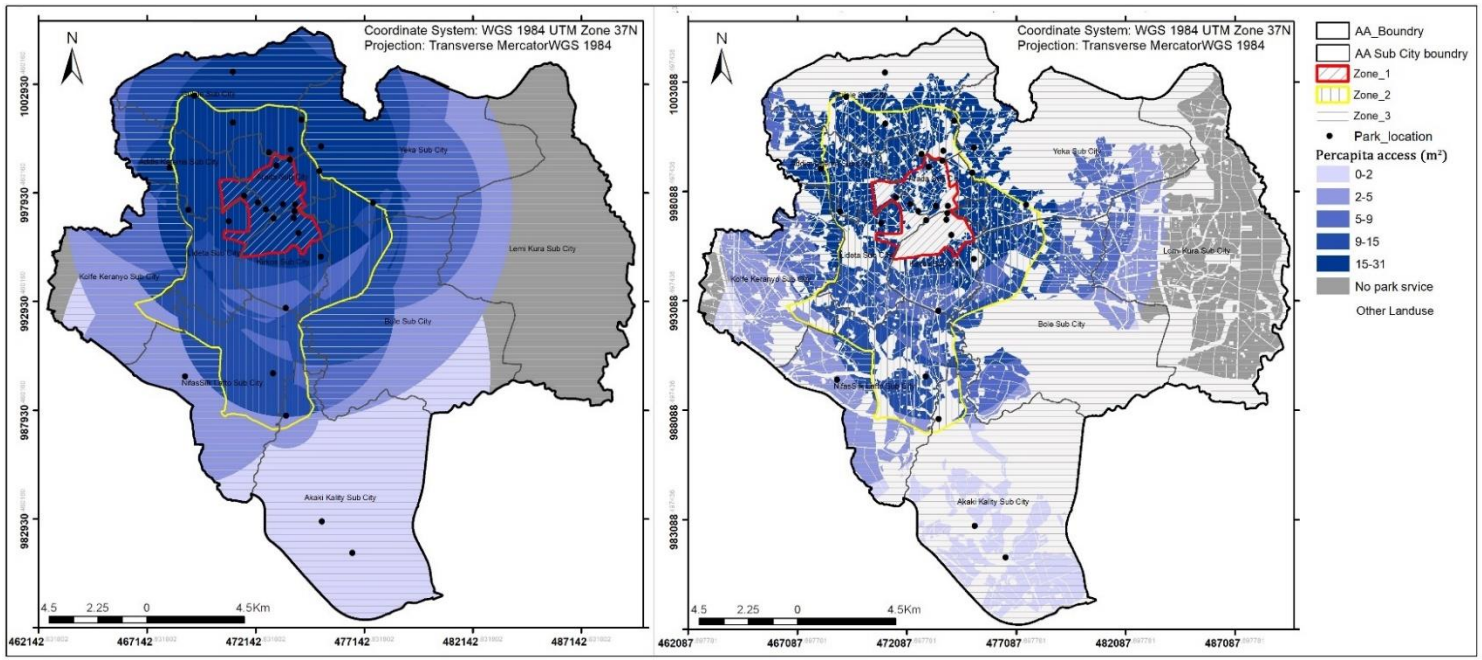
the city-wide average. The highest proportion (15.8%) of residential areas benefits from 10 parks, while significant shares also have access to five parks (11.6%) and seven parks (8.4%). In contrast, Zone 3 indicates accessibility challenges for residential areas. 38.7% of residents live in areas with no park service, and 13.5% only have access to two parks. Access diminishes further, with only 0.1% benefits from 10 parks.

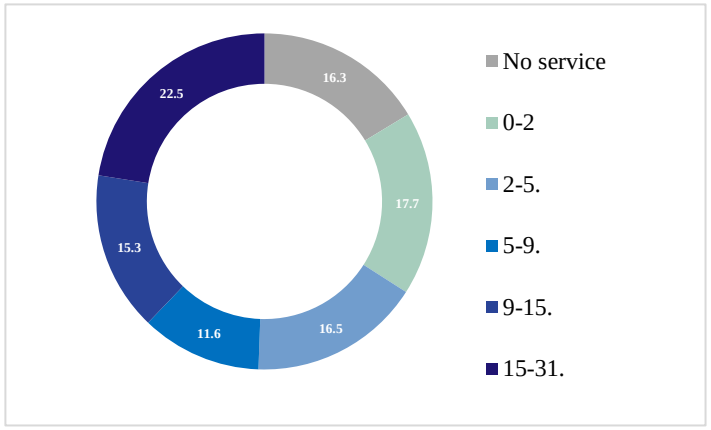
4.1.4 Per-capita access to parks

The analysis of per-capita access to parks in Addis Ababa highlights the variation in access to green spaces across both city-wide and in residential Blocks. Across the city, the results show that 16.3% of the total land area (7027.76 ha) falls under zones with no park access located on western part of the city. Per-capita access ranging from 0-2 m² cover 17.7% of the land (7625.66 ha), representing minimal access viewed on the southern part of the city (Figure 4.5). Areas with 2-5 m² of per-capita access constitute 16.5% of the city (7104.6 ha), while 11.6% of the land (4993.42 ha) provides 5-9 m² per person.

Land with higher accessibility is concentrated on the norther part of the city (Figure 4.5), between 9-15 m², covers 15.3% of the total area (6588.51 ha). The highest category of access, 15-31 m² per person, represents 22.5% of the city's land area (9686.08 ha), suggesting that a relatively small fraction of the city enjoys optimal park access (Table 4.4).

When focusing on residential Blocks, the disparities in park access are more pronounced 28.2% of residential land (6196.85 ha) has no park service, which is significantly higher compared to the overall city-wide figure. Areas with 0-2 m² of per-capita access constitute 11.3% of residential Blocks (2492.65 ha), while 14.5% of the residential land (3182.31 ha) provides 2-5 m² per person. Blocks with access between 5-9 m² account for 12.5% (2738.35 ha), and those with 9-15 m² cover 13.1% (2872.12 ha) of residential areas. The highest level of access, 15-31 m², is available in 20.5% of residential Blocks (4500.14 ha), which is slightly lower than the city-wide figure.





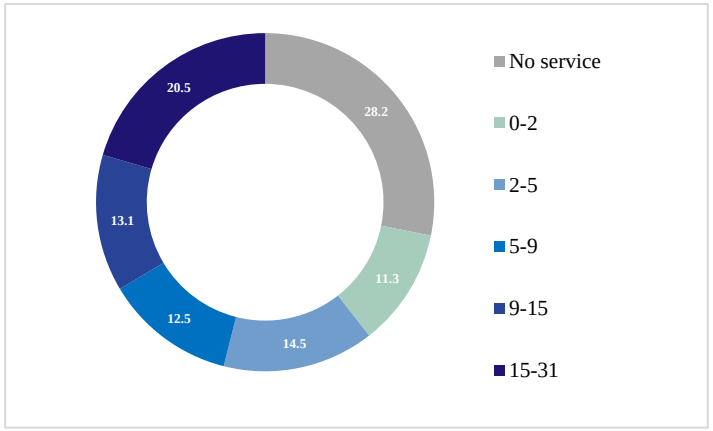


Figure 8. Per-capita access to park

Table 5. Per-capita access to parks

Per-capita access to the parks (m^2)	**City wide coverage**		**Residential Blocks coverage**	
	Area in ha	Percentage of land	Area in ha	Percentage of land
No service	7027.76	16.3	6196.847	28.2
0-2	7625.66	17.7	2492.65	11.3
2-5	7104.6	16.5	3182.31	14.5
5-9	4993.42	11.6	2738.35	12.5
9-15	6588.51	15.3	2872.12	13.1
15-31	9686.08	22.5	4500.14	20.5

The analysis also shows variations among the three zones. Zone 1 demonstrates the highest levels of park accessibility, with 100% of its area falling within the 15-31 m² per capita. In contrast, Zone 2 shows moderate access, with 53.3% of its area achieved the highest per capita range. 34.4% are in the 9–15 m² and 5–9 m² (9.1%) ranges. Zone 3 displays the lowest per capita access, with only 14.2% of its area in the 15–31 m² range and a considerable portion falling below 9 m², including 20.2% in the 2–5 m² category and 22.5% with less than 2 m².

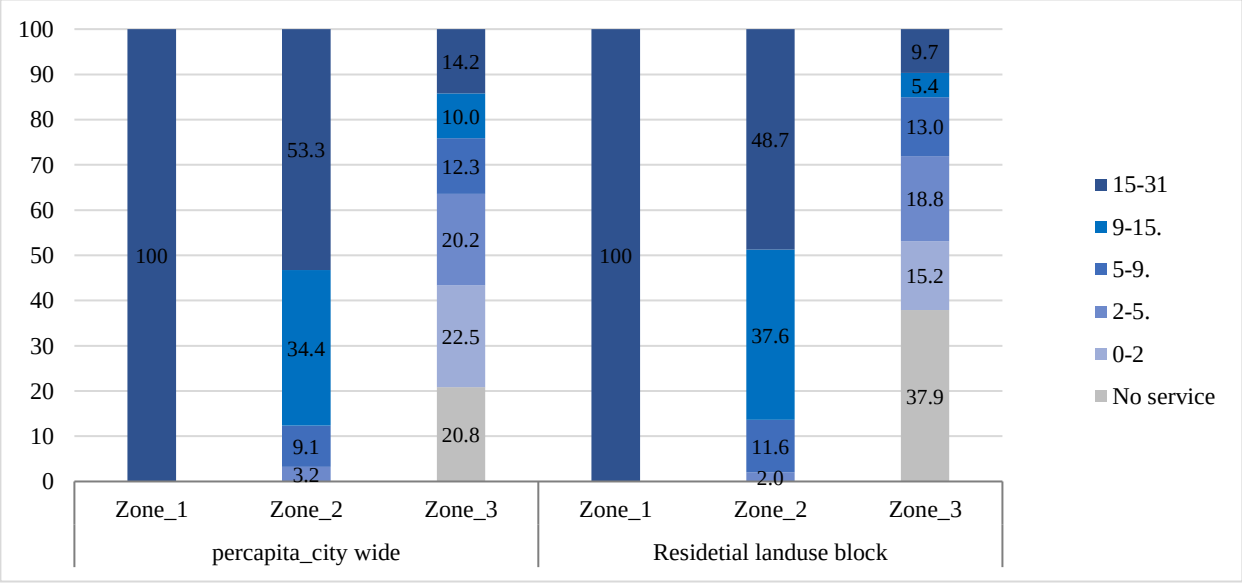


Figure 9. Percent coverage of Per-capita access to parks based on the three major zones.

A similar trend is observed within residential land use blocks. Zone 1 maintains superior access, with all blocks achieving over 15 m² per capita. Zone 2 fares moderately, with 48.7% of its blocks in the highest category, 37.6% fall into the 9–15 m² and 5–9 m² (11.6%) ranges. In Zone 3 only 9.7% is in the highest range, and a majority (18.8% and 15.2%) within the 2–5 m² and 0–2 m² categories, respectively.

4.2 **Discussion**

UGS contribute to ecological balance, community well-being, and the improvement of urban living standards by offering a variety of environmental and social advantages (Halil, 2011; Marion et al., 2018). In order for people to fully benefit from parks, appropriate accessibility is essential (Yuhong et al., 2017). Their equal distribution is important factor in urban development. In order for these initiatives to be successful, they need to be supported by data and metrics that precisely reflect the differences in UGS distribution among various urban settings (Marion et al., 2018).

The kernel density analysis reveals substantial progress in park distribution in Addis Ababa between 2014 and 2024. The addition of parks, particularly in peripheral zones, helps to mitigate historical disparities. Notably, the establishment of city-level parks in the inner-city core reinforces as a focal point of green space development. However, the persistent lack of park development in western and eastern zones highlights an ongoing imbalance in equitable access to green spaces. In contrast the findings of (Shuying et al., 2021), studied China, Beijing illustrate a progressive shift toward a more balanced distribution over a decade.

Major variations in the spatial distribution of public park service coverage throughout Addis Ababa were identified by the GIS analysis, highlighting the difficulties in attaining spatial equity in the provision of public parks. While certain areas benefit from extensive park overlaps, with 18.5% of residential Blocks having access to nine or more parks, 16.3% of the city lacks any access to park services. This finding is consistent with the study by (Habibollah and Taher, 2020), which analyzed spatial equity in Ilam, Iran, and similarly found a biased distribution of parks. In their study, about one-third of the city area excluded from any park service coverage, while certain regions experienced overlaps of more than 13 park services. The findings also align with observations by (Shu et al., 2019) who identified a mismatch between the distribution of urban parks and urban

residents in Beijing, China. Parallel findings also indicated that some areas are overserved due to the proximity of multiple parks, while others are underserved entirely because of their distance from park locations (Khamannatun et al., 2020);(Rashid and Haruka, 2021).This emphasize the critical need for targeted interventions in the different part of the city, where lower overlaps are concentrated.

On the other hand, spatial equity in cities is importantly gauged by measuring per-capita access to parks. The equitable distribution and usability of urban green spaces are greatly influenced by elements including park size, accessibility, and the proportion of parks to population density (Rashid and Haruka, 2021).

The analysis of per-capita park access in the city shows substantial spatial inequalities in public park availability. While a 22.5% of the city, predominantly in the northern areas, enjoys relatively high levels of access (15-31 m^2 per person), over 16% of the land, particularly in the eastern part of the city, lacks any park service. Similar problems are seen in Seoul, where many locals are unable to visit the city's many urban parks due to their concentration in outlying areas (Kyushik and Seunghyun, 2007). This disparity between park availability and actual accessibility highlights how spatial distribution impacts the equitable use of green spaces.

Even a sharper contrast emerges when focusing on residential Blocks, where 28.2% lack park service almost double the city-wide figure. While 20.5% of residential Blocks benefit from the highest access level (15-31 m^2), this remains lower than the overall city average. This stress inequities in the distribution parks among areas where people live. (Habibollah and Taher, 2020), further highlighted by the findings from Ilam, Iran where larger parks and lower population densities give some districts better access, but small and dispersed parks in other districts especially in the city's southern regions. Such patterns suggest a misalignment between population density and green space allocation.

Even though the GIS-based approach employed offers a robust framework for assessing park and distribution, it has certain limitations. The use of buffer distances to define park service areas assumes uniform access within these zones, which may not account for real-world barriers such as road networks, topography, or safety concerns.

5. Conclusion

Urban parks play a vital role in fostering livable cities by promoting environmental sustainability, social well-being, and equitable access to recreational spaces. The study aimed to evaluate the spatial equity, functional quality, and utilization trends of public parks in Addis Ababa, providing insights into their current state and potential areas for improvement. Using GIS-based analysis, survey data, and comparative studies, the research highlighted key patterns in park distribution, functionality, and usage across different parts of the city.

The distribution of parks in Addis Ababa from 2014 to 2024 shows a mixed story of advancement and enduring inequity. While advancements have been made such as the inclusion of parks in peripheral zones and the creation of city-level parks in the inner city the western and eastern parts of the city remain underserved. This uneven distribution shows the challenges of achieving spatial equity in rapidly urbanizing cities.

Moreover, park service areas in Addis Ababa reveals significant disparities, with a 16.3% (7027.76 ha) of the city and 28.2% (6194.85 ha) of residential Blocks lacking access to any park services. Although areas in the northern and central zones enjoy extensive overlaps of nine or more parks. This necessitates strategic planning and resource allocation to enhance coverage in underserved areas and optimize park distribution citywide.

Per-capita access to park analysis also reveals inequalities, both city-wide and within residential areas. The city lacks park access, with the eastern areas particularly underserved. While the northern part of the city enjoys optimal access, this high level of accessibility is lesser with respect to the residential blocks. The disparity is more acute in residential areas. This shows the misalignment between park distribution and population density, where equitable access is most critical.

Finaly, this research offers valuable contributions to urban planning and environmental design. The findings stress the importance of integrating spatial planning with social and environmental considerations to enhance equitable resource allocation.

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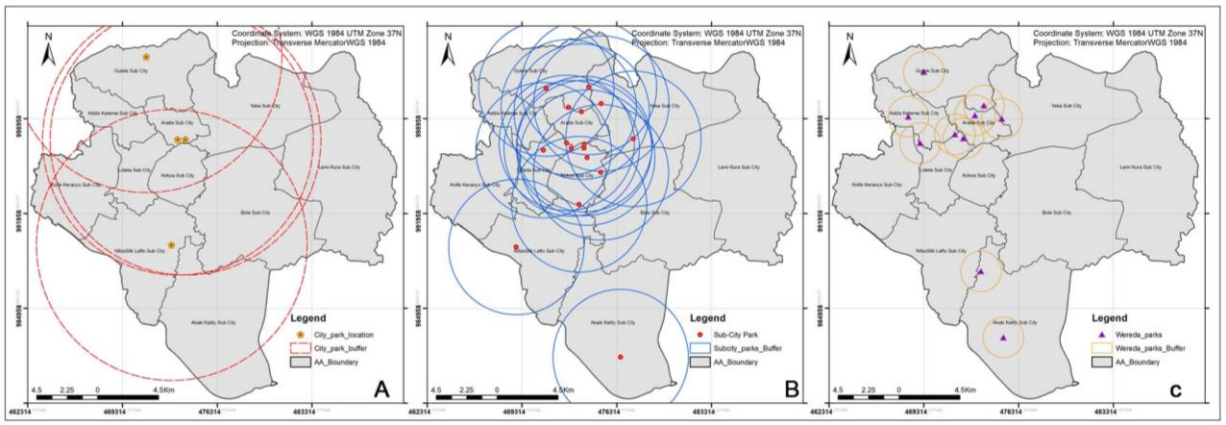
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Annex 2.Park service buffer zone. (A) City level, (B) Sub-city level, (C) Woreda level



Annex 3. City, Sub City, and Woreda level parks in Addis Ababa

Spatial Scale	Park name	Sub-city	Area (ha)		Percentage from the area of the city	
			Before 2014	After 2014	Before 2014	After 2014
City Level Park	Bheretsige Park	Nifasilk Lafto	15.90		0.0368%	-
	Entoto Park	Gullelle		560.00	-	1.2963%
	Friendship Park	Arada		28.00	-	0.0648%
	Unity Park	Arada		11.00	-	0.0255%
Sub-city Level Park	Africa Park- 1	Kirkos	1.10	-	0.0025%	-
	Africa Park - 2	Kirkos	0.70	-	0.0016%	-
	Akaki Park	Akaki Kality	-	1.50	-	0.0035%
	Ambassador Park	Arada	1.70		0.0039%	-
	ECA Park	Kirkos	-	4.40	-	0.0102%
	Ethio-Cuba Park	Lideta	3.60	-	0.0083%	-
	Ethio-Korea Park	Gullelle	3.60	-	0.0083%	-
	Ferensay Park	Yeka	5.00	-	0.0116%	-
	Hamle 19 Park	Gullelle	7.70	-	0.0178%	-
	Kentiba w/tsadik park	Nifasilk Lafto	-	2.70	-	0.0063%
	Ldeta Park	Lideta	-	1.20	-	0.0028%

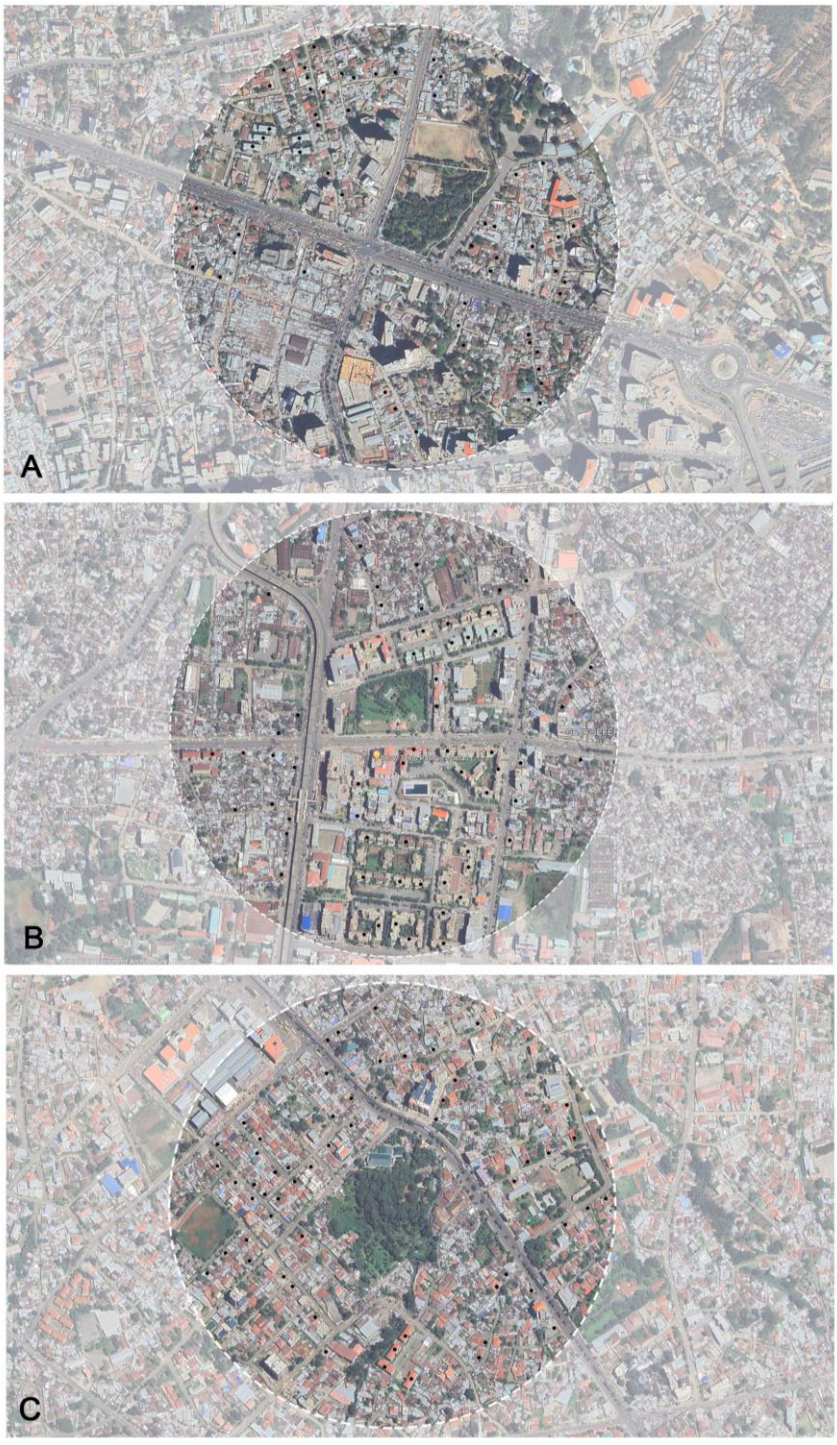
	Lion Zoo Park	Gullelle	1.50		0.0035%	-
	NNP square Park	Kirkos	-	5.20	-	0.0120%
	Peacock/Addis Zoo Park	Kirkos	7.90		0.0183%	-
	Sheger Park	Gullelle	4.00		0.0093%	-
	Yeka Park	Yeka	2.50		0.0058%	-
Woreda Level Park	Addis ketema Park	Addis ketema	0.70		0.0016%	-
	Afinchober youth park	Arada		0.40	-	0.0009%
	Akaki Millennium Park	Akaki Kality	1.00		0.0023%	-
	Dbab parrk	Gullelle	1.00		0.0023%	-
	Gola Park	Lideta	0.90		0.0021%	-
	Gullele park	Gullele	-	1.00	-	0.0023%
	Kolfe park	Kolfe-keranyo	0.90		0.0021%	-
	Kaleb Park	Yeka	0.30		0.0007%	-
	Teklehaymanot park	Lideta	0.30		0.0007%	-
	Zera Biruk Park	Akaki Kality	0.40		0.0009%	-
		Sum	**60.70**	**615.40**	**0.1405%**	**1.4245%**
		Total coverage	**676.10**		**1.5650%**	

Annex 4. Observation checklist

- Mapping of the distribution of different land uses and facilitites
- The presence and condition of landscape elements
- Functional quality: Spatial arrangement, Diversity of spaces within the park, Freedom of movement (circulation), Flexibility (capacity to adapt d/t activities), Inclusivity of the park (comfort to diverse user groups)
- The number of users engaged in different activities:
- How users interact with different park features:
- How do users navigate and move through the park?
- If there any areas that seem underutilized or poorly designed.
- The overall cleanliness and maintenance of the park.

- Factors that could impact safety: Crowding, Blind spots, Broken equipment
- General impressions about the park and potential areas for improvement

Annex 5. Location of sampled households



Annex 6. Questionnaire for Park User

Park Name: _____ Date: _____

Greetings! As part of our commitment to enhancing green spaces, you are invited to participate in this Survey. Your experiences and opinions will contribute to a better understanding of how these green spaces utilization coverage can be optimized. Thank you for taking the time to share your thoughts, your input is greatly appreciated.

Section 1: Demographic Information:

1.1 Age: ☐ Below 18 ☐ 18-25 ☐ 26-40 ☐ 41-55 ☐ 56+

1.2 Gender: ☐ Male ☐ Female

1.3 Marital status: ☐ Married ☐ Single ☐ Divorced

1.4 Educational status:

☐ Primary education & less ☐ Secondary, University, College ☐ Degree & above

1.5 How far is your home from this park?

☐ less than 400 KM ☐ 400m-1000m ☐ 1km- 5km ☐ greater than 5km

1.6 What do you think your level of awareness is about public parks in Adiss Ababa

☐ Excellent ☐ Very good ☐ Good ☐ Poor ☐ Very Poor

Section 2: Park Utilization and experience:

2.1 How often did you visit the green areas in the last six month?

☐ 1-5 ☐ 5-20 ☐ 20-50 ☐ >50

2.2 If rarely or never, why (Check all that apply)

☐ I'm busy ☐ I'm not aware about parks ☐ I'm not interested ☐ lack of safety ☐ Lack of recreational facilities ☐ Unfavorable weather condition ☐ Health and physical concern ☐ Other (please describe) _____

2.3 What days do you usually go to parks?

☐ Weekdays ☐ Weekends

2.4 What time of the day do you usually go to parks?

☐ Morning ☐ Midday ☐ Afternoon ☐ Evening

2.5 What activities do you primarily engage in when visiting Park? (Check all that apply)

☐ Walking/Jogging ☐ Sports (e.g., soccer, basketball) ☐ reading ☐ Relaxation and resting ☐ meeting with friends and relatives ☐ To get resh air ☐ Entertaining children ☐ Other (please specify): _____

2.6 How many accompanies do you usually have when you come to this park?

☐ Alone ☐ 1 ☐ 2-3 ☐ More than 3

2.7 How well do you think the available land in the park is utilized for recreational activities?

☐ Excellent ☐ Very well ☐ Acceptable ☐ Poor ☐ Extremely poor

2.8 what specific areas do you feel are underutilized or could be better optimized for recreational purposes? ☐ Entrance areas ☐ Around fence areas ☐Vegetated areas ☐ Facility areas ☐ Open fields ☐ Areas adjacent to natural features /water bodies, mountains /

2.9 What specific improvements would be enhancing your experience in this park?

☐ Seating areas ☐ Recreational facilities ☐ Improving quality of pathways ☐ landscaping ☐ Maintenance and cleanness ☐ Safety and Security ☐ Other (please specify)._____

2.10 Do you feel that the community's preferences and needs are considered in the park's planning and design? ☐ Yes, definitely ☐Somewhat ☐ Not really ☐ Not at all

2.11 Overall, how satisfied are you with the park?

☐ Extremely satisfied ☐ Very satisfied ☐ Somewhat satisfied ☐ Not satisfied

Section 3: complete the table with *(1= extremely poor, 2 = poor, 3 = acceptable, 4 =very good, and 5 = excellent).*

	Quality of the park	1	2	3	4	5
1	Spatial Arrangement					
2	Diversity of space					
3	Walkability					
4	Flexibility					
5	Inclusivity					
6	Safety and security					
7	Maintenance					

8	Cleanness					

Any additional comments or suggestions? _____

_____ *Thank you for sharing your insights! Your input will contribute to the ongoing improvement of our community parks.*

Annex 7.Interview question for officials

1. Can you provide of the current management structure of your institution?
2. when did this institution established and responsibilities and role of the organization.
3. Objectives regarding on the development and management of GAs?
4. Describe the no. of public parks available? There establishment date
5. Can you discuss the current development status and process of park management?
6. How do you collaborate with other stakeholders, such as departments and agencies sub-city administrations, in park management?
7. Is there any management plan, standard outlined to fulfill for development and maintenance parks?
8. How does the administration engage with local communities and stakeholders in the planning and decision-making processes.
9. What initiatives have been undertaken to address the park's quality and utilization?
10. What are the main obstacles encountered in the development of public parks.
11. Are there any innovative approaches being considered to overcome existing obstacles.
12. Number of users visited these parks in the recent 6 month? Seasonal data on park usage and visitor demographics?

13. What are the priority areas for future development or improvement of public parks within your institution?

Annex 8. Interview Question for Park manager and employees

1. Can you provide an overview of your role and responsibilities in this park?
2. What are the daily tasks and activities involved in the operation and maintenance of the park?
3. How do you engage with park visitors to enhance their experience and satisfaction?
4. Can you discuss any special events or programs organized within the park?
5. What are the main challenges faced in managing the public park, how do you address them?
6. How do you address security and safety concerns for the park visitors and staffs?
7. Are there any collaborative efforts with local organizations or businesses to support park initiatives?
8. How do you gather feedback from park users and nearby residents to inform park improvements?