

QATAR UNIVERSITY

COLLEGE OF ENGINEERING

THE IMPLICATIONS OF INADEQUATE PARKS IN LOW-INCOME

NEIGHBORHOODS - QATAR, INDUSTRIAL AREA

BY

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A Thesis Submitted to
the College of Engineering
in Partial Fulfillment of the Requirements for the Degree of
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ABSTRACT

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Title: The Implications of Inadequate Parks in Low-Income Neighborhoods- Qatar, Industrial Area

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Despite ongoing urbanization and industrialization, the scarcity of green spaces has emerged as a pressing socio-economic concern, particularly in developing nations. This study delves into the ramifications of inadequate green spaces on the well-being of residents in low-income neighborhoods situated within Qatar's Industrial Area. It pursues three primary objectives: understanding the impact of green space scarcity on motivation and productivity, analyzing the effects of population density surges in urban areas, and evaluating shifts in social behavior. Employing a comprehensive array of research methodologies such as literature review, case studies, interviews, observational studies, and analysis, this research investigates the nexus between insufficient parkland, substandard landscape planning, and the holistic welfare of low-income community members. Despite an uptick in green space availability in 2022, per capita green spaces still need improvement; deficient areas need improvement in low-income areas. Moreover, residents living approximately 300 meters away encounter significant barriers in accessing the nearest park, which is located a 50-minute walk away from the Industrial Area. By embracing a multidisciplinary approach spanning urban planning, environmental science, and social sciences, this research provides valuable insights into potential interventions and strategies to facilitate the living standards of the vulnerable within low-income neighborhoods.

Keywords: park, community, industrial area, workers, public spaces, low in

DEDICATION

This thesis is dedicated to my dear mother, Nafisa, whose prayers were a constant source of strength for me. I also dedicate this work to my father, Abdelgadir. May his soul rest in peace, whose guidance and wisdom inspire me. To my cherished small family, my wife Nada, Abdelgadir, and Amr, your unwavering support has meant everything to me. Your encouragement has been invaluable on this journey to my extended family, Sayda, Majid, Zoelnoon, Fath Elrahman, and Fathelalim.

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CHAPTER 1: INTRODUCTION

1.1 Background of the Study

In many developing world megacities, burgeoning population growth and rapid urbanization present parallel challenges. This phenomenon is vividly exemplified in Doha, the vibrant capital of Qatar, whose evolution from a modest fishing and pearling community in the early 1900s to a dynamic, globally aspiring modern economy has been propelled by significant governmental endeavors (Salama & Wiedmann, 2013). With a population exceeding 2.8 million in 2020 and projected to surge by another million over the next two decades, Doha's metropolitan landscape encapsulates the epicenter of this transformative momentum, hosting most of its inhabitants.

Aligned with its strategic vision for economic diversification, the Qatari government has spearheaded ambitious initiatives in tourism, education, sports, and service-related industries, notwithstanding the nation's substantial natural gas and petroleum endowments (Alhammedi, 2022). Notably, the grandiose FIFA World Cup 2022 preparations have engendered an array of large-scale infrastructural projects, including stadiums, ancillary facilities, and urban developments such as Lusail City, Hamad Port, and the Qatar Rail City transit system (Salama & Wiedmann, 2013). These endeavors have redefined Doha's skyline and spatial configuration, reclaiming land from the sea and expanding the urban fabric to accommodate burgeoning demands.

Despite these strides, the challenge of preserving green spaces amid rapid urban expansion looms large. Urban green areas, integral to biodiversity preservation and provisioning essential ecosystem services, have suffered encroachments due to competing governmental policies and relentless real estate development pressures. While Doha has witnessed a proliferation of public parks and pedestrian precincts in

response to urbanization, industrial areas, predominantly inhabited by low-income workers, still need such amenities. Consequently, workers flock to urban parks for leisure and recreation, inadvertently straining familial and societal dynamics and exacerbating urban congestion and vehicular traffic.

The ramifications of this phenomenon extend beyond social dynamics, encompassing environmental and climatic implications as well. Paved surfaces in industrial zones exacerbate local climate conditions and impose financial burdens on workers seeking green spaces elsewhere. Moreover, expanding modern cities at the expense of green areas underscores the intrinsic human need for natural environments. It emphasizes the imperative of integrating green spaces into urban design frameworks.

In light of these challenges, urban planners and designers must institute scientific principles for preserving and enhancing green open spaces. Prioritizing the establishment of expansive, interconnected green spaces that permeate urban sectors in a balanced manner is crucial to facilitating the human environment and safeguarding the well-being of urban inhabitants amidst the relentless march of urbanization.

1.2 Statement of the Problem

As developing countries undergo rapid urbanization and industrialization, the lack of green spaces in low-income neighborhoods is becoming a significant issue. The depletion of parks and green areas due to urban expansion poses tremendous challenges to residents' well-being. The Qatar Industrial Area is a relevant case study highlighting the global problem of inadequate green areas in industrial areas.

This research aims to comprehensively examine the social and economic impact of insufficient green spaces in low-income neighborhoods in the Qatar Industrial Area. The inadequate number of parks and green areas raises concerns about residents' quality

of life. The study has three main objectives: first, to identify how the lack of green spaces affects social dynamics, motivation, and productivity among residents; second, to analyze the resultant increase in population density in the city; and third, to measure the impact on social behavior within these communities.

The study will use a multidisciplinary approach integrating urban planning, environmental science, and social sciences insights. It will utilize various methodologies, including literature reviews, case studies, open-ended interviews, and observational studies. The study will assess the relationship between inadequate green spaces, poor landscape planning, and the overall well-being of individuals in low-income neighborhoods.

This research is particularly timely as it examines the impact of recent efforts to increase green areas in the Qatar Industrial Area in 2022. Despite these initiatives, the study will reveal the persistent shortage of per capita green spaces and the accessibility challenges residents face. The results of this research will contribute to understanding the complex interplay between urbanization, green spaces, and community well-being and provide a valuable framework for implementing interventions to enhance the quality of life in low-income neighborhoods.

1.3 Gap of the Study

While existing literature recognizes the significance of green spaces in urban environments, there still needs to be a notable gap in understanding the challenges posed by the lack of parks within industrial areas, particularly in low-income neighborhoods. Industrial areas, such as the Qatar Industrial Area, present a unique set of circumstances where the demands of industrialization intersect with the needs of residential communities. The lack of research addressing this intersection, explicitly

focusing on the need for more parks and green spaces in such industrial zones, underscores the need for a targeted investigation.

The rapidly industrializing Qatar Industrial Area is a representation of many comparable locations across the world. Though it is clear that more research is needed to address the particular difficulties people confront when living near industrial operations and the resulting dearth of parks, green spaces play a critical role in improving residents' general quality of life. More research is needed on the effects of industrial settings' lack of green areas on the general well-being, social dynamics, and quality of life of low-income neighborhoods.

Addressing this research gap is essential for developing tailored interventions and strategies that consider the unique challenges posed by industrialization in tandem with the residential aspect. This study attempts to fill the current knowledge gap and offer insightful information about the intricate relationship between industrialization, green spaces, and living standards in low-income areas by concentrating on the Qatar Industrial Area. Through this targeted investigation, the study seeks to inform urban planning policies, environmental initiatives, and community development strategies specific to industrial areas facing similar challenges globally.

1.4 Questions and Objectives of the Study

Study Questions:

1. How does the absence of parks and green spaces affect the daily lives and work motivation of residents in low-income neighborhoods within Qatar's Industrial Area?
2. Is there a relationship between the low incomes and inadequate parks in the Qatar Industrial Area?

3. How does the scarcity of green spaces affect social behavior among residents in low-income neighborhoods within industrial settings?

Aim:

The research aims to comprehensively examine the social and economic impact of insufficient green spaces in low-income neighborhoods in the Qatar Industrial Area. The inadequate number of parks and green areas raises concerns about residents' quality of life.

Study Objectives:

1. Evaluate the current status of parks in Qatar's Industrial Area, focusing on low-income neighborhoods, to understand the extent of green space availability.
2. Investigate the social implications of inadequate green spaces on residents of low-income neighborhoods to identify challenges affecting community well-being.
3. Explore the relationship between park availability and community cohesion in the industrial area to determine the role of green spaces in fostering social bonds and neighborhood connectivity.

These objectives collectively aim to address the gap in understanding the challenges posed by the lack of parks in an industrial area, providing valuable insights for policymakers, urban planners, and community development initiatives.

1.5 Significance of the Study

The idea for this study emerged from a growing recognition of the critical role that green spaces and parks play in enhancing urban living, particularly in densely populated and industrialized areas. Urban planners and policymakers in Qatar have been increasingly focused on creating sustainable and livable cities in alignment with the Qatar National Vision 2030 and Qatar National Master Plan- Qatar National

Development Framework 2032, which emphasizes environmental development and the well-being of all citizens. Despite these efforts, there has been a noticeable gap in the availability and quality of parks in low-income neighborhoods, especially in the Industrial Area, which houses a significant portion of the country's workforce.

This study is significant because it addresses a crucial aspect of urban inequality. The lack of adequate parks in low-income neighborhoods can lead to various negative implications, including reduced physical and mental health, diminished social cohesion, and lower overall quality of life for residents. By focusing on the industrial area, the study sheds light on its residents' specific challenges. It provides data-driven insights that can inform more equitable urban planning practices.

The lack of adequate parks in low-income neighborhoods and industrial areas in Qatar has significant implications, including reduced quality of life, limited access to recreational spaces, and adverse health impacts. This deficiency hinders the achievement of several United Nations Sustainable Development Goals (SDGs), such as Good Health and Well-being (SDG 3), Sustainable Cities and Communities (SDG 11), and Reduced Inequalities (SDG 10). Addressing this issue is crucial for promoting social equity, improving urban living conditions, and fostering overall community well-being (Sustainable et al., 2024).

The significance of this research lies in its potential to address a critical gap in understanding the socio-economic impact of insufficient green spaces, specifically within the unique context of low-income neighborhoods in industrial areas such as the Qatar Industrial Area. Firstly, the study provides tailored insights into the challenges faced by residents living near industrial activities. Industrial areas often present a complex interplay between the demands of industrialization and the residential needs of communities. Understanding the dynamics between industrialization and green space

scarcity is crucial for developing context-specific interventions and strategies.

Secondly, the research delves into the fundamental aspects of community life by exploring the impact on residents' motivation, productivity, and overall well-being. The findings can inform policies to improve individuals' living conditions and work experiences in industrial areas, addressing a critical community development aspect. Moreover, the study investigates the correlation between the scarcity of green spaces and population density, considering factors such as residential migration patterns and housing developments.

Urbanization and industrialization often contribute to increased population density, and understanding this relationship is essential for managing population growth in industrial zones and guiding urban planners and policymakers. Furthermore, the research explores the influence of green space inadequacy on social behavior, providing valuable insights into community dynamics. Understanding how the lack of parks affects social interaction, community engagement, and recreational activities can guide the development of community-centric initiatives, fostering a more cohesive and resilient social fabric.

The study also evaluates the effectiveness of recent efforts to increase green areas in 2022, offering a critical assessment of ongoing initiatives. This information can guide future policy adjustments and investments to ensure that such projects align with the actual needs of low-income residents, promoting sustainable and impactful urban development. Additionally, combining urban planning, environmental science, and social sciences, a multidisciplinary approach contributes to a holistic comprehension of the intricate connection between green places, industrialization, and community well-being. This approach enhances the potential for comprehensive and sustainable interventions, providing a model that can be adapted to diverse contexts facing similar

challenges globally.

In conclusion, this research holds significance for its potential to inform evidence-based decision-making, shape urban development policies, and contribute to the well-being of residents in low-income neighborhoods within industrial settings, both in the Qatar Industrial Area and in analogous regions worldwide.

1.6 Scope and Limitations

While holding significant potential, this research has limitations that need careful consideration. Firstly, the focus on the Qatar Industrial Area might limit the generalizability of the findings. This region's unique socio-economic and environmental characteristics may not be directly applicable to other industrial areas, impacting the broader relevance of the study.

Secondly, the study operates within a specific timeframe, which may constrain its ability to capture long-term trends or changes over extended periods. Short-term fluctuations in green space initiatives or population dynamics may need to be fully accounted for, potentially limiting the study's temporal scope.

Thirdly, the reliability and availability of data present potential challenges. Only complete or updated data on the inhabitants' socioeconomic standing and historical shifts in green space initiatives may introduce uncertainties, affecting the precision of the analysis. Methodological challenges also play a role, as various research tools, including interviews and observational studies, may introduce biases. The subjective nature of qualitative data and potential participant biases could influence the accuracy and objectivity of the findings. External factors, such as governmental policies, economic changes, or unforeseen events, could affect the outcomes. These externalities are challenging to control, introducing variables that may impact the research beyond

the study's initial scope.

Access to participants, particularly in industrial areas with security or privacy concerns, may be limited, potentially affecting the diversity and representativeness of perspectives gathered. While the multidisciplinary approach is a strength, it may also pose challenges. The depth of analysis within each discipline may be constrained due to time and resource limitations, potentially limiting the depth of insights in specific areas.

Lastly, establishing causation between the lack of green spaces and observed impacts may be challenging. Other confounding variables not accounted for in the study design may contribute to the observed outcomes. Recognizing these limitations is essential for a nuanced interpretation of the research findings and guiding future studies in similar domains. Researchers and policymakers should approach the study outcomes with an awareness of these inherent constraints.

1.7 Thesis Structure

The research is structured into several chapters to address the identified research objectives systematically. Chapter 1 serves as the research background and statement, defining the identified research gap, presenting the research questions and objectives, stressing the importance of the study, admitting its limitations, and summarizing the overall research structure. The introduction lays the foundation.

Chapter 2 delves into the literature review, organized around urban planning theories, including Social Justice Theory, The theory of central urban places, and Place Attachment Theory. This chapter also includes case studies from local, regional, and global contexts, offering a comparative study. The significance of parks and green areas for social cohesion, physical and mental health, and communal well-being is discussed,

as well as theoretical insights into landscape architecture from John Simonds. A thorough grasp of the corpus of information is aided by factors such as urban planning and landscape design, difficulties in low-income neighborhoods, and insights gained from speaking with pertinent stakeholders.

Chapter 3 outlines the research design, methodology, and limitations. It introduces the Industrial Area under investigation, details the use of equity mapping via Google Maps, summarizes the research sample and site selection criteria, discusses the data collection methods employed, and addresses the anticipated limitations of the study. This chapter concludes with a summary, setting the stage for the subsequent data analysis.

Chapter 4 engages in a detailed data analysis. It begins by outlining the criteria for the location of parks and other green spaces in Qatar and looks at how many more there will be by 2022. The chapter analyzes existing parks, calculates per capita green space based on a specific land use plan, and conducts observational studies in critical areas. The analytical questionnaire survey is introduced, providing a comprehensive approach to data analysis.

Chapter 5 transitions into a discussion of the findings and recommendations for practice. It suggests enhancements at the urban design level and identifies potential avenues for future research, ensuring a forward-looking perspective that builds on the insights gained from the study.

Finally, Chapter 6 serves as the conclusion, offering reflections on the purpose of the study, an in-depth analysis of the research questions, and an overview of the literature review, research methodology, and critical findings. The chapter concludes with a concise and impactful conclusion, bringing the research to a close. The references and an appendix of student publications supplement the main body of the

study, ensuring transparency and accessibility of the sources and additional materials utilized in the study.

In many developing world megacities, burgeoning population growth and rapid urbanization present parallel challenges. This phenomenon is vividly exemplified in Doha, the vibrant capital of Qatar. Significant governmental endeavors have propelled its evolution from a modest pearling and fishing village in the early 20th century to a lively, globally aspiring contemporary economy. Along with a population exceeding 2.8 million in 2020 and projected to surge by another million over the next two decades, Doha's metropolitan landscape encapsulates the epicenter of this transformative momentum, hosting most of its inhabitants.

Aligned with its strategic vision for economic diversification, the Qatari government has spearheaded ambitious initiatives in tourism, education, sports, and service-related industries, notwithstanding the nation's substantial natural gas and petroleum endowments. Notably, the lavish preparations for the FIFA World Cup in 2022 have engendered an array of large-scale infrastructural projects, including stadiums, ancillary facilities, and urban developments such as Lusail City, Hamad Port, and the Qatar Rail City transit system. These endeavors have redefined Doha's skyline and spatial configuration, reclaiming land from the sea and expanding the urban fabric to accommodate burgeoning demands.

Despite these strides, the challenge of preserving green spaces amid rapid urban expansion looms large. Urban green areas, integral to biodiversity preservation and provisioning essential ecosystem services, have suffered encroachments due to competing governmental policies and relentless real estate development pressures. While Doha has witnessed a proliferation of public parks and pedestrian precincts in response to urbanization, industrial areas, predominantly inhabited by low-income

workers, still need such amenities. Consequently, workers flock to urban parks for leisure and recreation, inadvertently straining familial and societal dynamics and exacerbating urban congestion and vehicular traffic.

The ramifications of this phenomenon extend beyond social dynamics, encompassing environmental and climatic implications as well. Paved surfaces in industrial zones exacerbate local climate conditions and impose financial burdens on workers seeking green spaces elsewhere. Moreover, expanding modern cities at the expense of green areas underscores the intrinsic human need for natural environments. It emphasizes the imperative of integrating green spaces into urban design frameworks.

In light of these challenges, urban planners and designers must institute scientific principles for preserving and enhancing green open spaces. Prioritizing the establishment of expansive, interconnected green spaces that permeate urban sectors in a balanced manner is crucial to facilitating the human environment and safeguarding the well-being of urban inhabitants amidst the relentless march of urbanization.

CHAPTER 2: LITERATURE REVIEW

Chapter 2 synthesizes a thorough analysis of urban planning theories, sample studies, landscape architecture principles, the importance of parks and green spaces, urban planning and landscape design practices, challenges in low-income neighborhoods, and stakeholder perspectives. This comprehensive literature review lays the groundwork for subsequent chapters, informing the research methodology and providing valuable insights to address identified research gaps and objectives.

Exploring the significance of parks and green spaces reveals their multifaceted part in enhancing mental and physical wellness, fostering social cohesion, and promoting community welfare. This discussion emphasizes both direct and indirect benefits, underscoring the positive impact of green areas on residents' standard of living. Urban planning and landscape design further highlight the importance of green spaces by examining their effects on well-being. This entails exploring best practices for designing inclusive and accessible green spaces, ensuring all community members can access their benefits.

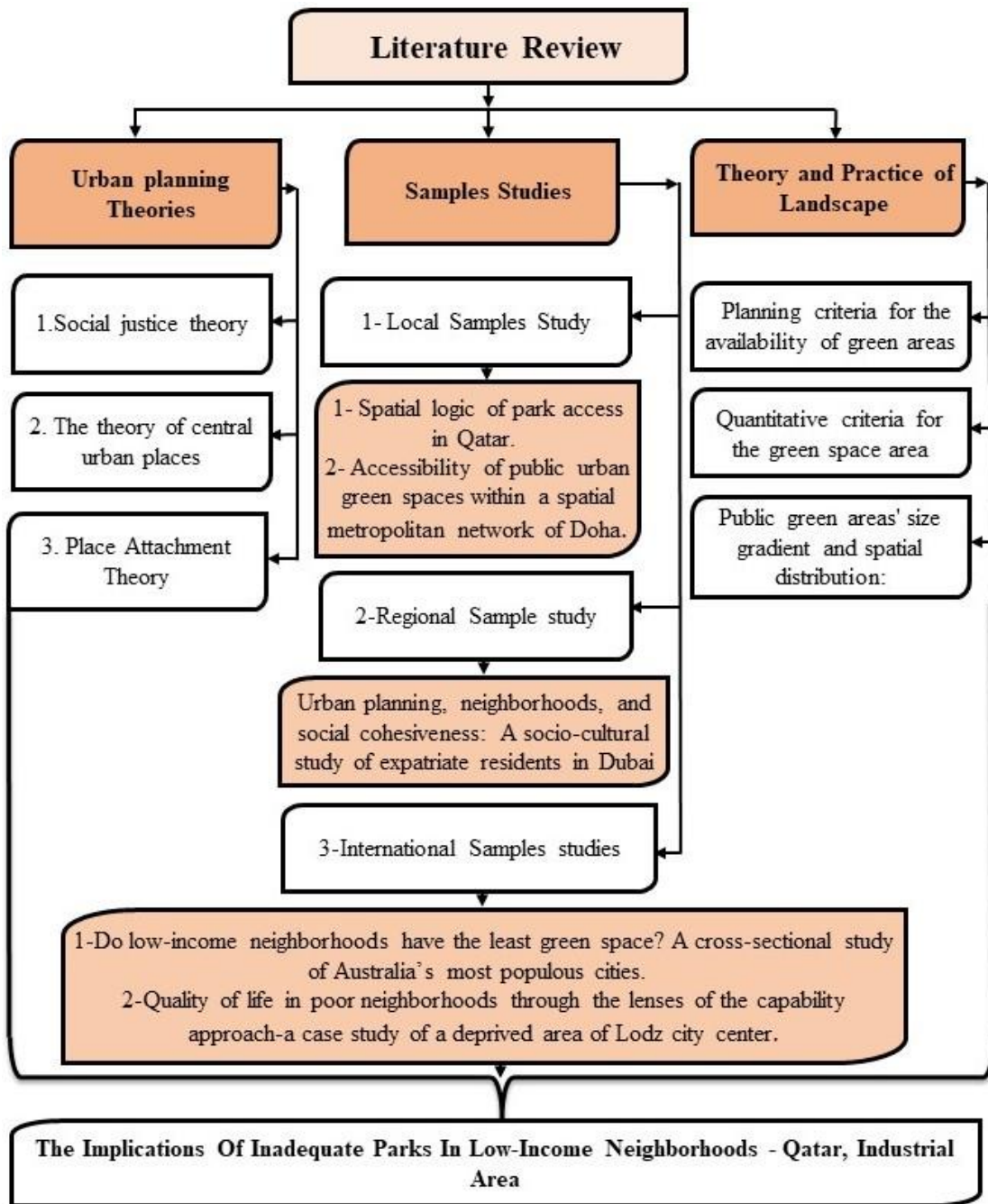


Figure 1. Literature Review Overview. Source (Author,2024).

2.1 Measuring the Standard of Living in Household Expenditure and Income Survey

2.1.1 Well-being Standart of Living and Definition of Low Income

Money income is crucial for a country's welfare, reflecting the amount needed to achieve utility. Distribution among households and individuals is essential, as it

highlights the low standard of living. Consumption is the most appropriate indicator of well-being, as income may not be entirely spent (MDPS, 2015).

"A low standard of living is defined in absolute or relative terms. The absolute definition (absolute poverty) explains the inability to meet essential needs to enjoy a decent standard of living. In contrast, the relative definition (relative poverty) explains the low standard of living in terms of its relationship to the living standards prevailing in the society in a given period"(MDPS, 2015, Page 14).

Measuring a Low Standard of Living: The initial step in examining the size and traits of households or individuals with a low standard of living involves determining the threshold value that separates them from others. The next step is to categorize the population into those with a low standard of living and those without. The final step is to identify the percentage and characteristics of the low-standard-of-living group. (MDPS, 2015, Page 14).

The Poverty Line in Global Comparisons: The World Bank (WB) has updated the global poverty standards to US\$1.25 and US\$2 per person per day based on 2005 purchasing power parity (PPP). These figures were calculated using the latest data from the 2005 cycle of the International Comparisons Programme. 2005 the US\$1.25 per day poverty line reflected the average national poverty line for the poorest 10-20 countries at 2005 PPP. (MDPS, 2015)

2.1.2 Measures of People with Low Income/Standard of Living (Poverty Measures)

"After classifying the population into those who enjoy decent SoL and those who lack decent SoL, one should choose a measure that reflects low SoL in society or a segment thereof by identifying the proportion of those with low SoL and the depth of such low level. The most commonly used measures are Foster-Greer-Thorbecke (In

1984, Foster-Greer-Thorbecke recommended a comprehensive measure, namely" (MDPS, 2015. p15).

q

$$Pa = \frac{1}{n} \sum_{i=1}^n E [(z - y_i) / z] a$$

In this equation, (y_i) represents the income or consumption of family or individual No. I, (z) denotes the threshold value defining the Standard of Living, and (q) represents the number of individuals whose income or consumption falls below this reasonable Standard of Living annually. (n) stands for the total population. For more details, refer to Ravalli (1992).

2.1.3 Level of monthly income and consumption in Qatar)

Doha Municipality has the highest monthly income/consumption rate among Qataris and non-Qataris, with an average monthly consumption of 7,856 riyals for Qataris and 4,978 riyals for non-Qataris in 2012/2013. This reflects a high standard of life in Doha Municipality, with per capita consumption 1.2 times the national average and 1.3 times higher than that of Al-Rayyan Municipality.

	Consumption Unit		Per capita		Per Households	
	Qataris	Non-Qataris	Qataris	Non-Qataris	Qataris	Non-Qataris
Consumption	7,856	4,978	6,674	4,010	57,724	17,323
Income	12,006	7,016	10,200	5,651	88,217	24,415
Expenditure	6,759	5,197	5,742	4,186	49,663	18,084

Figure 2. The average monthly consumption, income, and spending. Source (MDPS, 2015).

In 2012/2013, Qataris' monthly per capita income was QAR 10,200 (US\$3,808

at PPP), whereas for non-Qataris, it was QAR 5,651. Regarding consumption, Qataris in Doha Municipality had the highest average income, surpassing Al Rayyan Municipality and the other municipalities combined. Consumption constitutes only 60% of Qatari household income, indicating that 40% is saved.

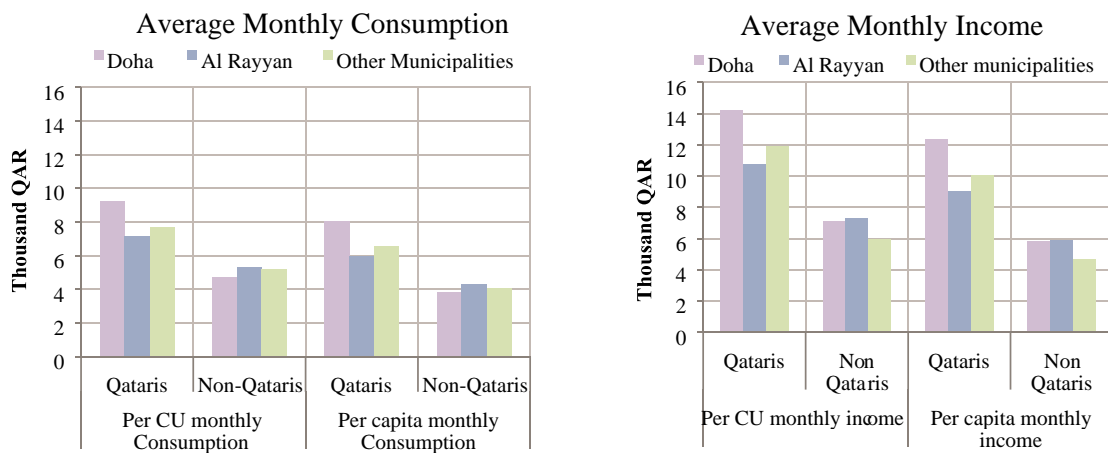


Figure 3. Average monthly consumption and income by municipality (MDPS, 2015).

"Nearly 33% of Qataris live in Doha Municipality, 43% in Al Rayyan Municipality, and 24% in other municipalities. We have decided to make the analysis based on the place of residence in Doha and Al Rayyan Municipalities while combining the rest of the municipalities. However, tables demonstrate the status of each municipality separately". (MDPS, 2015. p18):

Due to increased consumption and income, Qatar's wealthy households have a higher average income than the median. The distribution of Qatari households' consumption equivalents is skewed; the median and average consumption were QAR 7,034 and QAR 7,856, respectively. Similarly, the median and average income were QAR 12,006 and QAR 10,841, respectively. In both consumption and income, the average is higher than the median. (Qatar's Third Human Development Report, GSDP and UNDP, 2012).

The municipality of Doha, which includes the industrial zone and the study's site, shows lower inequality (0.227) than Al-Rayyan (0.2441) and the other municipalities. The Gini coefficient for equivalent income is 1.2 percentage points higher than for consumption. Nonetheless, the ranking disparity among the municipalities remains unchanged.

2.1.4 Percentage of low-income residents with a low standard of living by municipality

Most of Qatar's low-income population resides in Al-Rayyan Municipality, with 12% of low-standard-of-living individuals living there, which is four times higher than the 3% in Doha Municipality. Other municipalities have more than twice the percentage of low-income individuals, at 6%. Al-Rayyan, home to 72% of the low-income population, also houses 48% of Qataris. This concentration indicates that initiatives targeting this area could significantly improve living standards by reaching the largest segment of low-income individuals. Addressing the issue by combining municipalities like Al-Wakra, Um Slal, Al Khor, Al Dhaayen, and Al Shamal can also be effective. (Consumer Price Indices, MDPS, 2013).

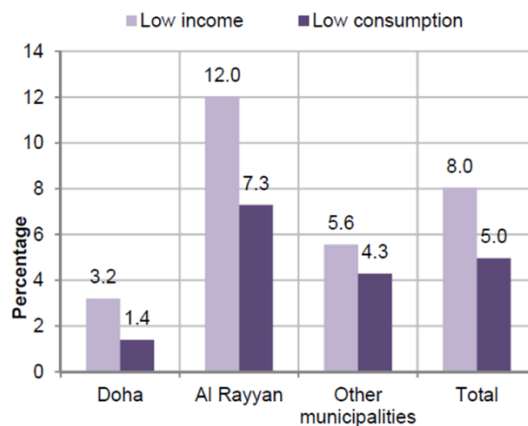


Figure 4. Percentage of Low-Income-SoL Qatari Residents by Municipality (MDPS, 2015).

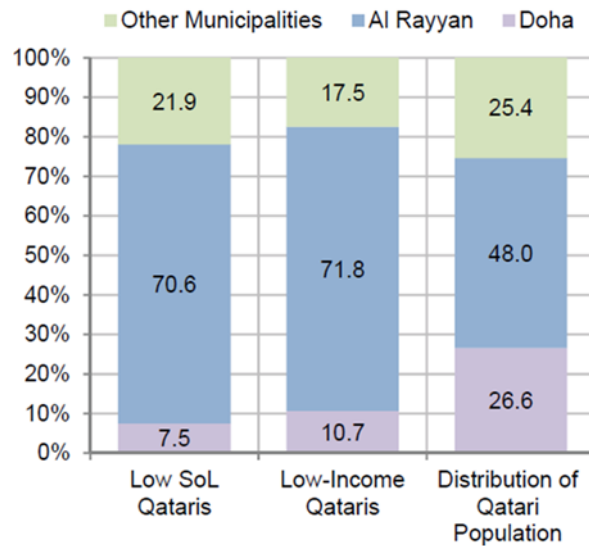


Figure 5. Percentage distribution of low-income/SoL, Qatari citizens, and the overall Qatari population by municipality (MDPS, 2015).

Cost of living index	the years
95.0	2014
96.7	2015
99.3	2016
99.7	2017
100.0	2018
99.1	2019
96.5	2020
98.8	2021
103.7	2022

Figure 6. Trends in the cost of living and consumer price index (Ministry of Development Planning and Statistics, 2015).

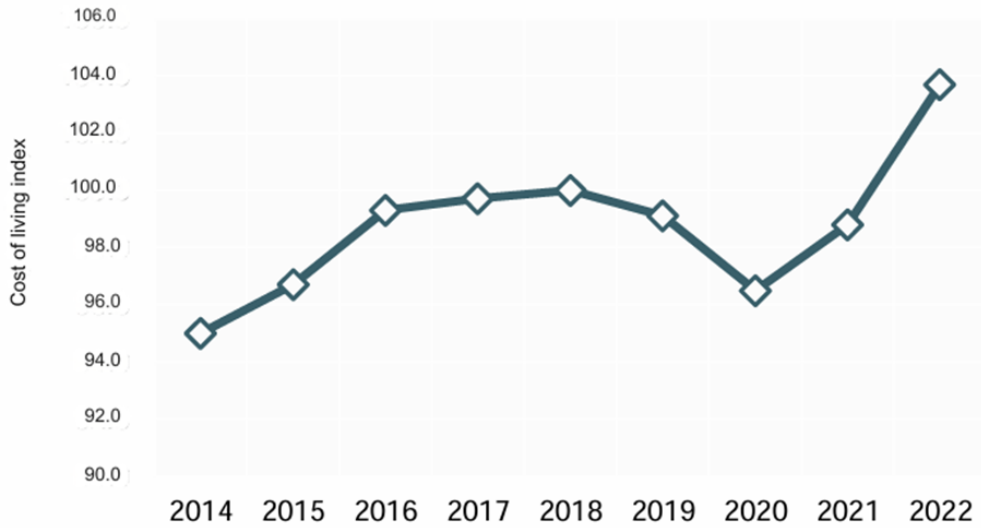


Figure 7. Evolution of the cost of living, consumer price index (MDPS,2015).

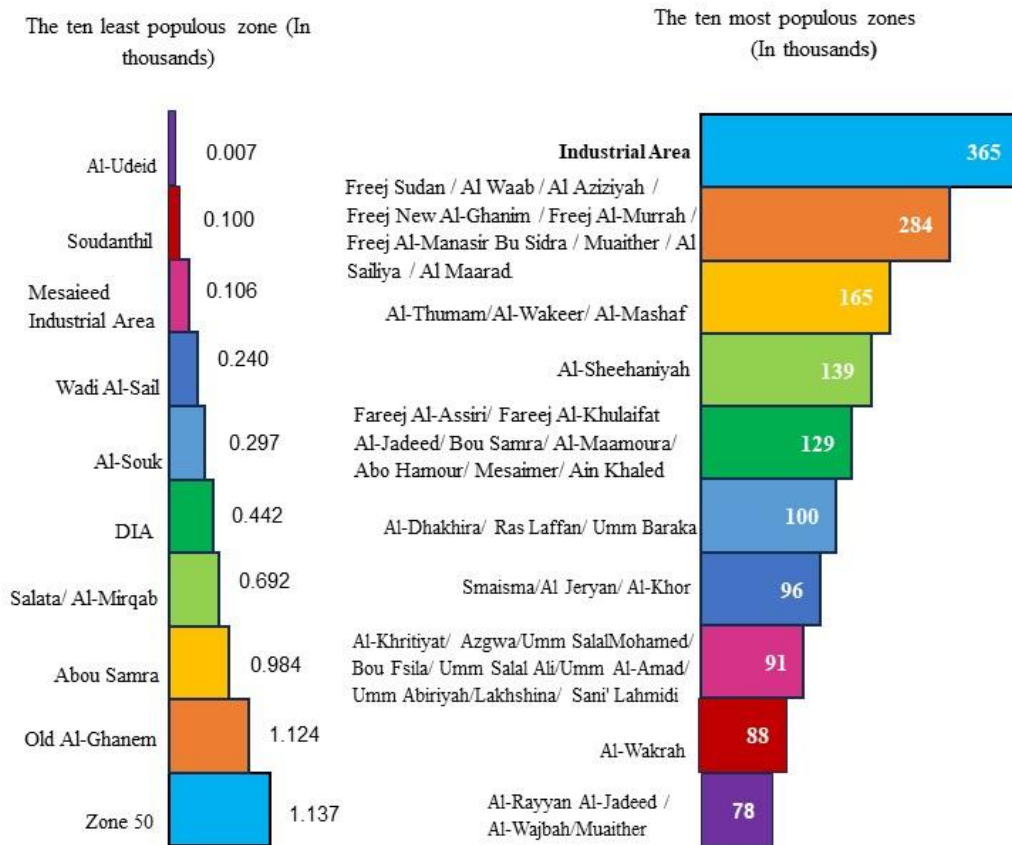


Figure 8. Evolution of the cost of living, consumer price index (MDPS,2015 and Author,2024).

This section examines the population density and income levels in Doha Municipality, highlighting its significance due to the high concentration of residents, especially low-income Asian migrant workers. According to the 2015 Qatar Planning and Statistics Authority census, most low-income neighborhoods are located in Doha Municipality, with more migrants (Marthya. Kh, 2022). Key areas include Old Airport, Fereej Abdel Aziz, Bin Mahmoud, Al-Nasr, Al-Sadd, the Industrial Area, and the Wholesale Market. These areas are characterized by fragmented land use, a high concentration of non-citizens, and mixed-use developments with significant retail activity principles (Al-Thani et al., 2019).

Designed initially as Qatar's capital, the Old Airport area now serves as a central retail hub. Al-Sadd and Fereej Bin Mahmoud are prominent commercial and residential districts. At the same time, Fereej Abdel Aziz (Ibrahim et al., 2020) and other areas such as Umm Ghuwailina and Najma host a large number of male Asian migrant workers in medium to high-rise residential buildings surrounded by retail shops. The Industrial Area, with the highest concentration of labor camps, accommodates most low-income, unskilled foreign workers. Regulatory relaxations in 2016 have further increased worker residency in this area (Nagy, 2006).

Despite data limitations preventing detailed statistical correlations of income and housing values, existing research indicates a dominance of low-income migrant workers in these neighborhoods. Similar to Doha, Al Rayyan Municipality also has a

significant population density that predominantly consists of Qatari citizens but includes a substantial number of migrants as well.

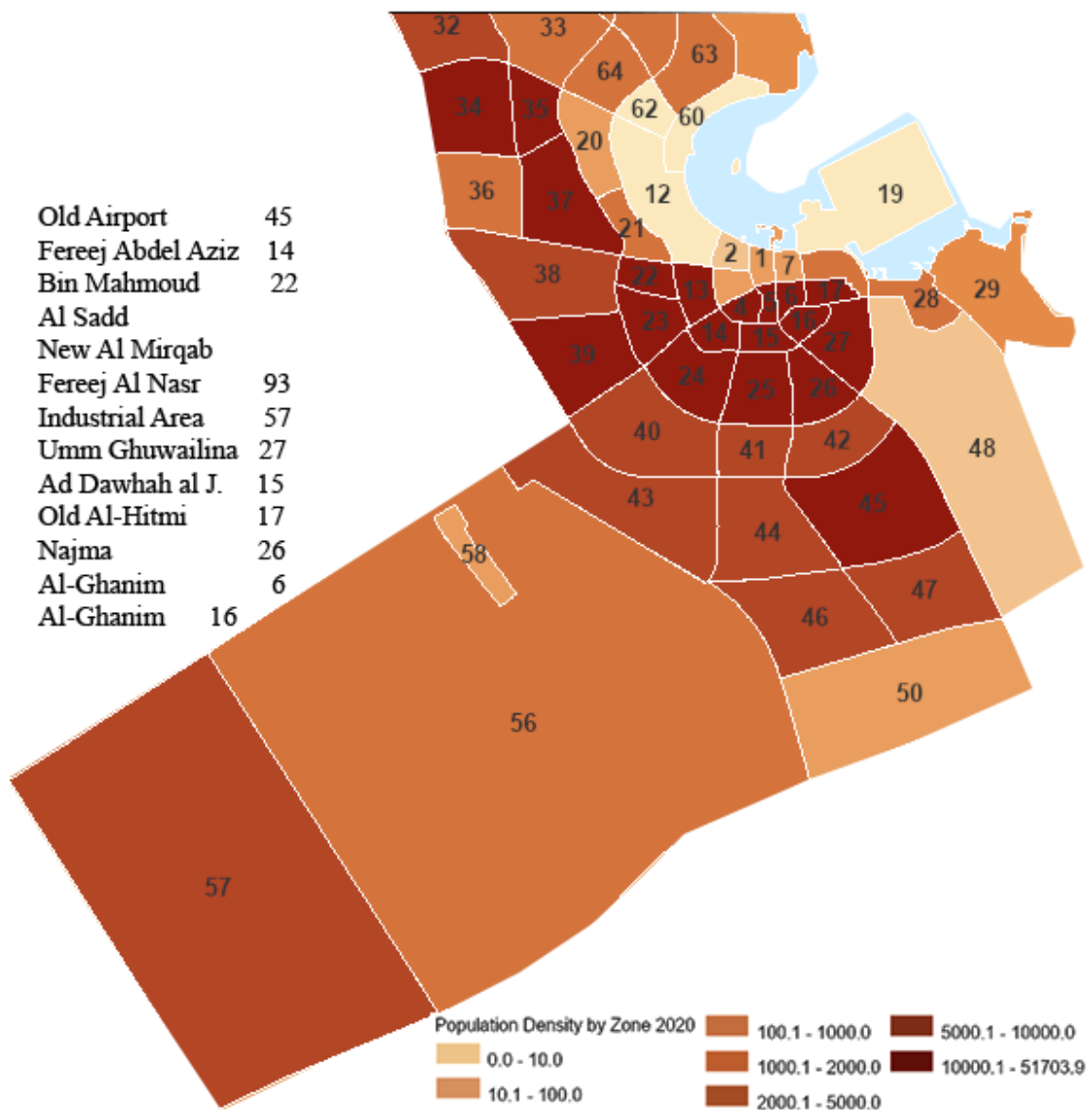


Figure 9. Shows low-income neighborhoods' population density by zone Doha Municipality (MDPS,2020 & Author,2024)

In summary, 8% of Qataris were classified as low-income in 2012/2013, with 5% consuming less than half the average consumption, indicating a relatively low standard of living. Low-income Qataris predominantly reside in Al Rayyan Municipality, which has the highest rate of poor living standards, while Doha Municipality has the lowest rate. Despite Al Rayyan housing 48% of Qataris, it accounts for 72% of low-income

residents, signifying a higher concentration of economically disadvantaged individuals. Conversely, Doha Municipality has the most significant number of low-income expatriates, particularly in the Industrial Area. The continuous rise in the cost of living from 95.0 in 2014 to 103.7 in 2022 underscores the increasing economic challenges (Ministry of Development Planning and Statistics, 2015).

Table 1 shows the residents of Doha Municipality's low-income neighborhoods (MDPS, 2020; Athour, 2024).

No	Neighborhood	Zone No	Populations in 2020	Key Characteristics
1	Old Airport	45	76,721	Initially designed as Qatar's capital, it is a significant retail market largely inhabited by non-citizens and has fragmented land use.
2	Fereej Abdel Aziz	14	27,515	It is predominantly inhabited by male Asian migrant workers and is surrounded by medium—to high-rise residential buildings and retail shops.
3	Bin Mahmoud	22	18,850	Mixed-use neighborhood, predominantly high-rise commercial and residential buildings.
4	Al Sadd New Mirqab Fereej Al Nasr	93	36,008	Includes New Mirqab; mixed-use developments. Key commercial center; high activity due to diverse demographics; mixed land use; high population density.
5	Industrial Area	57	313,749	The highest concentration of labor camps, primarily low-income, unskilled foreign workers; regulatory relaxations increased residency.
6	Umm Ghuwailina	27	39,612	High concentration of migrant workers.
7	Ad Dawhah al Jadidah	15	22,048	A significant number of migrant workers.
8	Old Al-Hitmi	17	8,413	Inhabited by migrant workers; significant retail activity.
9	Najma	26	43,695	It previously housed the Haraj Market, a significant number of migrant workers.
10	Al-Ghanim	6	3,181	Known for thriving automobile accessory businesses.

No	Neighborhood	Zone No	Populations in 2020	Key Characteristics
11	Al-Ghanim	16	19,133	This area is famous for Al-Ghanim Singles Park, which is metaphorically named. (Google Maps)

2.2 Industrial zones in the Gulf Cooperation Council countries.

Numerous researchers commonly misapply the term "Industrial City" to settlements, colonies, and industrial areas associated with cities. It is essential to note that cities possess distinctive characteristics absent in such industrial areas, rendering the application of the term "cities" inappropriate under any circumstances (Conference, GCC Countries, 1993). Conversely, some individuals erroneously utilize the term "industrial zone" to designate major industrial cities in the Arabian Gulf, a misnomer that necessitates rectification (Gulf Organization for Industrial Consulting, Annual, 1993, p. 7.).

The establishment of industrial zones serves dual objectives. Firstly, it aims to relocate industrial and service establishments from urban areas for re-planning and enhancing their aesthetic appeal. Secondly, it seeks to foster the development of medium and small manufacturing industries by offering affordable land, essential services, and other amenities. Additionally, there may be a tertiary objective of settling workers and expatriates outside cities predominantly occupied by citizen and non-citizen families (Al-Raya newspaper, (1991, p.12).

Among these industrial zones, the oldest was established in the late 1960s in Mina Salman, Bahrain. It encompasses an area of—km² and comprises 95 plots (Al-Madani et al., 1993). Conversely, the most recent developing industrial zones include Sohar and Raysut in Oman, Al Khor in Qatar, and Asir and Hail in Saudi Arabia.

These industrial zones are dispersed across all Gulf countries and exhibit continuous growth. As indicated in Table 1, 56 has a cumulative area of 217 km²(Gulf Organization for Industrial Consulting). Projections suggest that the total area of existing and planned industrial zones in Saudi Arabia is anticipated to reach approximately 83 km², with ongoing plans to expand in terms of number and area across all Gulf countries. Notably, the Sharjah region in the UAE boasts one of the largest industrial zones, covering approximately 26 km². In comparison, the Doha Industrial Area in Qatar spans around 21 km² (Al-Shafi'i et al., 1999.P.200). Conversely, industrial areas in Bahrain and the Sultanate of Oman tend to be smaller, with the Rusayl area in Oman being the largest, not exceeding 2 km².

Furthermore, the Sultanate of Oman adopted the fourth five-year plan (1995-91), earmarking 27 million Omani riyals to establish new industrial zones (Al-Raya newspaper, (1991, p.12).

Table 2. Industrial zones in the Gulf Cooperation Council countries and their total existing areas source (Al-Shafi'I; Nizam. A., 1999.P.201).

Country	Number of regions	Total area	The most important Regions
The UAE	20	80 km ²	Musaffah, Al Ain in Abu Dhabi Ramool, Al Quoz in Dubai Sharjah in Sharjah
Saudi Arabia	15	55 km ²	Riyadh - Dammam and Jeddah
Oman	3	5km ²	Al Rusayl - Sohar
Bahrain	8	35 km ²	Meta Salman, north of Sitra and south of Al Hadd
Kuwait	8	20 km ²	Shuwaikh - Subhan
Qatar	2	22 km	Industrial Doha and Al Khor

Table 3. Industrial areas in the GCC area (Gulf Organization for Industrial Consulting, Annual Report 1992, Doha, August 1993, p. 7)

Industrial Area	Country	Space (sq. km)	City Location	Establishments	Workers
Riyadh	Saudi Arabia	12.4	14 C, Medina Street	552	35,669
Dammam	Saudi Arabia	9.4	Directly south of it	320	25,813
Jeddah	Saudi Arabia	9.2	Directly south of it	388	28,092
Doha	Qatar	21	12 west of the city	235	10,625
Al-Rusail	Oman	1	45 EGP West Muscat	70	1,000
Sharjah	The UAE	16.2	Southwest of the city	205	n.s
Subhan	Kuwait	3.1	20 West Kuwait	761 vouchers	n.s

2.2.1 Characteristics of Industrial Areas

Industrial areas are strategically located near or adjacent to cities, establishing a symbiotic relationship with urban centers. Within cities, they function as markets for the facilities, directly serving their needs. For instance, the Riyadh and Doha industrial areas are approximately 12 to 14 kilometers (Hugh.M and Roperts.P., 1979) from their respective cities, connected via major roads. Meanwhile, the Rusayl Industrial Area, situated about 45 kilometers away from Muscat, stands as one of the farthest industrial areas from its capital in the Gulf region. Waterfronts are rare in industrial areas, except for exceptions like the Musaffah Industrial Area in Abu Dhabi and Mina Salman in Bahrain. However, urban expansion has integrated some industrial areas into the city fabric, as observed in Bahrain and Riyadh.

These industrial areas host a variety of functions. While industrial facilities are

prominent, many plots also accommodate service-oriented businesses such as repair shops, car dealerships, and warehouses. For example, in the Doha Industrial Area, out of 2000 plots, only 235 are dedicated to industrial establishments. In contrast, industrial zones in Riyadh, Dammam, and Jeddah, Saudi Arabia, boast approximately 1,260 Jaafar (Al-Shafi'i) (N.A., 1989, p. 235) establishments, with metallurgical industries leading the pack, followed by construction and food industries. However, the Al-Rusail Industrial Estate in Oman is notable for its singular focus on industrial activities.

Most workers in these industrial areas, mainly unmarried expatriates, reside within them. For instance, industrial sectors in regions like Riyadh, Dammam, and Jeddah employ around 89,600 workers, averaging 71 workers per facility (Muhammad et al., 1987.P.20) The Development of the Industrial Function in the Saudi City, Letter 99, Kuwait Geographical Society, Kuwait University, Kuwait, March 1987. In the Doha Industrial Area, approximately 11,000 workers are distributed among the industrial facilities, averaging 47 workers per facility (State of Qatar, Central Statistical Organization, 1978, Doha, p. 204). Additionally, efforts are made to provide residential areas for workers, such as the particular residential area in the Rusayl Industrial Area, located 3 kilometers away from the industrial zone.

Efforts to increase the participation of citizen workers in factories have been observed, driven by policies favoring national employment over foreign labor. However, this shift is more pronounced in specific industries compared to others. For instance, citizen participation exceeds 60% in some sectors, while it remains low in light sectors due to economic factors favoring cheaper expatriate labor. (Abdul Karim Al-Shafi'i Nizam, 1992),

Industrial areas have stimulated the growth of the private sector, with governments providing substantial financial support to citizens engaging in industrial

activities. For instance, Kuwait and Saudi Arabia have initiated significant industrial development plans with considerable investments in light industries to serve local markets. However, these industrial zones contribute to traffic congestion, particularly on main roads leading to them. Additionally, they pose environmental challenges, with pollution a significant concern, especially when these areas are close to human settlements or water bodies.

Despite challenges, industrial zones play a crucial role in regional development, reducing population pressure on capital cities. As these zones continue to develop, they are expected to accommodate a substantial portion of the population and significantly contribute to economic growth, job creation, and regional integration. Moreover, they facilitate the development of light manufacturing industries, reducing import dependency and strengthening economic activities. Ultimately, industrial cities and zones reshape spatial relations within countries, fostering cultural, social, and economic transformations with far-reaching impacts.

2.3 The Role of Parks in Urban Areas

The body of literature addressing the ramifications of insufficient parks in low-income neighborhoods within Qatar's industrial regions is expanding, though it remains relatively limited. Numerous studies have scrutinized the repercussions of inadequate green areas on these localities' well-being and standard of life. Research in this domain underscores that the absence of parks detrimentally affects physical health, mental well-being, social cohesion, and environmental sustainability in low-income communities. Evidence suggests that inadequate parks can precipitate heightened stress levels, obesity, and social seclusion among residents, contributing to compromised air quality

and escalated pollution in the vicinity. While the publication rate concerning this subject remains comparatively subdued compared to other fields, there has been a discernible surge in recent years, indicative of a growing acknowledgment of the imperative to address this issue and pursue further investigation.

The literature underscores the impact of insufficient parks on residents' accessibility to green spaces, which can engender a spectrum of health issues, diminished well-being, and community alienation. The debate surrounding ensuring equitable access to green spaces for all socio-economic strata is central to the discourse. Another scholarly work delves into utilizing visualization tools and methodologies in community planning, particularly spotlighting the transition from conventional sketches to virtual reality. The author deliberates upon the advantages and hurdles of deploying these tools in planning. The principal inference drawn from the study is that visualization tools, notably virtual reality, can substantially enrich community planning endeavors by furnishing stakeholders with a more immersive and interactive experience. However, the author underscores the significance of accounting for these tools' limitations and potential biases.

Furthermore, a study delves into the determinants influencing walking behavior, specifically focusing on the significance of the proximity of public open spaces, attractiveness, and size. The researchers conclude that public open spaces' proximity, attractiveness, and size substantially influence fostering walking behavior. Access to well-designed and appealing parks nearby can incentivize residents to partake in physical activity, ultimately enhancing public health outcomes.

Kaczynski and Henderson's (2007) paper comprehensively examines the nexus between physical activity and environmental factors, with a particular emphasis on parks and recreational amenities. The authors dissect existing research to elucidate how

parks can impact physical activity levels among individuals. The primary takeaway from the paper is that Parks and leisure areas are essential to fostering physical activity among populations. Access to well-maintained parks with walking trails, playgrounds, and Green places can positively impact the amount of physical activity and the general well-being of locals.

Veitch, Salmon, Ball, and Crawford's (2008) study explores the disparities in public open spaces' characteristics in rural and urban settings, focusing on how these features might influence physical activity levels. The authors assess the characteristics of parks in urban and rural environments to evaluate their influence on residents' physical activity levels. The study concludes that the characteristics of public open spaces differ in rural and urban settings. Urban and rural parks can promote inhabitants' engagement in physical exercise and social interactions. This underscores the significance of accessible and well-designed public spaces across all communities. Because of the Gulf region's hot and dry climate, walking is almost impossible, making using natural and artificial shading necessary for parks and green spaces. Walkability adds value to facilities and infrastructure while improving a healthy lifestyle and reducing reliance on private transportation through improved connected spaces (Ahmad, Ahmad.,2021).

Several vital papers delve into the intricate relationship between urban planning and various facets of community well-being:

Al-Kodmany (2002) delves into the evolution of community planning techniques and visual technologies, examining the transition from conventional freehand drawings to contemporary virtual reality. By spotlighting the benefits and hurdles of these tools, the author underscores their pivotal role in fostering effective communication, engaging stakeholders, and refining decision-making processes.

Frumkin and Loukaitou-Sideris (2004) scrutinize the detrimental effects of urban sprawl on public health, advocating for prioritizing healthy community design, planning, and construction. Their examination accentuates the adverse impacts of urban sprawl on physical activity, air quality, and social cohesion, urging for holistic urban planning strategies that integrate public health considerations. These strategies encompass promoting active transportation, amplifying green spaces, and mitigating environmental hazards.

The relative effects of social, physical, and individual environmental variables on physical activity levels are examined by Giles-Corti and Donovan (2002). The authors underscore the significant influence of the physical environment, which encompasses parks and recreational facilities, by analyzing the interaction of these variables and their consequences on behaviors related to physical exercise. The appeal for urban planning interventions to foster supportive surroundings supportive of active lifestyles is made in the paper's conclusion.

Kaczynski and Henderson (2007) conducted a comprehensive review of the evidence surrounding the environmental correlates of physical activity, with particular emphasis on parks and recreation facilities. Their analysis scrutinizes the influence of park availability, accessibility, and quality on individuals' engagement in physical activity. The paper underscores the significance of parks and recreation facilities as pivotal environmental determinants of physical activity. It advocates for urban planners to prioritize their development and upkeep, especially in low-income neighborhoods, to foster active lifestyles and bolster public health outcomes.

2.4 The effort of the Qatar government to improve the situation in Industrial areas

2.4.1 *Road and infrastructure development project in the industrial area in Doha*

The project is a massive undertaking aimed at redesigning and modernizing the existing road network and associated infrastructure services. It involves creating and developing roads totaling more than 110 km, spanning three packages covering an area of more than 12 square km. The project is divided into six packages, three currently being worked on: the first, second, and sixth. The project provides a fundamental improvement in surface and groundwater drainage and the efficiency of sanitation infrastructures to fulfill the fundamental requirements of enhancing working and living conditions for residents and commercial projects in the Doha Industrial Area. The project will provide a safer road network and smooth traffic flow by modernizing roads, providing traffic intersections equipped with traffic lights, multi-level intersections, pedestrian and bicycle routes, a street lighting system, and beautifying and decorating the streets. The project began on January 14, 2014, and was completed in the first quarter of 2022 (Ashghal, 2022).

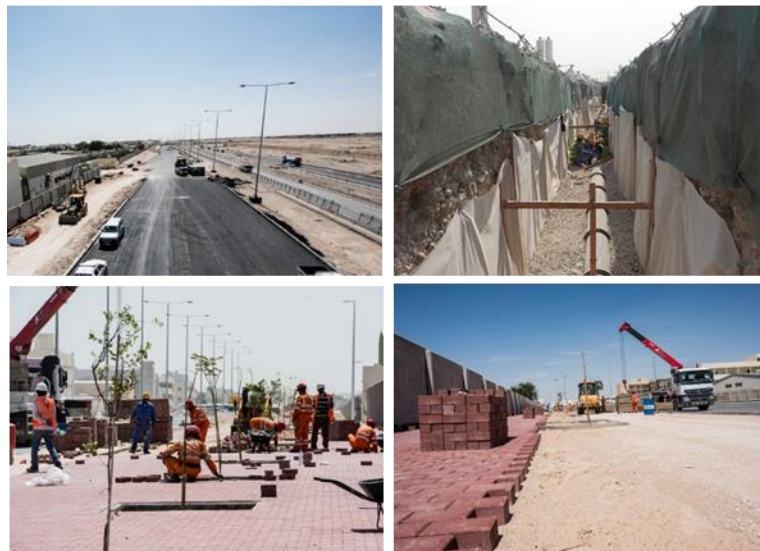


Figure 10. The Industrial Area in the red line is being developed in the black line St. 33 to 55, and Potos presents the works as a source (Ashghal & Author,2024).

2.4.2 Development projects completed in the Industrial Area

The Public Works Authority “Ashghal” opened all roads to traffic as part of the third package of the Roads and Infrastructure Development Project in the Doha Industrial Area, as part of the Authority’s commitment to implementing its plan to

provide an advanced road network and integrated services for infrastructure network lines throughout the country. The development work carried out within the project included the streets located between Street 33 in the north to the Seventh Ring Road to the south and East Industrial Street (Hamad et al.) in the east to Crushers Road in the west. It covers a network of roads extending with a total length of approximately 40 km, in addition to carrying out development work on infrastructure network lines to enhance the standard of services.



Figure 11. The work on the third package of the streets and infrastructure project in the Doha Industrial Area has been completed—source (Ashghal,2024).

Figure 3 shows Ashghal’s plan to improve roads and infrastructure services south of Doha. The work on the third package of the streets and infrastructure project in the Doha Industrial Area has been completed: Industrial Area Road, Eastern Industrial Road,41st Street, Al-Wakalat Street, Garages Street, Al Manajer Street,52nd Street, 47th Street,37th Street, Construction Street, 33rd Street, Al-Kasarat Street, Seventh Ring Road. The project's total area is approximately 4.57 square kilometers and includes local streets, intersections, and arterial roads that have been completely opened to road users. Seven intersections with traffic lights were also created to regulate traffic and increase road safety, and ten new roundabouts were constructed, and 17 intersections were also designated for pedestrian crossings. Lighting systems were also

developed, and the number of car parking spaces allocated increased to approximately 4,200. In an interview with the Qatari Al-Watan newspaper, Engineer Mohammed Al-Yafei, project engineer at the Roads Projects Department at Ashghal, stressed the importance of the tasks undertaken by the authority within the industrial zone and the influential role it plays in reviving the movement of goods and people and facilitating movement and connectivity with the main roads and the highway network, including It keeps pace with the economic development in the country, pointing out the positive impact of these projects on the flow of traffic in the industrial area.

The authority had previously announced the completion of the first, second, sixth, and fourth packages and the opening of their streets for traffic, explaining that these packages serve about 2,281 plots and provide 85 km of roads. He explained that the third package of the project serves about 816 plots of shops, factories, warehouses, and workshops and develops about 40 km of roads, the most important of which are the combined streets such as Al-Wakalat, Crushers, Manufacturers, and Building Streets, and some arterial streets such as “37, 41, 47, and 52,” in addition to subsidiary streets within the scope of the project. Safety elements were also provided; approximately 4,200 parking spaces were created, and directional signs and lighting systems were provided, with 1,573 lighting poles installed, in addition to the construction of intersections with traffic lights on all streets of “agencies, garages, mangas, 52, 41, and 47.” As for infrastructure work, the third package included the implementation of a security control systems network with a length of 49 km, a communications network with a length of 13.5 km, a potable water network with a length of 11.5 km, sewage drainage networks with a length of 52 km, and a network for surface water and rainwater drainage with a height of 47 km (QNA,2022).

2.4.3 Asian Town Projects in Qatar:

Asian Town is a significant business complex in the Industrial Area. Formerly known as West End Park, the district's attractions include the West End Park International Cricket Stadium, a theatre, a vast retail mall, and three movie halls. It was developed to appeal to the enormous Asian expatriate community of South Asia and Southeast Asia in Qatar, mainly the Indian, Bangladeshi, Pakistani, Nepali, and Filipino groups (The Peninsula,2015).



Figure 12. The industrial area is yellow, the Asian town is red, and the orange square borders the residential area of the town source (Author,2024 Nas Property Group,2018).

The figure shows the location of Asian Town between the Industrial area and Mossalat Company. The left map highlights the location indicated in red. In contrast, the maps on the right side depict the residential compounds of Asian Town., which contain six green spaces (inside the compounds, only for residents on the side), and the Markets outside the complex: Grand Mall, Blaza Mall, Saudi hypermarkets, theaters, cinemas, and Cricket Stadium.

Asian town was intended and built to strategically coincide with Qatar's 2022

FIFA World Cup vision. To this aim, Asian City is a Civil Defense-approved facility ready for habitation and leasing to private and public institutions. Asian City is ideally positioned in Mesaimmer, a short commute from the country's major project attractions. The Asian city has a total population of around 68,000 people, including workers and employees. We offer diverse exceptional amenities, including open spaces, parks, gyms, and recreational areas, fostering a pleasant atmosphere and a positive outlook, ultimately resulting in a happier and more productive team. Asian City is a government-approved bachelor accommodation that provides high-quality living accommodations and the necessary services and welfare to Qatar's worker population. The Asian city provides commercial, entertainment, religious, health, and security amenities to fulfill the needs of its citizens.

The Asian city is the finest spot for singles in the Gulf Cooperation Council. It is a premium site with unique features designed to provide workers with comfortable living circumstances.

The interior amenities offer personalized services, with each level having two hallways that include 26 rooms of varying sizes, each with a room area of 24 square meters, offering a comfortable space of 6 square meters for each person. The rear terrace is primarily intended as a service area, where residents may eat in the dining hall and drop off their clothing at the laundry. The room size of 6*4 square meters is intended to provide enough space for occupants to spend their stay pleasantly. Separate facilities, toilets, and sinks are accessible on either side of every hallway in the building. (Asian City Brochure, 2017-2018).

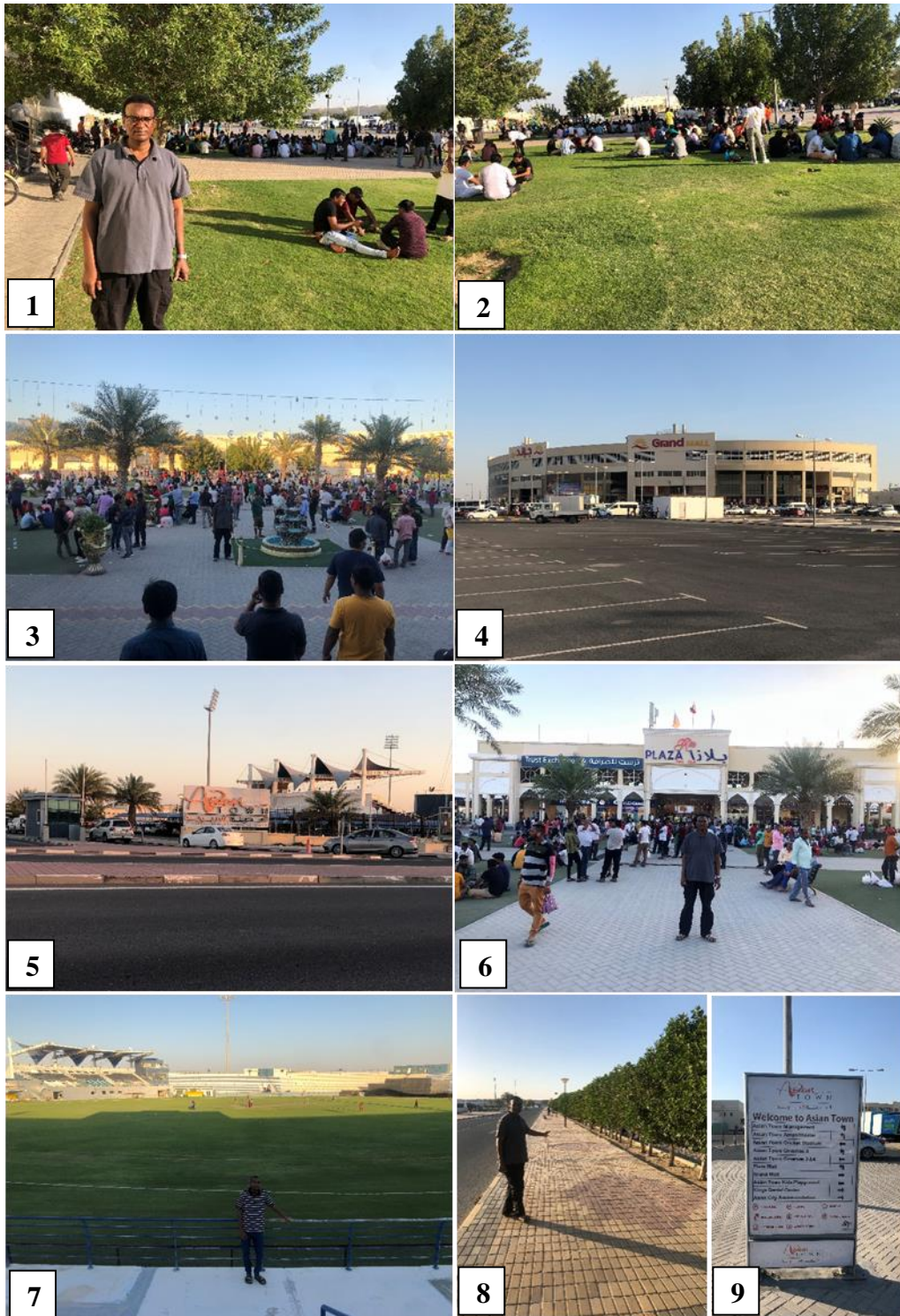


Figure 13. Observation by The Author,2024 site visit to Industrial area, Asian Town.

The photos in Figure 4 present many recreation sites in the Asian town that nonresidents can use in the Asian compounds, and many green spaces near the cricket stadium, Plaza Mall, Grand Mall, and walk side; the not-so-good thing is that some

significant areas in front of Plaza Mall and Grand Mall are covered with artificial grass only, and they could have used natural grass that softens the atmosphere and increases the amount of oxygen in the air. It is also noted that the Asian City area is close to the industrial area from Street 33 to Street. The photos present: 1. A photo of the researcher in an excellently used green area of some workers in front of Plaza Mall; 2 A green area where workers sit in excellent social situations in front of Plaza Grand Mall-; 3- Entrance to the Plaza Mall complex lined with palm trees, outdoor furniture, and green spaces; 4-Grand Mall; 5- Entrance No: one near Crecet Stadium; 6-Plaza Mall; 7-Inside the Crecet Stadium; 8-Walkside; and 9-Signprad contains all the location in Asdian Town.

2.4.4 Creating a green belt surrounding the industrial areas

Qatar National Vision 2030 specified that preserving the environment for future generations requires working to increase the green area and expanding tree planting to reduce carbon emissions and thus protect the environment and contribute to lowering temperatures, noting that one tree emits 10 liters of oxygen and also works to withdraw a second gas. Carbon dioxide, necessary for photosynthesis, enters the atmosphere, thus softening the temperature and purifying the atmosphere of car exhaust or carbon pollutants. (Al Nuaimi. Latifa, 2024)

It is essential to plant the most significant number of trees in industrial areas, especially those located in the north and south of the country, to create a green belt around those areas to contribute to reducing the effects of harmful gases issued by factories, which cause severe health damage to individuals and expose them to allergic and eye diseases, and at the same time reduce From the effects of the factors causing desertification, especially with their presence in desert areas, stressing that the presence of a green belt in the vicinity of factories and planting the most significant possible

number of trees also contributes to achieving urban and biological diversity and preserving the atmosphere. (Abonda Hussein, 2024).

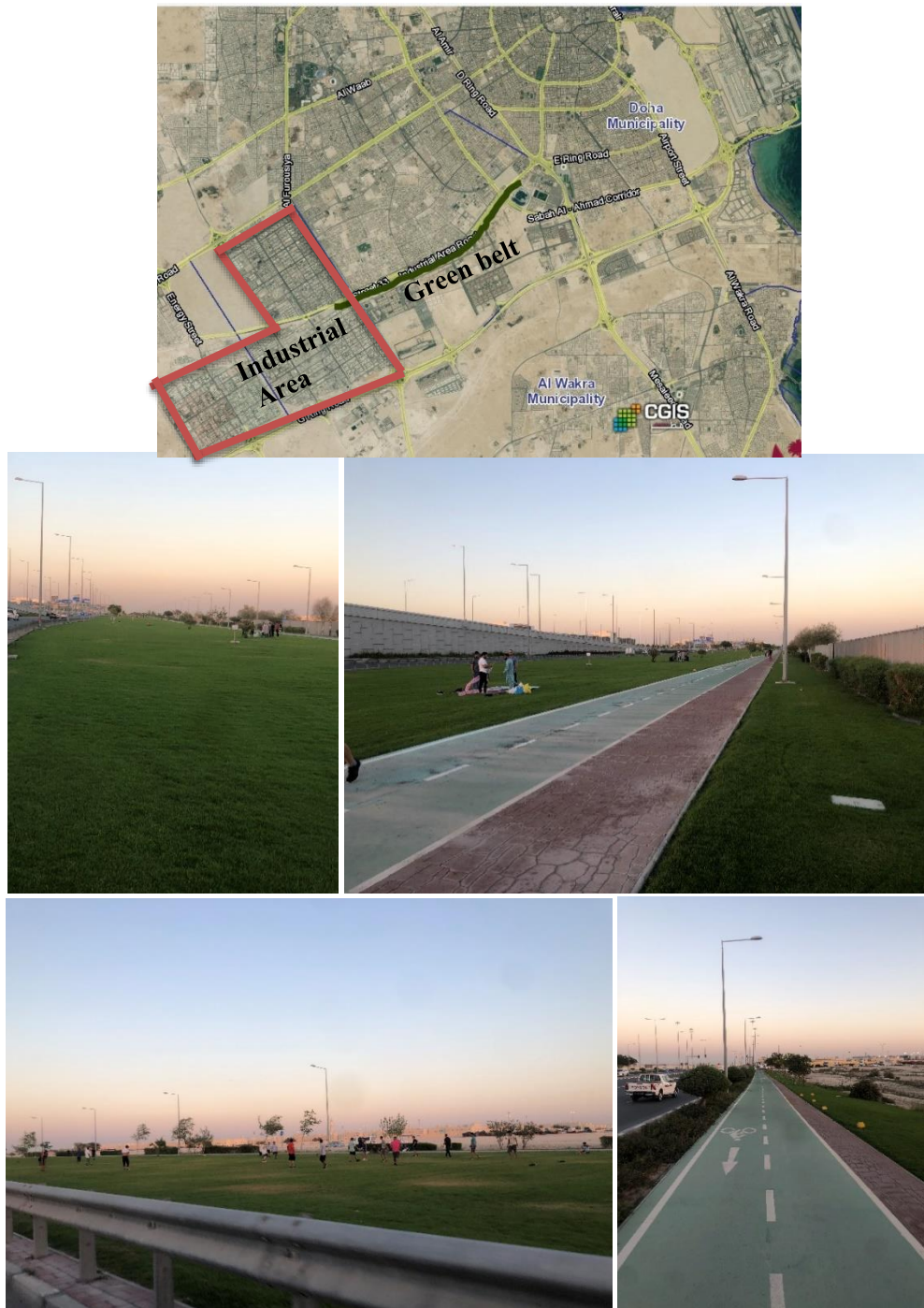


Figure 14. The green belt starts at 33 St.Stand East Industrial Street, extends along Abu Hamour St., and ends at the intersection of 6 Ring St.(Author, 2024)

This belt is located along Abu Hamour Street (Industrial Street) in distinct spaces

used by some workers to play football, volleyball, and basketball. It also has a path for bicycles, walking, and running. The people who benefit most from it are those who live in the industrial zone from 33rd Street to 55th Street and the city's residents. Al-Asiwa and the Mowasalat Company complex due to its proximity to these areas, but it is very far from the old industrial area from Street 1 to Street 32, according to the scale of the Qatar Geospatial Information website, which finds a distance of 3.77 kilometers from the Al-Attiyah area.

2.5 Planning Theories: Green Spaces Equity

Urban planning theories are the bedrock for comprehending the intricate interplay between urban spaces, green areas, and community well-being. Among these theories, social justice provides equal opportunities for all citizens; the theory equitably allocates resources, especially in green areas. The notion of core urban places further explains the importance of the particular regions within urban landscapes and their consequences for community dynamics. Furthermore, Place Attachment Theory explores people's psychological and emotional connections with their environment, emphasizing green areas' role in promoting a feeling of community. The theories and ideas listed below about urban planning and design may help improve the standard of living in low-income areas of Qatar's industrial sector that are impacted by a lack of parks and green spaces. Reviewing several theories and selecting the three most applicable to the industrial zone's temporal and spatial context may be beneficial.

2.5.1 *Social Justice Theory*

The discourse surrounding social justice theory within urban planning revolves around the meticulous orchestration of urban landscapes to foster equilibrium and societal fairness across diverse demographic strata. Central to this pursuit is the

endeavor to furnish all denizens with commensurate opportunities while effectuating an equitable allotment of resources and amenities within the urban milieu. This academic inquiry delves into several pivotal tenets germane to the ethos of social justice theory in urban planning:

1. **Equitable Resource Allocation:** A cornerstone principle entails the judicious calibration of public domains, infrastructural facilities, and essential services across urban sprawls to ensure parity in accessibility for all inhabitants.
2. **Facilitation of Social Engagement:** Emphasis is placed on galvanizing communal involvement in urban planning, wherein fostering social participation and transparency are deemed indispensable prerequisites for attaining justice.
3. **Embrace Diversity and Inclusivity:** Urban planning endeavors strive to cultivate environments that mirror the rich tapestry of societal diversity, fostering inclusivity across disparate socioeconomic strata and cultural cohorts.
4. **Promoting Sustainability:** A focal point concerns the crafting of urban habitats that espouse environmental, economic, and social sustainability imperatives, with a discernible eye towards the difficulties of both present and future generations.
5. **Enhancement of Quality of Life:** Central to the discourse is the imperative to facilitate residents' living standards by cultivating urban milieus that engender a harmonious interplay between work and leisure while nurturing holistic well-being.

Within the annals of social justice theory in urban planning, a litany of scholarly luminaries and seminal works beckon scholarly scrutiny. Among these luminaries, the oeuvre of Jean Gottmann, a distinguished French geographer renowned for his seminal contributions to urban planning and social geography, stands in salience. Gottmann's magnum opus, "The Social Logic of Space," published in 1983, constitutes a seminal treatise wherein he elucidates the intricate interplay between urban design and social

dynamics, thereby enriching our comprehension of how urban morphology shapes communal connectivity and equity within urban ecosystems.

Moreover, a pressing concern within this discourse is the absence of verdant expanses within low-income neighborhoods, encapsulating the quintessence of social justice theory in urban planning. This scholarly exegesis delves into the ramifications of green space paucity within economically marginalized locales and proffers avenues for redressing social justice lacunae.

The deficiency of green spaces within low-income enclaves engenders palpable repercussions on social parity, exacerbating extant disparities in resource allocation. Besides serving as bastions of recreation and respite, green spaces are pivotal in mitigating environmental degradation and nurturing mental well-being, thus constituting an indispensable facet of urban habitation.

Manifestly, imbalances in green space distribution are starkly conspicuous in locales characterized by economic impoverishment, precipitating deleterious ramifications on ambient air quality and the physical well-being of residents therein. Compounding this predicament, empirical evidence corroborates the salubrious impact of green spaces on psychological welfare, with restricted access to them within low-income precincts ostensibly correlating with the heightened prevalence of depression and mental afflictions.

Remedial measures are proffered to redress this glaring disparity and promulgate social justice within urban planning praxis. These encompass augmenting financial allocations towards environmental initiatives aimed at fortifying green infrastructure within low-income bastions, fostering robust community engagement in the urban planning milieu, and imbuing design paradigms with a pronounced social orientation geared towards ameliorating residents' quality of life while implementing a

more fair allocation of green areas.

In conclusion, the availability of lush havens within low-income neighborhoods constitutes a linchpin in fostering societal well-being and engendering equity within urban topographies. It behooves stakeholders across societal echelons, governmental agencies, and urban planners alike to converge efforts towards fashioning cities that resonate as equitable, salubrious sanctuaries emblematic of societal solidarity and justice, irrespective of socio-economic stratification.

2.5.2 *The Theory of Central Urban Places*

The theory elucidated by the esteemed German scientist Christaller stands as a seminal contribution to urban studies, offering a comprehensive framework for analyzing urban morphology, distribution patterns, and functional categorization of cities. This theoretical construct conceptualizes cities as pivotal hubs facilitating the provision of diverse goods and services. Moreover, it accentuates the intricate interplay between urban centers and their hinterlands, delineating the symbiotic relationships within and between regions (Nassef, 2006).

Central to Christaller's theory are two pivotal determinants explaining the nexus between urban centers as primary nodes for provisioning goods and services and their spatial manifestation. The first determinant pertains to the critical mass of the population, denoting the minimal populace requisite for the sustenance of basic amenities. Population size serves as both the impetus for demand and a prerequisite for the viability of infrastructural undertakings. For instance, allocating healthcare services is contingent upon a threshold population, illustrating the pivotal role of demographic factors in service provisioning. Consequently, disparities in service availability between metropolises and smaller settlements ensue.

The second determinant underscores the centrality of market dynamics in shaping spatial distribution patterns. The diffusion of services and commodities emanates from intrinsic human needs, thereby dictating the permissible extent of travel to satisfy said needs. This distance, fundamentally influenced by temporal and financial considerations, delineates consumers' willingness to traverse for goods and services vis-à-vis their utility. Consequently, the strategic localization of economic and service activities becomes paramount, premised upon facile accessibility and optimal cost-benefit ratios.

The significance of Christaller's theory reverberates across various domains, notably urban planning and regional economics, which are underscored by several salient facets. Foremost, it serves as a heuristic device for delineating regional configurations and discerning urban structural dynamics, facilitating the identification of extant urban nuclei, demographic compositions, and service typologies. Furthermore, its methodological framework furnishes a convincing mechanism for predicting future spatial arrangements, engendering equilibrium amidst evolving urban constellations.

The delineation of optimal spatial locales for economic endeavors, nestled within the ambit of accessible amenities and logistical conduits, accentuates another cardinal utility of Christaller's theory. Rationalizing trip organization, spatial boundaries, and resource utilization elucidates avenues for harnessing material and human capital toward sustainable development. Moreover, it serves as a linchpin for enhancing the economic viability of foundational industrial ventures, anchoring upon the imperative linkage between economic activities and populace dynamics.

In delineating the regional purview of the theory, the salience of competitive dynamics in augmenting efficacy vis-à-vis service delivery to urban denizens becomes

manifest. Propagated through a spatially coherent array of hexagonal service areas, this framework engenders a network of centers poised to cater to urban exigencies comprehensively. The diverse functions served by service facilities proffer a gamut of options to residents, contingent upon service requisites and spatiotemporal considerations, thereby accentuating the nuanced interplay of choice within the urban fabric.

2.5.3 *Place Attachment Theory*

Place attachment, a concept rooted in the emotional connection between individuals and their physical surroundings, has garnered attention across various disciplines within the social sciences, albeit with differing conceptualizations. Terms such as place attachment, rootedness, sense of place, and urban attachment have been employed to describe this phenomenon, reflecting the interdisciplinary nature of the subject and the diverse theoretical influences it encompasses (Hernández et al., 2014).

This multidimensional construct of place attachment has been explored extensively in neighborhood studies, health research, tourism assessment, management of natural resources, social housing policy, regional planning, and pro-environmental engagement. Despite conceptual disagreements, the importance of investigating place attachment is evident across these diverse research contexts (Hernández et al., 2014).

Several models have been put up to conceptualize the interaction between people and their surroundings., such as the structural alternative model, the model of place dependence, and the place identity model (Turton, 2016). These models highlight the multidimensional nature of place attachment, incorporating affective, cognitive, and behavioral components.

The Place-Person-Psychological (PPP) framework, introduced by Turton (2016), aims to organize these diverse conceptualizations and delineate three

interconnected. The person, psychological process, and location dimensions are the three aspects of place attachment.

The person dimension distinguishes between the meanings of place determined by individuals and those defined by groups or communities. This dimension acknowledges the subjective and collective nature of place attachment, emphasizing the role of personal experiences and shared cultural narratives.

The psychological process dimension delves into the components involved in the attachment process. Emotion, behavior (including proximity-maintaining behaviors), and cognition (thoughts and perceptions) are crucial elements shaping the attachment bond between individuals and their environments.

Finally, the place dimension discerns between a place's physical and socially bound characteristics, recognizing how tangible features (e.g., natural landscape, built environment) and intangible aspects (e.g., social interactions, cultural significance) contribute to the formation and maintenance of place attachment.

Place attachment theory, which examines the emotional and psychological bonds between individuals and places, supports the critical reflection on design production and local knowledge as legitimate intervention methods. This reflection helps us understand the legitimacy of space, place, and meaning, emphasizing that these concepts are deeply connected to personal and collective experiences. Eliade's idea of uncovering profound meanings in faded images aligns with the dynamic nature of place attachment, where meanings evolve through engagement with the environment. Projects like CGC and Al-Azhar Park demonstrate how intentional design and cultural aesthetics can reveal historical layers and enhance people's emotional bonds with public spaces, reinforcing the sense of place as a palimpsest of time and meaning (Kahera, A., (2016).

In summary, the PPP framework offers a comprehensive perspective on place attachment, elucidating its complex interplay between individuals, psychological processes, and environmental characteristics. By delineating these interconnected dimensions, the framework provides a nuanced understanding of the factors shaping the emotional bonds between people and their physical surroundings.

2.5.4 The Theory and Practice of Landscape Architecture.

Theory of planning and architecture, whose norms are used in parks and green spaces. For more than 50 years, a thorough reference to the theory and practice of landscape architecture (5th Edition) (J.O. Simmonds, 1961) How to plan and design for human use of land with the least negative influence on the environment: How to plan and design for human use of land with little adverse impact on the environment, as well as a case study illustrating the application of this theory and case studies from diverse local and worldwide geographic areas.

Planning criteria for the availability of green areas

Due to their positive environmental effects on lowering air pollution and making it easier to breathe, improving local climatic conditions in cities, lessening the impact of audio and visual pollution, and providing other environmental benefits, green spaces are significant in major cities. They also have important psychological, social, and aesthetic advantages that elevate them above simple displays of wealth and make them one of the services that must be offered in cities. To attain an acceptable environmental and urban level of the town, it is required to provide green places with enough space, distribute these spaces geographically to serve the various neighborhoods and planning units, and supply them with the proper sorts of (Simonds, J.O,1961).

Quantitative requirements for the size of green spaces

The elements that decide the number of green spaces in cities vary substantially from one site to another because of natural conditions, such as rain, surface or groundwater sources, and the composition of soil and temperature. The population's urban, social, and economic circumstances make calculating rates or broad indicators for urban green spaces challenging. The planning requirements vary because there might be other environmental-focused criteria, such as a proportion of the city's surface or an area that reflects how much the individual, family, or housing unit belongs to green spaces. Despite the variations, having an idea of the generally suggested rates for these services is helpful. Even if they have a wide range of fluctuations, try to apply them as much as possible to the mentioned variables. (Simonds, J.O,1961).

Per capita green areas

In the 1960s, Symonds' plan called for an average of 90 m² per household and required that at least 10% of the city be covered by green space, whereas Paul Reiter's proposal called for 10 m² of recreational green space per person. Some international organizations, including the United Nations Program, The European Union, the United Nations Environment Programme (UNEP), and more organizations, as well as some municipal institutions in various nations, set quantitative standards that specify the very minimum quantity of green land required, between 12 square meters and 16 square meters per person, The majority of developed nations achieve this number in their cities many times (in most European cities, the number is between 20 and 30 square meters is between 20 and 40 square meters per person). Still, it remains a valuable indicator for those who have yet to reach or approach this number. (Simonds, J.O., 1961).

The proportion of green space in the city

This indicator is straightforward to grasp, yet it has a drawback: its accuracy may need to improve in densely populated regions or amidst towering structures. For instance, in Germany, this ratio varies from 40% to 50% across most cities. Nevertheless, the lowest figures often hover between 10% and 20% of the city's total area.

2.6 Workplace Attachment

Stakeholders in both the workplace and the construction industry must thoroughly comprehend how employees respond to changes, encompassing their emotional and cognitive reactions. Utilizing this understanding, change management strategies can be developed to prioritize the psychological well-being of employees. Studies indicate that employees often feel threatened and resist workplace changes, underscoring the necessity of addressing potential impacts on their welfare. To achieve this, facility managers, designers, and planners should integrate principles derived from workplace attachment research into their processes of redesign and relocation.

Workplace attachment, a relatively recent concept in workplace studies, has garnered significant attention. It denotes the emotional connection between individuals and the physical work environments associated with their organizations. Numerous investigations have investigated the correlations between workplace attachment and socio-environmental and psychosocial factors. Existing literature identifies three theoretical models of workplace attachment, including Rioux's unidimensional model, the adaptation of the PPP model to workplace contexts, and Inalhan's model, which emphasizes emotions, attitudes, and behaviors regarding place loss amid workplace change endeavors.

Table 4. Shows theories, key aspects, and how to applicate in the industrial area; source: Author,2024

Theory	Key Aspects	Application
Theory of Central Urban Places	- Analyzing the concentration of infrastructure and public services in the center of industrial areas in Qatar. -Aware of how centralization affects citizens' standard of living.	The study focuses on improving industrial area centralization to enhance residents' comfort and convenience by concentrating on public facilities and services.
Theory of Social Justice in Urban Spaces	- Examining equitable distribution of resources and services, especially in low-income neighborhoods. - Reviewing the social impact of enhancing green spaces and public areas.	Enhancing life in low-income neighborhoods through fair resource and service allocation and improving green spaces will positively change community well-being.
Theory of Place Attachment	- Exploring how residents can strengthen their connection to an area, mainly through green spaces. - Understanding the enhancement of individuals' sense of belonging through improved parks and natural spaces.	Improving parks and natural spaces within the neighborhood will strengthen residents' sense of belonging and interaction with their surroundings.

To apply these theories effectively, the following aspects can be combined:

1. **Analyzing Quality Facilities and Green Spaces:** Evaluate how providing quality facilities and green spaces can elevate the standard of life in low-income neighborhoods by utilizing insights from the theory of central urban places and social justice in urban spaces.
2. **Considering Social and Economic Factors:** Study the social and economic factors affecting the equitable distribution of resources and services, integrating

concepts from the social justice theory in urban spaces to ensure fair access to amenities.

3. **Enhancing Personal Connection to Place:** Examine how personal connections to place influence residents' experience and well-being. Use place attachment theory to guide improvements in parks and natural spaces that strengthen residents' bonds with their environment.

By integrating these theories, a comprehensive understanding of the problem can be achieved, leading to more effective strategies for addressing the effects of inadequate parks and landscaping in industrial areas in Qatar on the standard of living in low-income communities.

2.7 Samples Studies of Park Initiatives in Industrial Areas

Sample studies are integral in grounding theoretical frameworks and offering practical insights. They contextualize theories by examining real-world scenarios. Local case studies provide in-depth analyses of specific neighborhoods, highlighting the influence of green spaces on residents. Regional case studies expand this scope to broader geographical areas, identifying trends across various urban settings. International case studies offer a global perspective, enabling cross-cultural comparisons and extracting universally applicable principles.

2.7.1 *Local Samples Studies - Spatial logic of park access in Qatar*

The study emphasizes the transformative role of urban parks in uniting communities and enhancing livability, highlighting their evolution from utilitarian spaces to vital locations for relaxation and leisure. Even with the advantages, parks frequently must be arranged to accommodate people's requirements. To solve this problem, this thesis maps out the distribution pattern of green parks in Greater Doha,

Qatar, utilizing walkable service areas and need-based analysis incorporating variables like population density and housing type (Low et al., 2005).

The research indicates that roughly 22% of areas, especially those accommodating expatriates and low-income migrants within Doha municipality, lack adequate park facilities. A needs assessment emphasizes the genuine demand for parks in urban Doha and surrounding areas. An analysis of walkability reveals shortcomings in street-level policies that impede pedestrian accessibility. These results offer valuable insights for formulating policies focused on tailoring park planning to meet the distinct requirements of various demographic groups (Marthya, 2022).

The literature review also explores the evolution and significance of public parks, acknowledging their multifaceted impacts on psychosocial, ecological, and economic aspects. Parks are essential components connecting people across ethnicities and socioeconomic classes. However, the review criticizes the traditional narrow lens of park distribution, advocating for a more comprehensive approach considering socio-economic and socio-cultural factors (Kaplan & Kaplan, 1989; Ulrich, 1981).

The introductory section delineates the research framework, covering the historical development of green parks and the importance of ensuring fair access. It presents the research problem, emphasizes the study's significance, and discusses research inquiries, hypotheses, and possible constraints. Furthermore, it elucidates the methodology, overall thesis organization, and the thesis's contribution to both academic progress and practical implications, establishing a groundwork for forthcoming chapters.

Public urban green space accessibility

The second case study is entitled "Accessibility of Public Urban Green Spaces within the Spatial Metropolitan Network of Doha, State of Qatar." According to Robble

(2016), green spaces are essential for increasing citizens' and the environment's public health and well-being and improving inhabitants' physical and psychological well-being. As a result of globalization, research on green spaces has taken on greater significance in urban planning processes in fast-growing cities worldwide (Mitchell et al.; F., 2007).

To maintain the standard of living in urban surroundings, Urban planning now heavily depends on the presence of green areas. It concentrated on how to situate ecologically friendly public facilities such that many people or only a few can (Ottensmann et al.; L.,2008). (Gehl, J., and Svarre, B.,2013), (Gehl, T.,2010) and (Beatley.T.,2000). This article claims that accessibility is the simplicity of access to urban green areas from various resources in the urban spatial network at both the macro and micro scales. Surprisingly, the need for more open space or green regions in certain metropolitan places results from the fast urbanization of numerous urban centers worldwide.

The provincial capital of Qatar, Doha, is where it is most noticeable that urbanization and globalization are accelerating and broadly harming the amount and quality of easily accessible green areas (Salama et al.; F.,2013). This article used network analysis methods and space fitting techniques (Penn et al.; J.,1998) to unbiasedly assess the Doha metropolitan area's accessibility to amusement parks and urban green spaces. The study's primary contention is whether or not the accessibility of urban green spaces and their placement correlate with public planning policies' design goals. Several research findings indicate that urban green areas' physical and geographical qualities over a particular scale in terms of meteorite measures appear to follow a distinctive spatial and social logic.

On the other hand, these properties result from problems with land availability

and a need for more infrastructure in private projects, which causes them to be more sporadic in smaller urban green areas. Following the research publication, a discussion regarding the study's potential effects on governmental planning directives for green urbanization occurred in the State of Qatar and other quickly expanding international cities. They conducted methodical research to calculate the area per capita of urban green spaces that exceed a given criterion. And their connection to park distribution and accessibility. According to the study, a non-positive distribution in terms of maximum benefit and utilization was found in several parks.

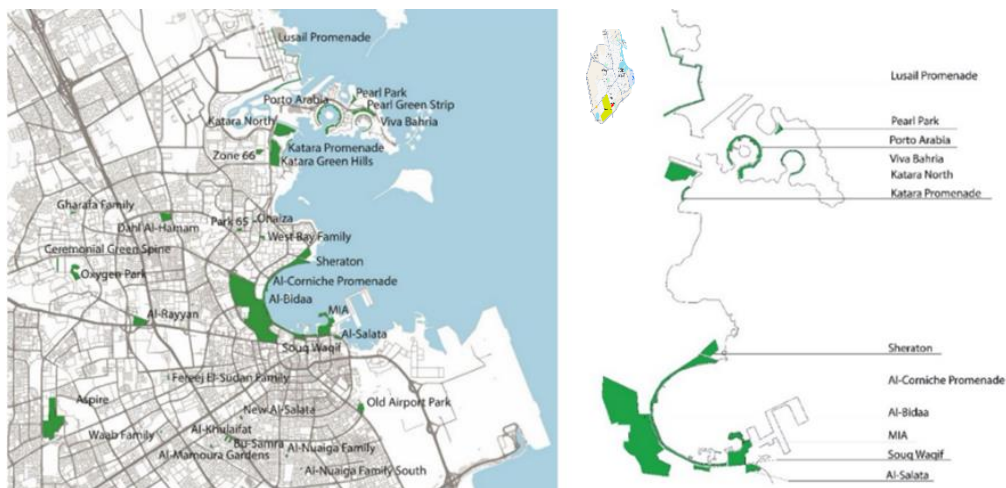


Figure 15. Investigated public parks and promenades along Doha's shoreline.(Tannous et al., 2021)

	Park Name	Type	Region	Area Acre	Area m2	Global rad=n	Local Integration rad=3	Integration rad=8
1	Bidda	M	East	426.0	1,723,962	1.282	2.578	1.668
2	Aspire	M	South West	185.7	751,502	1.496	3.256	2.007
3	Katara Green Hills	R	East	74.3	300,682	0.972	2.199	1.433
4	MIA	R	East	70.5	285,304	0.939	1.973	1.223
5	Katara North	R	North	65.4	264,665	0.877	1.807	1.247
6	Al-Corniche	P	East	57.2	231,480	1.114	2.179	1.480
7	Lusaail	P	North	33.5	135,570	0.976	1.714	1.231
8	Oxygen	C	West	31.3	126,667	0.989	1.500	1.115
9	Porto Arabia	P	North	28.0	113,312	0.552	1.083	0.826
10	Al-Rayyan	C	West	24.2	97,934	1.488	2.941	1.877
11	Sheraton	C	East	22.9	92,673	0.990	2.292	1.413
12	Dahl Al-Hamam	C	North	21.6	87,412	1.275	2.978	1.802
13	Pearl Green Strip	L	North	19.3	78,104	0.605	1.599	1.006
14	Viva Bahria	P	North	10.9	44,111	0.552	1.083	0.826
15	Souq Waqif	L	East	10.1	40,873	1.259	3.087	1.704
16	Katara Promenade	P	East	8.2	33,265	0.758	1.389	0.959
17	Old Airport Park	N	South	6.8	27,519	1.202	3.105	1.787
18	Al-Salata	N	South East	6.2	25,091	1.106	2.895	1.577
19	Ceremonial Green Spine	N	West	5.9	23,876	1.467	2.847	1.599
20	Park 65	N	North	5.5	22,258	1.019	2.238	1.487
21	Pearl Park	N	North	5.1	20,639	0.647	1.776	1.090
22	Zone 66	N	North	4.2	16,997	0.924	2.216	1.345
23	West Bay Family Park	N	North	4.0	16,187	1.071	2.339	1.532
24	Onaiza Park	MN	North	2.4	9,712	0.846	1.200	1.175
25	Bu Samra	MN	South	2.4	9,712	1.522	2.624	1.951
26	Al-Khulaifat	MN	South	2.3	9,308	1.100	0.887	1.294
27	New Al Salata	MN	South	1.8	7,284	1.115	1.295	1.409
28	Gharafa Family	MN	North West	1.7	6,880	1.032	2.491	1.389
29	Al-Mamoura Garden	MN	South	1.7	6,880	1.272	2.100	1.685
30	Al-Nuaiga family	MN	South	1.0	4,047	1.028	1.489	1.370
31	Fereej Al Sudan Family	MN	South	1.0	4,047	1.389	2.603	1.845
32	Al-Nuaiga family (South)	MN	South	0.9	3,642	1.139	2.503	1.629
33	Waab Park	MN	South	0.8	3,076	1.184	1.484	1.595
	TOTAL			1142.8	4,621,595			
	AVERAGE			34.6	144,425	1.066	2.114	1.442

Figure 16. Shows different city regions' recreational areas, parks, and walkways (Tannous et al., 2021).

The table presents the recreational areas, parks, and walkways in different city regions, listed from biggest to smallest. It includes measuring acres and square meters and global and local integration values. The average integration is calculated from the eight streets with the highest levels.

2.7.2 Regional Samples Studies Urban Cohesion: Dubai Case

The research delves into the essence of human interaction. It underscores the significance of creating communal spaces to facilitate social gatherings, drawing from Gehl's observations referenced in Matan & Newman (2016, p. 40). It highlights the

worldwide scope of communities and the necessity of establishing inviting public areas for social engagement, citing Gill. The study sheds light on the challenges arising from the globalization of cities, particularly in managing the influx of migrants, and stresses the importance of prioritizing human-centric approaches in urban development.

A people-focused urban planning and architecture strategy is critical, especially in fostering social bonds within diverse neighborhoods. The dwindling interactions observed in modern urban settings suggest a paradigm shift towards designing neighborhoods that actively encourage social networks and cohesion. The study also examines the prevailing trend of cities striving for intelligence, sustainability, and livability, emphasizing the mutually beneficial link between the built environment and its occupants.

The research focuses on urban social sustainability and how it might improve social cohesion and livability, especially at the neighborhood level. In particular, it examines Dubai to clarify how social cohesion metrics and urban design contribute to developing a cohesive community inside residential areas.

The study reflects on the era of globalization characterized by rapid urban expansion and the consequent metamorphosis of cities into hubs of social, cultural, and economic evolution. The urban landscape increasingly reflects urbanism principles, marked by a decline in intimate human connections, leading to superficial and transient relationships. The decline of residential neighborhoods presents difficulties for architects, designers, and urban planners.

Due to the social and cultural settings in which architecture and urban planning are enmeshed, the research assesses modern urban planning approaches. It uses a theoretical framework influenced by scholarly literature on urban social sustainability,

social cohesion, and urban neighborhood planning to evaluate the cohesion and sustainability of neighborhood communities.

The study assesses how urban planning—including constructed forms, planning, and design—shapes socially cohesive neighborhoods in Dubai's diverse community. Using a mixed-methods approach that includes quantitative, qualitative, geographical, and observational investigations, the research examines the physical characteristics of four distinct neighborhoods and how they affect social cohesion.

The findings affirm the significant role of physical planning and architectural structures in fostering social unity among residents. Residents are interested in socially cohesive environments, and urban planning initiatives are perceived as practical tools in cultivating such communities in Dubai. The research underscores the pivotal role of planners and architects in shaping neighborhoods that promote social cohesion in the city.

This study aims to guide future urban planning endeavors by augmenting existing expertise in creating socially cohesive urban neighborhoods, which is especially important in Dubai's dynamic, multinational expat community. The built environment, culture, Dubai, expat, housing, neighborhood, social cohesion, and social sustainability are some of the essential search terms.

Moreover, the paper explores the impact of green spaces on social dynamics in Mosul, emphasizing their role in fostering community bonds and enhancing residents' quality of life. It underscores the significance of green areas in facilitating communication among locals and nurturing a sense of belonging. Additionally, the study offers recommendations to optimize green space utilization in Mosul, aiming to enrich residents' social interactions.

The impact of greenspace in Mosul

The research presents a methodological approach that involves several stages: identifying and categorizing green areas in Mosul, determining their total size, analyzing their ratio to the city's overall area and population, and assessing whether these spaces meet residents' needs. Additionally, it explores how green spaces in Mosul serve as recreational hubs for the city's population. A different study focusing on Berkane, Morocco, highlights the importance of urban space planning in improving the city's green space index. Despite efforts, Berkane needs more green spaces, necessitating realistic development strategies aligned with sustainable urban planning goals. Moreover, existing literature indicates that urban green spaces are crucial in reducing social exclusion and promoting community cohesion, especially in marginalized areas. These spaces provide accessible locations for social interaction, stress relief, and community involvement, contributing to residents' well-being and inclusivity.

However, Problems like uneven green space distribution and safety concerns prevent everyone from accessing these facilities. Disparities in green space allocation within metropolitan areas worsen social inequalities, while neglected parks may encourage antisocial behavior and discourage certain demographic groups from using them. Addressing these challenges requires comprehensive city-level planning for green spaces and safety measures to ensure fair access and utilization for all urban residents.

2.7.3 International Samples Studies

Green Space Inequality Analysis: Melbourne Cases

The contextual backdrop of this research underscores the potential exacerbation of health disparities due to an uneven allocation of green areas, such as parks. This issue

is particularly concerning as individuals with lower incomes, who already face a higher risk of preventable illnesses, may experience reduced access to such amenities.

In conducting this study, we employed a methodology linking statistics from the 2011 Australian census across major cities: Sydney (n = 4.6 million persons), Melbourne (n = 4.2 million), Brisbane (n = 2.2 million), Perth (n = 1.8 million), and Adelaide (n = 1.3 million) regarding the availability of green space within a 1-kilometer radius of Statistical Area 1 (SA1). A measure of socioeconomic status was the proportion of SA1 residents earning less than \$21,000 annually.

We employed negative binomial and logit regression models to explore how green space availability relates to the socioeconomic status of neighborhoods while also factoring in city and population density. Our results revealed a significant decline in green space availability in SA1s with a higher percentage of low-income residents. For example, an observed incidence rate ratio of 0.82 (with a 95% confidence interval of 0.75 to 0.89) for SA1s containing $\geq 20\%$ low-income residents compared to those with 0-1%. Moreover, this association varied across cities ($p < 0.001$). Adelaide showed the least equitable distribution of green space, with affluent areas having approximately 20% greenery compared to only 12% availability in the least affluent areas.

Melbourne exhibited the most equitable distribution of greenery among all the cities, with just a 0.5% variance in green space availability between SA1s with 0-1% low-income households and those with $\geq 20\%$. This is noteworthy, considering the city had fewer SA1s in the top quintile of green space availability (13.8%). However, when comparing the likelihood of having at least 20% (with an odds ratio of 0.74 and a 95% confidence interval of 0.59 to 0.93) or 40% (0.45, 0.29, 0.69) green space in impoverished versus affluent neighborhoods using logit regression, disparities in access persisted across all cities.

Our study's conclusion emphasizes the necessity of affirmative action in green space development to address socioeconomic gaps in access to this essential public health resource.

Quality of Life Analysis: Łódź City Centre Poland

The study aims to uncover the underlying forces impacting living standards for those in disadvantaged neighborhoods, exemplified by a disadvantaged area within the city center of Łódź. Employing the capability approach, the research delves into the multifaceted nature of this phenomenon, mainly focusing on conversion variables that make it challenging to live the lives one wants. The study finds distinct paths, which are then combined. It uses official data from public institutions (specific to the building level, permitting a nuanced spatial analysis) and 80 in-depth interviews with residents.

This amalgamation is visualized as a network of social exclusion. Through this comprehensive data collection, the author establishes a taxonomy of conversion factors prevalent in marginalized areas, accounting for their interconnectedness and intricate causal relationships. The taxonomy encompasses various dimensions, covering work environment, social capital, housing conditions, economic standing, knowledge and skills, social norms and attitudes, and general living conditions (including access to public areas and services). By fusing quantitative building-level data with qualitative observations, the study provides crucial insights for identifying particular public policy initiatives that impact these conversion determinants (Grabowska, I. 2021).

Applying the theory and practice of Landscape Architecture. (John Simonds) to Samples Studies

Applying urban planning theories to Samples Studies

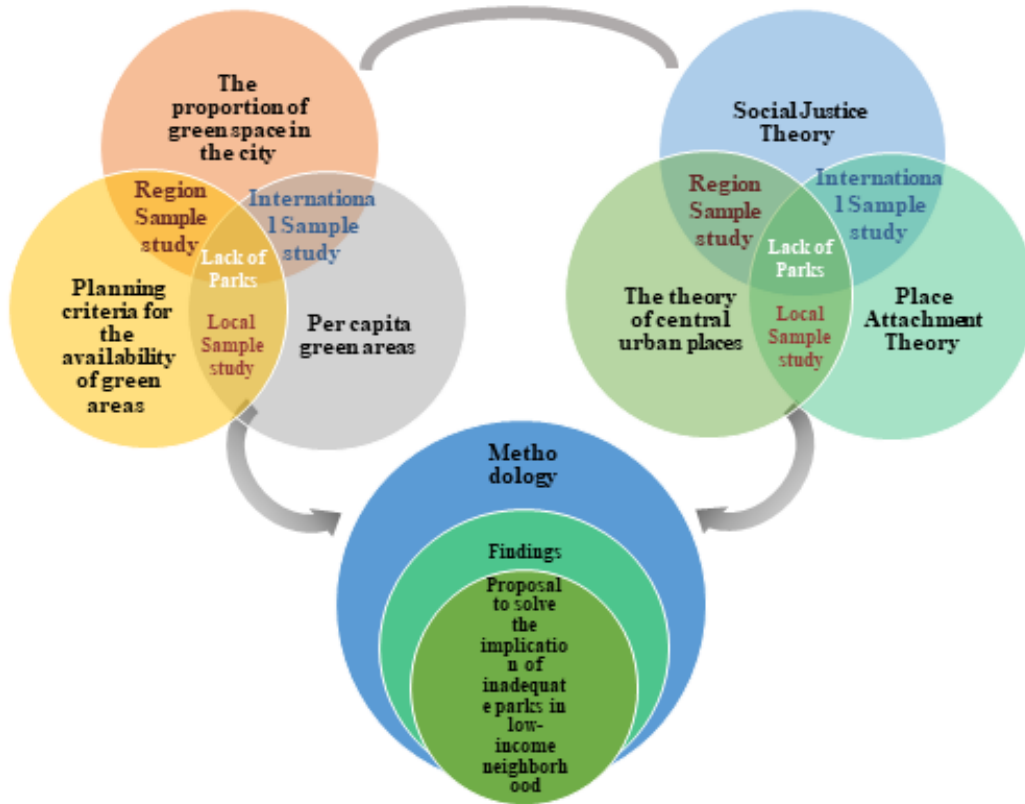


Figure 17. Literature Review Overview. Source (Author,2024).

Table 5. Summarize the findings of three categories of case studies. Source. Author2024.

Items	Local Sample Study	Regional Sample Study	International Sample Study
Name of Study	Spatial Logic of Park Access in Qatar (Marthya. Khalida,2022). Accessibility of public urban green spaces within a spatial metropolitan network of Doha (Tannous. H.O et	Urban planning, neighborhoods, and social cohesiveness: A socio-cultural study of expatriate residents in Dubai (More. Bhakti,2018)	Do low-income neighborhoods have the least green space? A cross-sectional study of Australia's most populous cities (Astell. Th. et al.,2014). Quality of Life in Poor Neighborhoods through the Lenses

Items	Local Sample Study	Regional Sample Study	International Sample Study
	al.,2021)		of the Capability Approach—A Case Study of a Deprived Area of Łódź City Centre Poland (Grabowska, I. 2021)
Methodology adopted	<p>To identify critical factors for analyzing public parks and green spaces in Metropolitan Doha, the study is divided into three phases: (1) a literature review that explores the interdisciplinary context of green urbanism and space syntax; (2) the identification of twenty-three (23) public parks and green spaces as case studies; and (3) the collection and analysis of quantitative metrics, such as area, global and local integration, and radius integration to all other axial lines, based on perimeter streets that provide access to these public parks and green spaces in the urban network of Metropolitan Doha, using a space syntax model.</p>	<p>The study uses different methods, such as quantitative, qualitative, spatial, and observational analyses, to investigate the influence of physical factors in specific neighborhoods in Dubai on their social cohesiveness. The research is guided by theoretical frameworks based on academic literature in critical areas. The study emphasizes how green parks and public regions improve aesthetics, interpersonal relationships, and general wellness.</p>	<p>1. The methodology used in this study involved assessing the availability of green spaces within a 1-kilometer radius of SA1 (Statistical Area Level 1) and correlating it with the five most populous cities in Australia according to statistics from the 2011 Australian census. According to the percentage of each SA1 population that makes less than \$21,000 annually, the socioeconomic status was ascertained.</p> <p>2. This study used a mixed-methods approach, which included gathering information from building-level public agencies and conducting in-depth interviews with inhabitants. The research design, data sources, analysis flow, and empirical findings are all covered in depth in the Materials and Methods section.</p>

Items	Local Sample Study	Regional Sample Study	International Sample Study
Study Aim	<p>1. An analysis of the spatial distribution of urban parks in Greater Doha, Qatar, focusing on their effects on community livability.</p> <p>2. The study uses a ratio based on the metric area of the parks, green areas, and promenades in Doha to assess their accessibility. While smaller areas could be too big or tiny for accessibility, larger parks are more accessible. This aids in locating the best parks for upcoming growth.</p>	<p>To assess and analyze the relationship between physical planning, layout and design, and social cohesion indicators in the neighborhoods of Dubai</p>	<p>-Green space measures may not have been sensitive to differences in quality. At the time of data processing, a conventional way of evaluating the socioeconomic circumstances of neighborhoods was not available. - Future research should differentiate between various types and attributes. Of green space</p> <p>- Sensitivity analyses with a different measure of socioeconomic advantage and disadvantage revealed similar results</p>
Criteria for Assessing Lack of Parks	<p>The study evaluates criteria such as park proximity to residential areas, walkable service areas, zones, population density, accessibility, equitable distribution, community feedback, and comparative analysis to identify underserved areas and understand spatial distribution deficiencies.</p>	<p>To evaluate and examine the function of physical planning, layout, and design by comparing a few chosen Dubai neighborhoods.</p>	<p>- Substantively lower green space availability in areas with a higher proportion of low-income residents; unequal access to green space in all cities; and an analogous relationship between the availability of green space and the socioeconomic status of the surrounding neighborhood in Australia's most populous cities</p>
Criteria for Assessing	<p>The capital of the State of Qatar, Metropolitan Doha,</p>	<p>The study reveals that building forms and spatial</p>	<p>The paper aims to use the capability approach to determine</p>

Items	Local Sample Study	Regional Sample Study	International Sample Study
Low-income Neighborhood	is the subject of this study article. With a metropolitan population of about 1.7 million in 2016, it has an area of 132 km ² (Source: Ministry of Development Planning and Statistics).	organization significantly influence social cohesion, with locals willing to be part of a cohesive society, suggesting that urban planning can foster this.	the factors influencing each person's quality of life in underprivileged areas and provide public policy recommendations based on empirical analysis.
Enhancing Low-income Neighborhood Parks	The study underscores the significance of designing parks based on accessibility, need score, spatial equity, and green spaces to guarantee equitable access for all demographics. A study in Doha reveals that 22% of municipality zones lack enough parks, mainly for foreigners and low-wage migrants. The study emphasizes the importance of green parks for aesthetics, social interactions, and health, particularly in hot and arid climates. It suggests a scientific approach to park planning and emphasizes quality design over quantity allocation.	The role of architects and urban planners in creating socially integrated neighborhoods in Dubai The project intends to advance our understanding of how to build socially cohesive urban neighborhoods, particularly in light of Dubai's migrant, multicultural expat population.	The study draws attention to the unequal distribution of green spaces in metropolitan areas, revealing significantly less availability of green space in neighborhoods with a higher proportion of low-income individuals. Affirmative action in green space development is emphasized to overcome this socioeconomic disparity and advance public health. quality of life (QoL) in underprivileged areas, particularly in the impoverished Łódź city center

2.8 Summary

This literature review examines the characteristics, challenges, and initiatives related to industrial parks in the GCC, focusing on Qatar. It emphasizes the importance of industrial areas in urban development and economic growth, highlighting the role of parks in improving quality of life and mitigating environmental impacts. The review delves into the Qatari government's efforts to enhance industrial areas, including infrastructure development projects and the Asian City initiative to improve workers' quality of life. Theoretical frameworks such as urban central places theory and place attachment theory are discussed alongside case studies of community initiatives. Attention is given to the spatial logic of park access in Qatar and the wider GCC region. Quality of life analysis from a case study in Poland underscores the importance of well-planned industrial areas in enhancing urban livability. The review highlights the interdisciplinary nature of addressing the critical need for green spaces in low-income neighborhoods, particularly Qatar's Industrial Area. It emphasizes the social and economic consequences of inadequate green spaces. It concludes by advocating for interventions to improve the well-being of vulnerable communities.

The next chapter introduces research design two and data collection methods. It also discusses choosing the research site and industrial area for study and a comparative analysis of the industrial area divided into three places.

CHAPTER 3: RESEARCH DESIGN

3.1 Research Design

The genesis of this research emanates from the observable phenomenon of laborers congregating in open spaces and plazas within the Al-Jfairi, Al-Najada, and Souq Waqif districts, engaging in recreational activities and fostering interpersonal communication. These gatherings' focal points were concentrated in the Al-Jfairi area, Grand Hamad Street, and the intersection between New Doha and Al-Ghanim, specifically around the currency exchange establishments of Al-Sharqi and Al-Watan Mobiles. The researcher meticulously observed this area for over a month, emphasizing weekends when population density reached its zenith, aiming to discern the impetus behind the substantial gathering of workers.

A comprehensive approach was adopted to elucidate this phenomenon, incorporating the distribution of questionnaires via WhatsApp and engaging in amicable interactions with select workers. Through these methods, it was discerned that many of these workers, predominantly hailing from the industrial area, sought leisure and locations boasting verdant expanses. This revelation prompted the identification of the industrial area as the locus after the researcher investigated the area's parks and green areas as part of the research problem.

The study area selection was further substantiated through visits to the old industrial area, deemed the epicenter of industrial zones in Qatar, which subsequently succeeded by establishing the new industrial location and the industrial area catering to medium- and small-scale industries. The old industrial area emerged as the case study due to its role as a pivotal transportation hub linking various cities in Qatar, epitomized by Al-Attiyah Market, a central nexus for diverse amenities such as transportation,

eateries, retail establishments, medical facilities, and clinics. Moreover, the theory of attachment to place underscored the enduring connection of the workers with this locale, akin to the historical cities of any nation, thereby influencing the choice of the study sample.

An exhaustive survey of the industrial area revealed a conspicuous absence of parks or green spaces, with the nearest park at Umm Al Seneem necessitating a 50-minute walk. Entertainment gatherings for workers predominantly coalesced around Al-Attiyah Market, 10th Street (Car Dealership), 13th Street, and 18th Street. The workers who ventured beyond these locales primarily sought recreation in areas such as Al-Jufairi, Al-Najada, and Souq Waqif, owing to their proximity to public transportation stops, initially situated at Al-Ghanim and Musheireb.

The research design incorporated urban planning theories and drew insights from relevant local and international studies conducted in Qatar, the Gulf region, Poland, and Australia between 2018 and 2022. These studies explored the fortification of less developed neighborhoods and the equitable distribution of parks, contributing valuable knowledge to inform the present investigation. The theory of social justice and spatial distribution, particularly Simond's theory, guided the extraction of gaps and the formulation of results about the Qatar Industrial Zone.

Methodologically, the research employed case studies, pertinent theories, direct observations, and administered questionnaires. The objective was to gauge the repercussions of the absence of parks on the workers' health and social well-being. Additionally, the study sought to foster positive behavior to enhance productivity, strengthen social bonds, and alleviate harmful practices such as occupying streets and sidewalks, the proliferation of street vendors, and the emergence of marginal crafts resulting from these phenomena. Economic impacts were also assessed concerning the

workers' expenditure when seeking parks outside the industrial area. Goal Maps and Google Earth facilitated measuring distances and delineating the workers' spatial context, with a comprehensive weekly study framework being implemented.

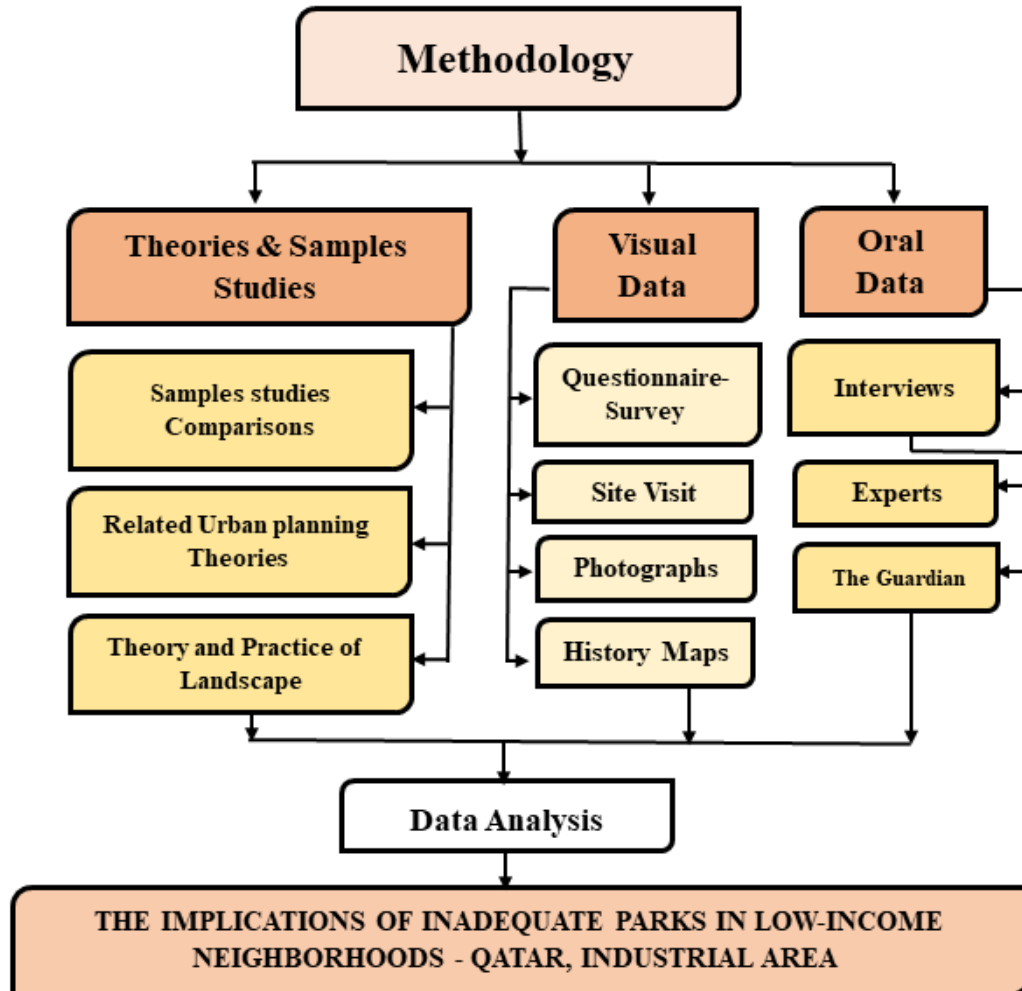


Figure 18. Methodology Review Overview. Source (Author,2024).

3.2 Data Collection Methods

Literature Review: Perform a thorough analysis of the body of research on the relationship between green spaces, quality of life, and low-income neighborhoods.

Samples studies: Examining two prior investigations conducted in Qatar, including Abdul Razak Khalida's "Spatial Logic of Park Access in Qatar" (2022) and Heba O. Tannous's "Accessibility of Public Urban Green Spaces within a Spatial Metropolitan

Network of Doha" (2021), clarifies the dynamics of the area's availability of urban green space and park accessibility.

"Urban Planning, neighborhoods, and Social Cohesiveness: A Socio-cultural Study of Expatriate Residents in Dubai" (More, 2018) is a study that focuses on Dubai and provides insights into the relationship between social cohesion among expatriate communities in the city and urban planning. Moreover, looking at foreign studies conducted in Australia, like "Do low-income neighborhoods have the least green space? Thomas Astell-Burt's (2014) "A cross-sectional study of Australia's most populous cities" offers insightful insights into the distribution of green spaces in economically challenged places.

Similarly, exploring the Polish study Applying the framework of the capability approach, Grabowska's (2021) case study, "Quality of Life in Poor Neighbourhoods through the Lenses of the Capability Approach-A Case Study of a Deprived Area of Łódź City Centre," provides a distinctive viewpoint on the quality of life and access to green spaces in impoverished urban areas.

These studies collectively contribute to understanding green space distribution and its implications for residents, particularly those in low-income neighborhoods, across various geographical contexts, including Qatar, Dubai, Australia, and Poland.

Select theories : Identify urban planning theories to analyze spatial and temporal reality, such as social justice theory, the theory of central urban places, and Place Attachment Theory. Analysis of spatial reality: We will use urban planning theories to examine how green spaces are distributed throughout the industrial area in Qatar.

Per capita assessment: The study adopted the Theory and Practice of Landscape Architecture. John Ormsbee Simonds will assess green space per capita.

Field Surveys: Conduct surveys and interviews with residents in low-income

neighborhoods to gather firsthand information on their perceptions of parks and green areas and assess the quantity and arrangement of the green regions.

Observational Studies: Monitor how the parks and green areas are used in the industrial area and understand their impact on community well-being.

Questionnaires: Design questionnaires to collect residents' opinions about quality of life and the impact of green spaces.

3.2.1. Administrative division of the State of Qatar

Understanding Qatar's administrative structure was imperative for identifying parks, their sizes, and their correlation with per capita allocation. The total area of the State of Qatar is 11,493 square kilometers. The initial municipality established in Qatar was known as Qatar Municipality in 1963. Shortly after that, it was renamed Doha Municipality in the same year. Subsequently, on July 17, 1972, the municipalities of Al-Rayyan, Al-Wakrah, Al-Khor, Al-Shamal, and Umm Salal were established. In 1997, the Umm Saeed municipality was created from portions of Al Wakra and Jeryan Al Batinah (Ministry of Municipality and Urban Planning, 2017).

In 2004, the Al Daayen Municipality was formed from parts of Umm Salal and Al Khor. Concurrently, Al-Ghuwairiya amalgamated Al-Khor and Al-Jumailiya with Al-Rayyan. The Al-Batinah area was divided between Al-Rayyan and Al-Wakrah (AlDaayen Municipality, 2005).

In 2014, the western urban area of Al-Shahaniya was detached from the Al-Rayyan municipality to establish its municipality, incorporating around 35% of the land area previously under Al-Rayyan's jurisdiction. Additionally, certain western districts within Al-Rayyan, including Al-Gharbiyah, Al-Atouriya, Al-Jamiliya, Umm Bab, Rawdat Rashed, Al-Nasraniya, Dukhan, and Al-Kharib, were integrated into the new

municipality (Hisham Yassin, 2014).

Since 2015, Qatar's administrative divisions have undergone consolidation, reducing the number of municipalities from ten to eight. This was achieved by merging the Jaryan Al Batinah municipality between Al Wakra and Meseaied and combining the Mesaieed municipality with the Al Wakra municipality (Qatar Ministry of Municipality and Environment. 8 Retrieved August 201).

The municipalities are divided into 98 districts. Each district is divided into smaller units called blocks, making the district the smallest administrative unit. Each level in the department has been given serial numbers as follows (Municipality, 2018): First level: Municipalities (1 – 8). The second level is the region (1 - 98). The third level is a square. Figure (11) shows the eight municipalities: Doha, Al-Rayyan, Al-Shahaniya, Al-Daayen, Umm Salal, Al-Khor, and Al-Shamal.

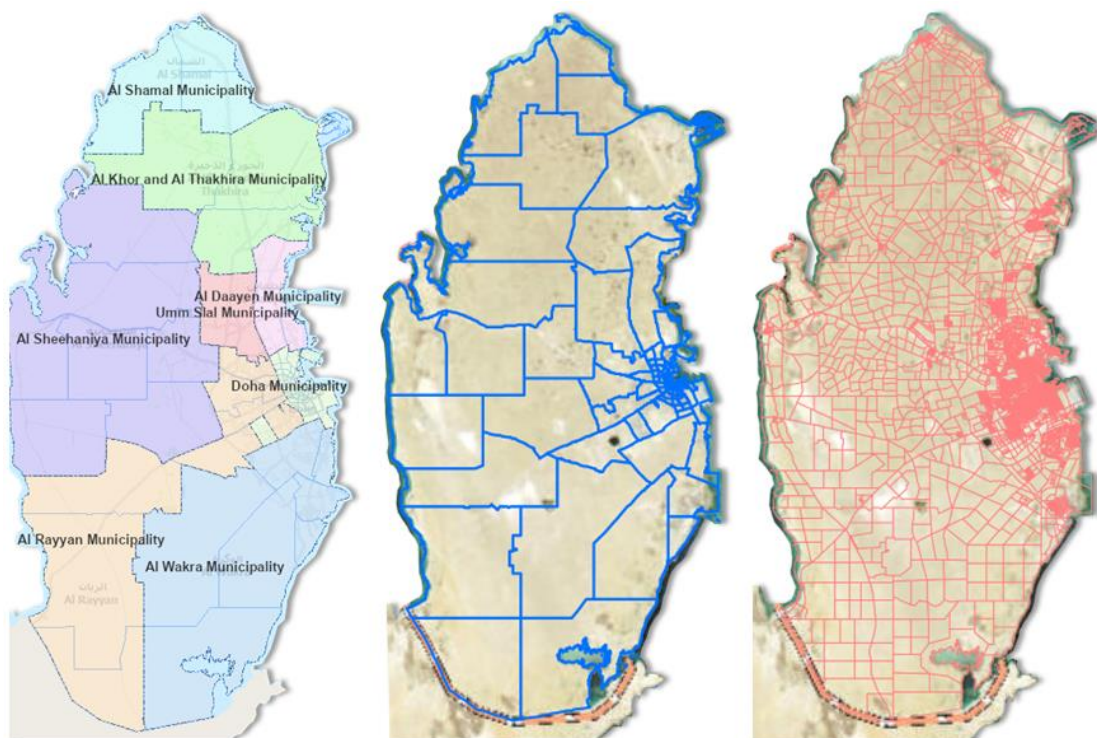


Figure 19. Qatar's eight municipalities, zones, and blocks (Source: Planning and Statistic Authority and Author 2024).

Doha Municipality includes the city of Doha, bordered by Umm Salal, Al-Rayyan, and the Arabian Gulf. It includes zones 1 to 49 and 60 to 69, with numbers 8 and 9 reserved for future urban expansion. Halul Island is also part of the municipal boundaries.

The municipality of Al-Rayyan includes Al-Rayyan, Al-Gharafa, Al-Shahaniya, Al-Sailiya, and their neighboring villages. Umm Salal and Al Jumailiya border it to the north, and Al Wakra and Doha to the south and east. It consists of areas 51 to 57, with reserved numbers 58 and 59. (Planning and Statistics. April 2015).

This clarifies that the municipality of Doha is one of the oldest municipalities and is subject to change through merging or splitting, as the industrial area includes the study site. The municipality of Al-Rayyan also includes the small and medium industries area.

3.2.2 Overview of Doha Municipality, Qatar

According to Law, (Qatar Municipality) was founded and is the oldest municipality in the nation. No. (11) of 1963 regulating the Qatar Municipality. Then, some provisions of Law No. (11) of 1963 was amended by Law No. (15) of 1963, and Article (1) of its amendments stated, “Provided that The title of Law No. (11) of 1963 (organizing the Qatar Municipality) will be replaced with Law No. (15) of 1963 (organizing the Doha Municipality), and based on this article, the name of Qatar Municipality has been changed to Doha Municipality, which is considered a public institution whose goal is to work well. Means for Doha’s urban and health progress.

It includes the city of Doha with its new extensions. It is bordered to the north by the municipality of Umm Salal, to the east by the Arabian Gulf, to the south by Al-Wakrah, and the west by the Al-Rayyan municipality. The areas that make up the

municipality start from area No. 1 to 49 and from area No. 60 to 69, knowing that the numbers 8 and 9 were not included in the numbering of the regions, as they are considered numbers. Reserve and use in the future if new urban expansion occurs and falls within the municipal boundaries of Halul Island.

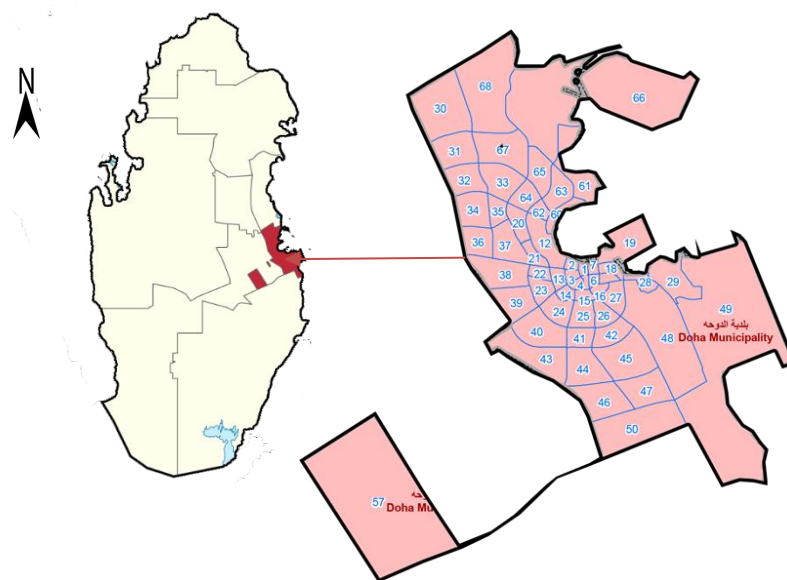


Figure 20. The industrial area is in Doha Municipality (Source: Planning and Statistic Authority 2020 and Author (2024)).

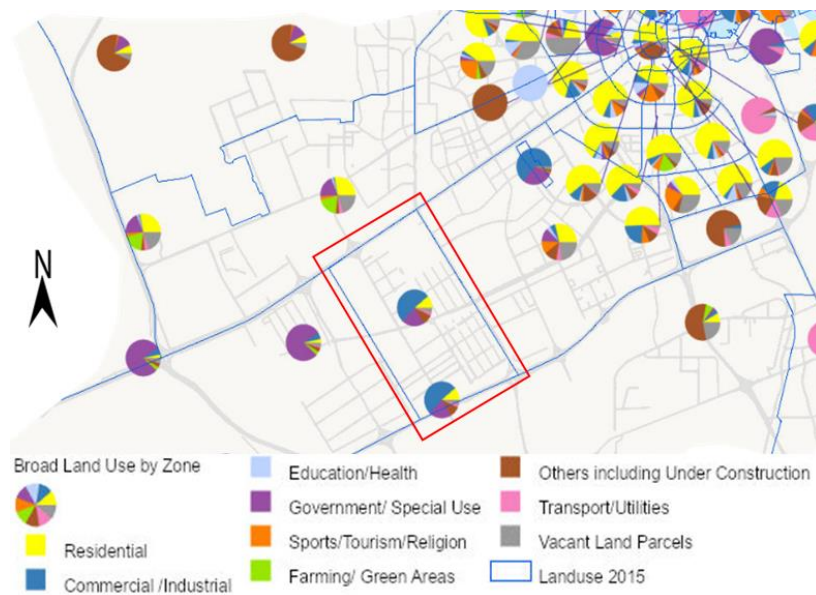


Figure 21. Land use Categories by Zone 2015 (Source: Planning and Statistic Authority and Author 2024).

The land use map delineates the industrial area within a red boundary to facilitate the analysis of its land uses. The map legend indicates that the blue color represents extensive areas. The industrial zone, marked accordingly, is designated for commercial and industrial purposes, encompassing companies, factories, warehouses, and other industrial activities. This zone typically includes commercial buildings, offices, and manufacturing facilities.

The map also identifies government areas, highlighted in purple, as special-use zones. These areas are reserved for government buildings, public facilities, and other specific functions, such as government service offices. Residential areas are shown in yellow, primarily allocated for worker housing and encompassing individual residential complexes and other residential buildings. Notably, the map reveals an absence of designated parks and green spaces for recreational purposes. Additionally, areas marked in gray signify large tracts of land currently not utilized for any specific purpose.

3.3 Research Site Selection (Industrial Area)

Doha Industrial Area: It was established in the early 1970s by the Ministry of Municipal Affairs and Public Works. They worked together to remove industrial facilities from Doha and replan and beautify them. The area also encouraged investors to move toward Industry by providing them with land. Most previous goals have been achieved (State of Qatar, Industrial Survey, Central Bureau of Statistics (various issues); the industrial zone is located southwest of the capital on Salwa International Road, about 12 km from its port. At first, it began distributing its vouchers to every

Qatari with a commercial registry in an unorganized manner, as the lands were not exploited in the required and planned manner (Al-Shafi'i et al., 1999)

The industrial zone is divided into nine blocks with various industrial and service activities, and the number of plots is approximately 2,000, with different areas, the least of which is approximately 1,500 square meters. The exploitation rate is about to be completed after the new procedures for exploiting it, and the exploitation rate is increasing to about 100% drops in the southern regions and increases in the northern ones. The western area is supervised and managed by the Industrial Zone Administration of the Ministry of Municipal Affairs and Agriculture, through which lands are allocated where services, facilities, and roads are available.

Most workers in industrial facilities from the lower working class live in housing built next to or on the upper floor of the industrial facility (Report of the Technical Center for Industrial Development, 1978).

Investors rent land from the state at an annual incentive fee of half a riyal per square meter. While the wages before 1990 were meager, they were 50 riyals for a plot of 3,000 square meters. By the end of 1991, the number of industrial establishments in the Doha Industrial Area reached 235, representing about 73% of the total industrial establishments, and they employed about 10,600 workers, representing about 58% of their total. The percentage of Qatari workers decreases to less than 2. Asian workers are the most abundant (Al-Kubaisi et al., 1985).

The density of workers for one facility is about 45 people. The industries vary from food, wood, mining, textile, metal, paper, and chemical to other service facilities. Consequently, the number of all workers in the industrial zone upon completion of its exploitation may reach more than 50 thousand, which calls for the development of recreational, security, therapeutic, and traffic services to reduce the effects resulting

from these diverse human numbers in their races, beliefs, ideas, and languages, especially since the industrial zone has begun to be surrounded by them. Residential and commercial areas(Gulf Organization for Industrial Consulting, Annual Report 1992, August 1993, Doha)Within the Doha Municipality is the district known as the Doha Industrial Area. It was geographically isolated from the rest of the Doha Municipality in the 2010 population census, but it was formerly a part of the Al Rayyan Municipality. Labour City is nearby and home to most of the region's laborers (Population Census, 2004). View the location in the following figure.

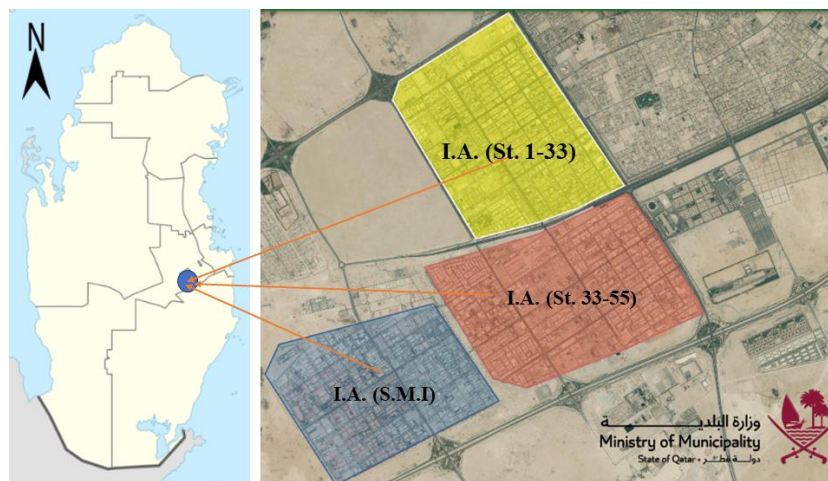


Figure 22. Location of 3 Industrial areas: Yellow industrial area from St. 1 to St. 33, Red from St. 33 to 55, and Small and Medium Industries (Source: Author,2024).

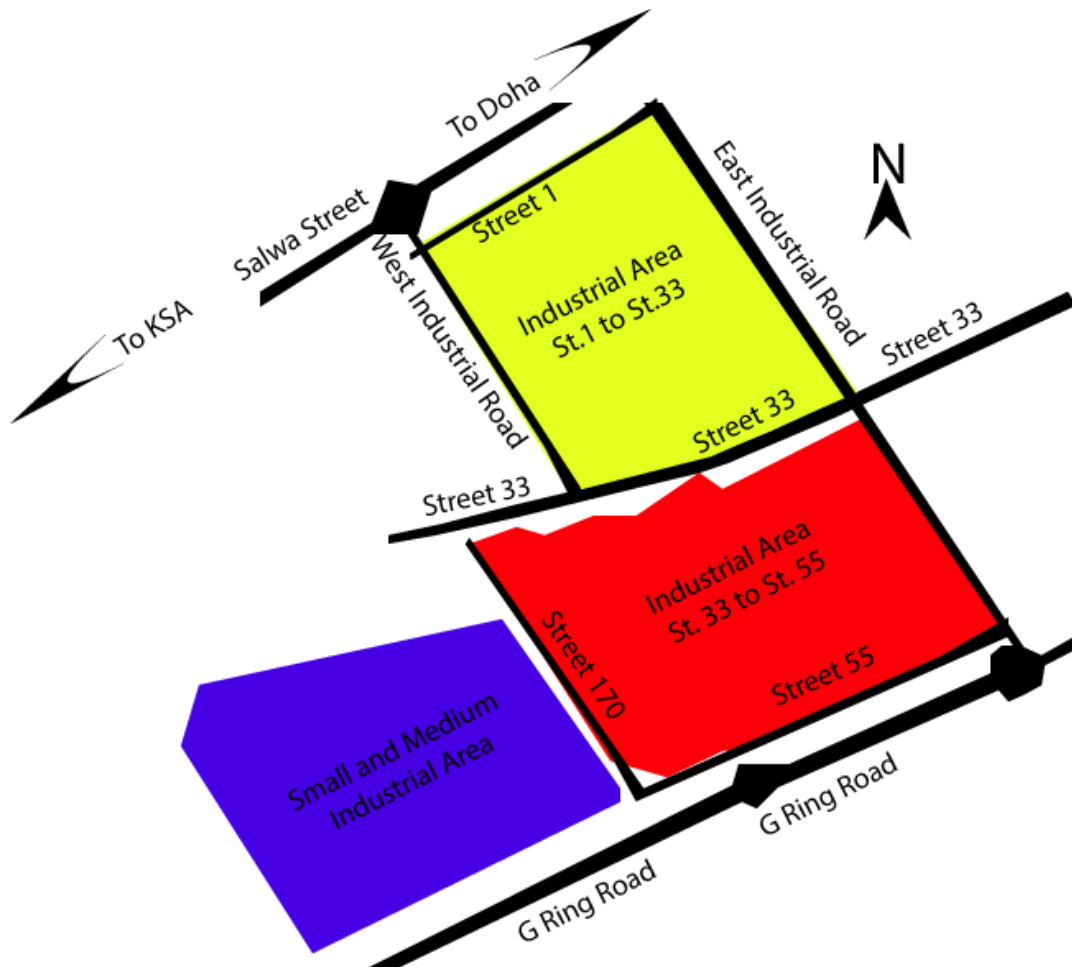


Figure 23. The main streets and roads define the industrial area (Author.,2024).

The industrial zone stretches from Street 1 to Street 55. Abu Hamour Street (Industrial Zone Street - No. 33) separates the old industrial zone from its new extension from Street A to Street 55, where the industrial zone was divided into two parts before the establishment of the newly established small and medium industries zone in It was founded in 2001 and is regarded the first of its sort in the state of Qatar. It is located twenty kilometers west of Doha and covers an area of over 10 million square meters. Regarding lands assigned, there are 712 industrial projects, 249 factories that have begun production, and projects on the list.

There are 853 industrial projects awaiting completion (Lotfi, Gamal, 2017). Street 1 or Street 33, as well as East and West Industrial Streets, form the boundaries

of the ancient industrial zone. Streets 33 and 55 form the boundaries of the second industrial zone. The small and medium industries zone is located south of the second zone.

The emphasis of our study is the industrial zone from Street 1 to Street 333, which will be evaluated in the next section.

3.4 Comparative Study on three Industrial areas:

Table 6. Comparison between three industrial areas. Source. (Author, 2024).

Industrial	I.A. (St. 1-33)	I.A. (St. 33-55)	I.A. (S.M.I)
Location	Doha Municipality	Doha Municipality	Al Rayyan Municipality
Population	313749 for both I.A. (St. 1-33) and I.A. (St. 33-55)	-	
Size	11.7 km ²	12.2km	10,2km
Characteristics	There are car garages, agency showrooms, printing presses, garages, iron shops, and gas factories.	There are concrete and brick factories, car workshops and factories	It was created for small and medium industries and is the most recently established industrial zone
References	Qatar Municipality	Qatar Municipality	Qatar Municipality
Similarities	It is inhabited by a large number of expatriate workers	It is inhabited by a large number of expatriate workers	It is inhabited by a large number of expatriate workers
Differences	It is the oldest industrial area and contains many factories, retail outlets, and leading commercial streets such as Al-Wakalat Street.	It was established as an extension of the old area, and many factories for building materials exist. It also includes the Asian City, which contains green and recreational areas.	It was established to serve small and medium industries and includes many food, iron, aluminum, and wood factories. It is more organized than the old and modern area.

Land uses in the industrial area of Qatar.

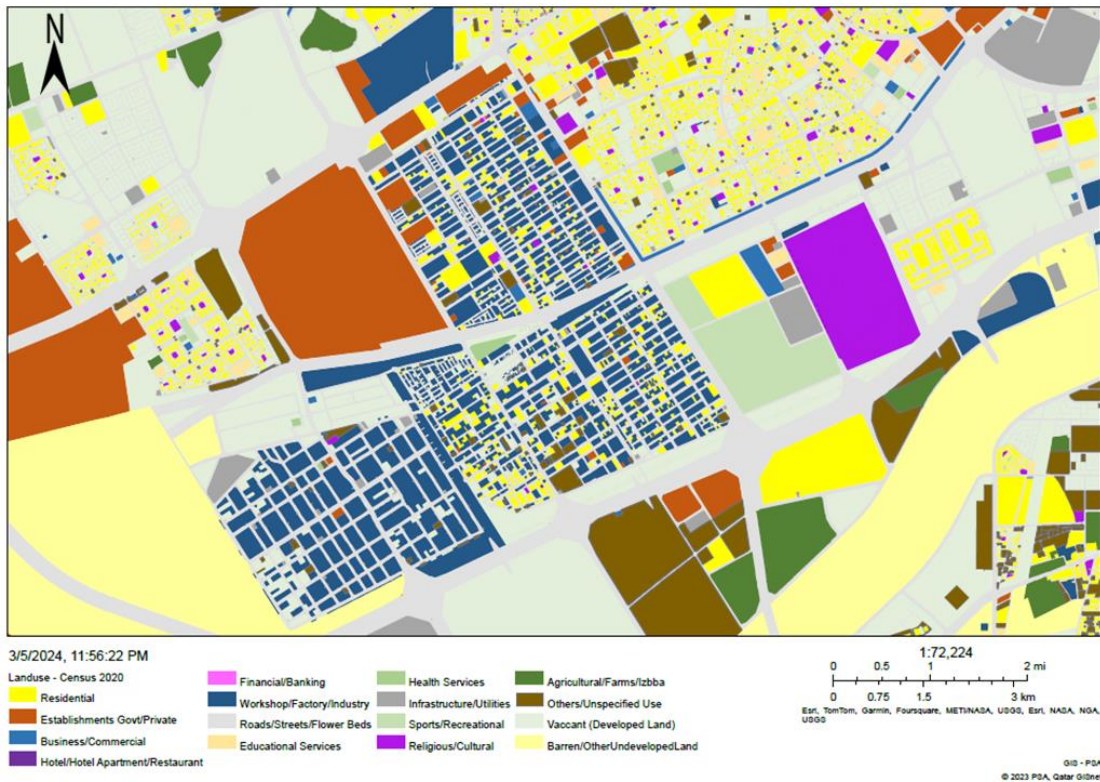


Figure 24. Map showing the land use in an industrial area. Source(Qgis,2024).

The land use map shows that more parks and green places must be there. Residential buildings for workers also appear mainly in the old industrial area. There is also a large area of unused land, as grey shows. The map shows that the old industrial zone from Street 1 to Street 28 is considered to have a low and medium environmental impact, and the industrial zone for small and medium industries also shows a high ecological impact. There are also vast governmental and private areas shown in brown. Government lands with enormous regions, some of which are used for a small purpose. An example of the buildings used for technical inspection on Street 24 is shown in the following map.



Figure 25. Technical inspection building. Source Qgis and (Author,2024).

3.5 Summary

This third chapter presents this study's research design, methodology, and collection methods. The study adopted a literature review, examples studies, three urban planning theories, and spatial reality analysis. Per capita assessment: Adopting the theory and practice of landscape architecture, especially John Ormsby Symonds's framework, facilitates Evaluating the green space per capita in the industrial area. Field surveys: combining surveys, interviews, observational studies, and questionnaires.

The chapter dealt with the administrative hierarchy of the State of Qatar, municipalities, regions, neighborhoods, and blocks. Then, a section was devoted to the

Doha Municipality, where the industrial zone is located (the research and study area). After that, a comparison was made of the divisions of the three industrial zones, and then the study area was determined based on the results of these comparisons.

The old industrial area from Street 1 to Street 33 is considered the most needed for this study. The land uses in this area and the vacant and less-used lands were analyzed.

In the next chapter, the data will be analyzed by studying the governance, the current situation of the industrial area in Qatar, the social and economic profile, the infrastructure and facilities, public transportation, the historical development of the region, the existing parks, the population number and the area required until 2032 for the municipality of Doha and Al Rayyan, calculating the per capita share of green spaces in Qatar based on On the Medellin 2013 plan for land use, green spaces in Qatar, and the per capita share of green spaces in the State of Qatar at the end of 2019. The unbalanced distribution of public parks and an observational study: Al-Attiyah Market and Street No.: 13 Industrial Area and the implications of insufficient parks in neighborhoods with Low-income analytical studies: exploring observations and questionnaires.

CHAPTER 4: DATA ANALYSIS

4.1 The Current Situation of the Qatar Industrial Area

4.1.1 Socio-Economic Profile

The district had 4,395 enterprises and 29,001 dwelling units as of the 2010 census. (Statistics Authority Archived, 2015). It was inhabited by 261,401 individuals, with a striking demographic skew: 99.9% were male, leaving only 0.1% as female residents. Among these inhabitants, 99% were aged 20 or above, while the remaining 1% were under 20 (Qatar Statistics Authority, 2015). Notably, 99.8% of the population was employed, with females representing 0% of the workforce (Development Planning and Statistics Ministry, 2015).

Table 7. Total populations in Qatar, Source: (Qgis et al., 2020, 2024).

Year	2004	2010	2015	2020	2024
Population	744029	1637443	2344557	2684329	3119589
Women	247647	408808	567441	748115	907121
Men	496382	1228635	1777116	1936214	2212468

Table 8. Total populations in Doha Municipality, source: (Qatar Population Statistics,2020).

Year	1986	2004	2010	2015	2020
Population	369079	339847	796,947	956,457	1,186,023
Women	121227	120171	186,130	250,027	304,869
Men	247852	219676	610,817	706,430	881,154

Table 9. Population in the industrial area from 2004 to 2020—source: (Qatar Population Statistics,2024).

Year	1986	1997	2004	2010	2020
Population	8,704	23,454	62,612	261,401	313,749
Women					1,618
Men					312,131

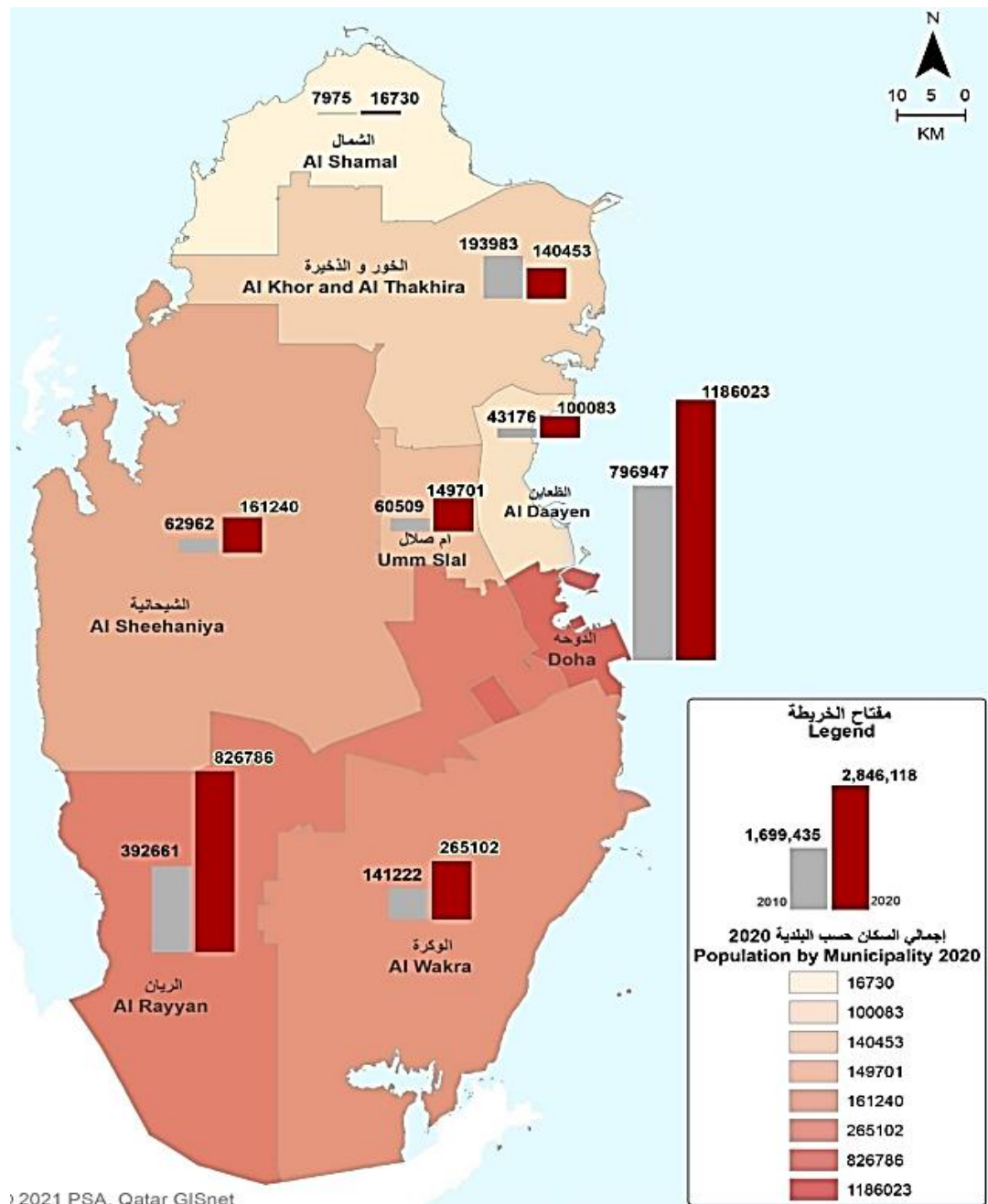


Figure 26. Populations by Municipality 2020, Source: (PSA.Qatar Gisnet 2021 and Author, 2024).

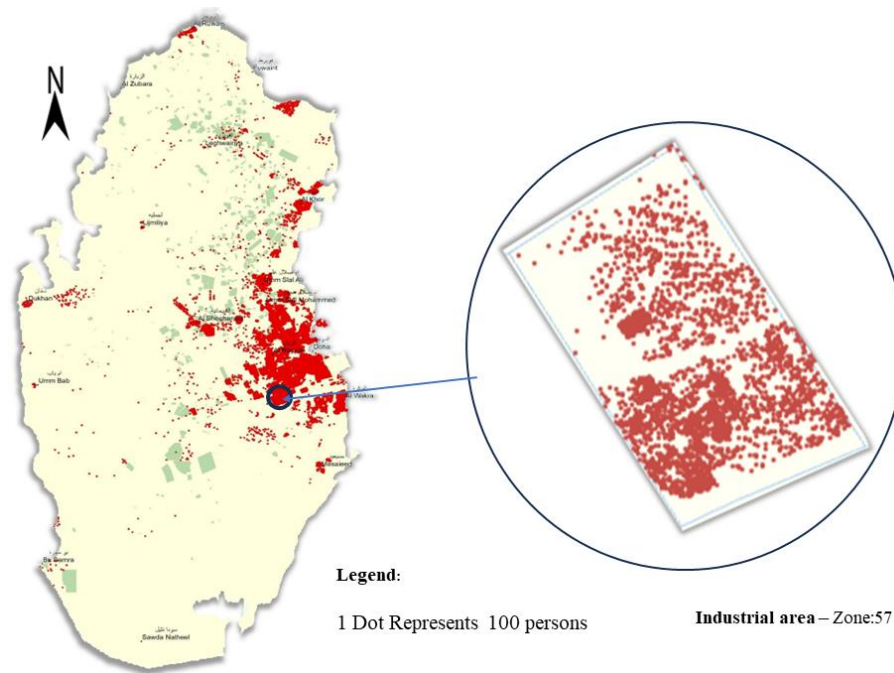


Figure 27. Populations Density (1) Dot represents 100 person Municipality 2022:
Source: (PSA.Qatar Gisnet 2021 and Author, 2024).

4.1.2 *Infrastructure and Amenities Public Transport*

Mowasalat, the national transport corporation of Qatar, runs public bus lines, which benefits the community. Six bus routes service the Industrial Area, the most populated area outside downtown Doha. Two bus lines leave from the Karwa Bus Station and four from Al Ghanim Bus Station. In addition, there is a bus station in Asian Town from which six daily trips depart (Qatar et al., 2019).

Rail Phase 1A saw the construction of the elevated Industrial Area Metro Station. When finished, it will be a component of the Green Line of Doha Metro (see map).Spatial Characteristics of the old and new industrial zones

The old industrial zone cannot be dispensed with, as the area of the old industrial zone is vast and cannot be accommodated by the new industrial zone.

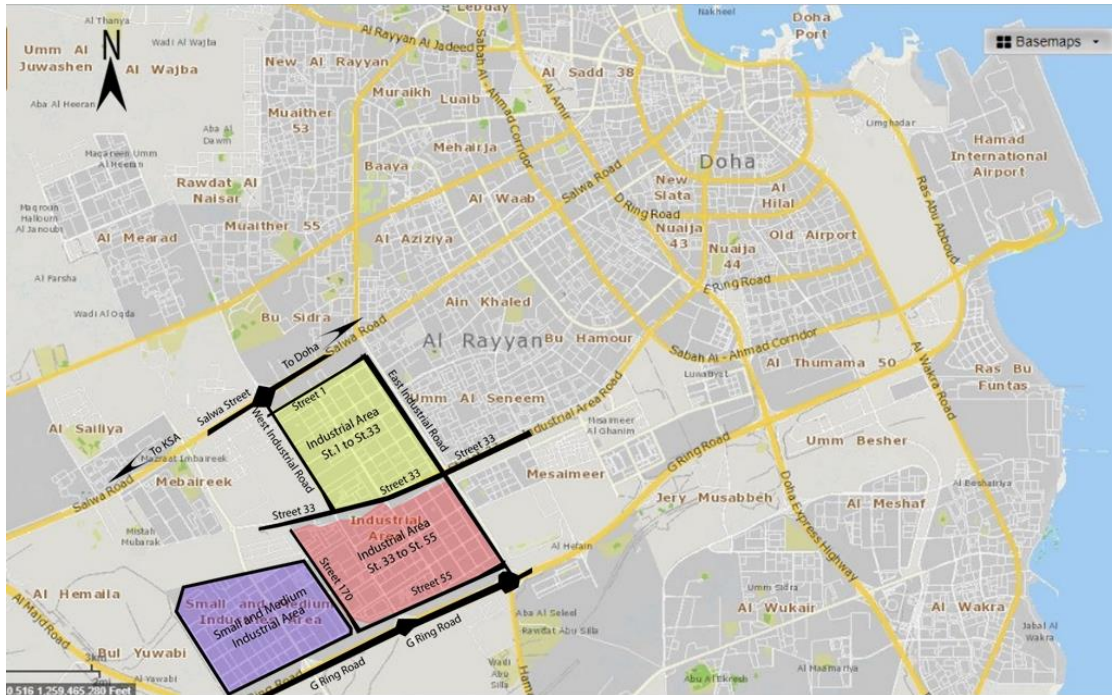


Figure 28. Primary and secondary roads connect industrial areas to other cities—source: Google Maps (Author,2024).

Also, investments in the old area are estimated at millions of riyals, considering each has its own goals. The old one contains small and light industries. Bricks, marble, quarries, etc., warehouses, and new ones were established because they are for modern industries and depend on gas and electricity while preserving the old ones. Therefore, the latest industrial zone is considered an excellent addition and expansion, indicating that the type of industries in the new industrial zone depends on modern and advanced industry elements. It is supervised by the Ministry of Energy and Industry, according to my knowledge, while the old industrial zone is under the supervision of the Ministry of Municipal Affairs and Agriculture and was built on a solid foundation, as the infrastructure was provided, whether electricity, gas, roads, and planning, and was prepared for it thoughtfully and soundly.

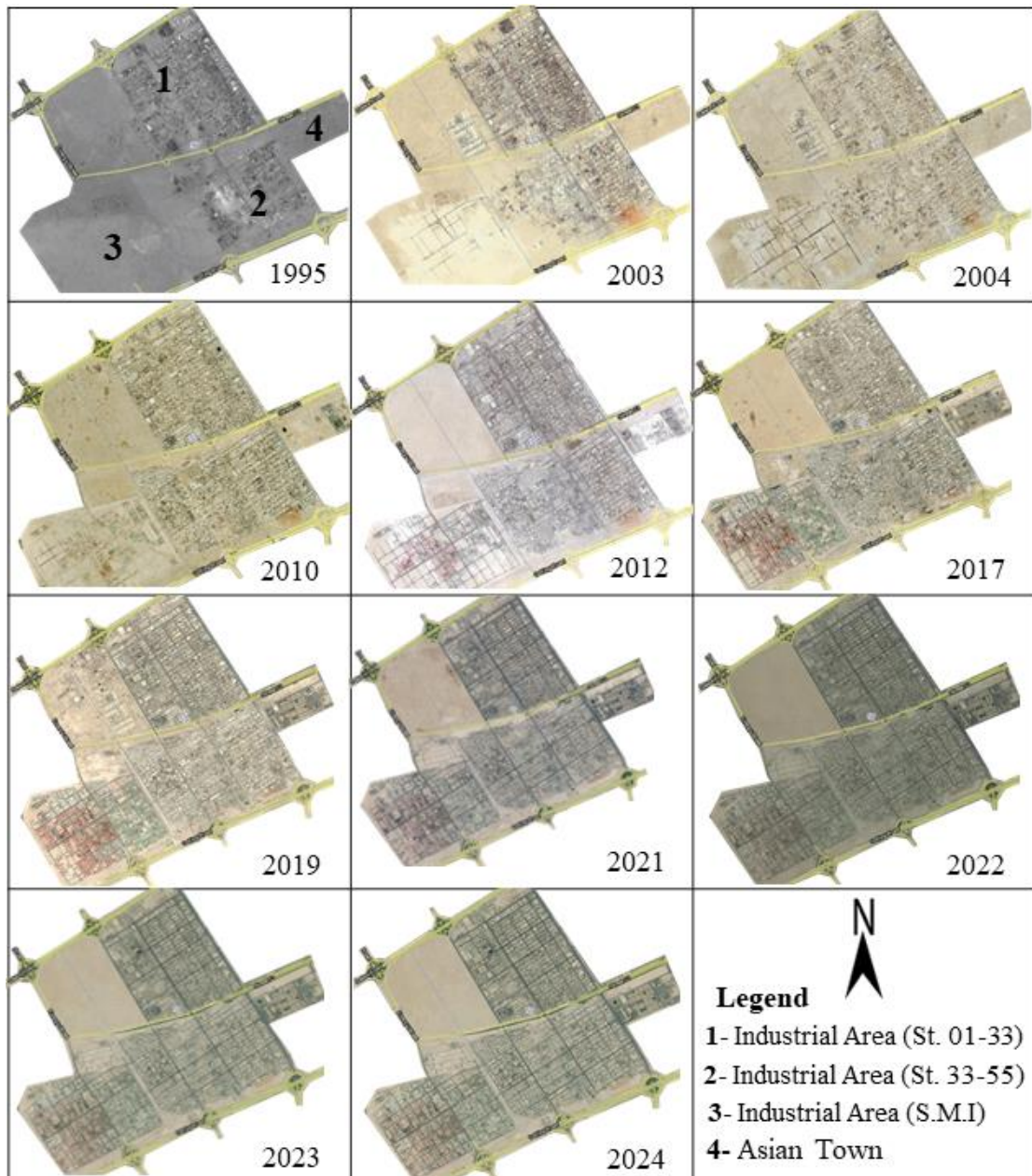


Figure 29. Industrial Area Historical Evolution. Source Qatar Gis and (Author,2024).

4.2 Policy and Governance Issues

Executive regulations for planning and design requirements for industrial areas with high environmental impact dictate meticulous considerations regarding the built formation and components of projects. Firstly, the shape of buildings must align with the scale of activities intended for licensure within the area. This necessitates adherence to stipulated regulations about the placement and orientation of buildings and other

facilities, ensuring adequate minimum areas, dimensions, and distances between buildings and open spaces.

Moreover, a paramount objective is to ensure a reasonable level of comfort for workers while optimizing space utilization on the site. Emphasis is also placed on ensuring that each building and open space contributes positively to the overall visual coherence of the settlement. This entails meticulously coordinating and designing road boundaries and extension areas and maintaining adequate separation distances from high-impact industrial zones and sensitive neighboring areas.

Attention is directed towards strategically placing raw storage and loading/unloading areas exclusively within designated site boundaries to prevent encroachment on surrounding areas. Furthermore, industrial activities must be complemented with essential infrastructure services encompassing water, sanitation, energy, transportation, and waste disposal facilities to ensure operational efficiency and environmental sustainability.

Efforts are made to curb negative impacts stemming from industrial activities, including emissions of smoke and pollutants. Residential units are strictly regulated to mitigate potential adverse effects on inhabitants and ensure compatibility with the industrial setting. Mitigation measures also extend to controlling vehicular movement, particularly concerning access to the site and enhancing road safety standards to minimize risks associated with industrial operations.

Furthermore, provisions are made to facilitate efficient traffic flow to and from the site, contingent upon road capacity and design standards commensurate with the projected industrial activities. This includes fostering seamless connectivity between local and arterial roads to bolster regional accessibility and accommodate developmental imperatives.

In this section, we examine the application of social justice theories in allocating land proportionately to benefit communities and individuals. Simonds' theory, outlined in the 1960s (Simonds, J.O. 1960) McGraw Hill, New York, "Landscape Architecture," advocates for a per capita allocation of green spaces, with an average of 90 m² per family, and stipulates that no less than 10% of urban areas should consist of green spaces. Planner Paul Reiter further specified a provision of 10 m² per person for recreational green spaces.

During the 1990s, initiatives by the European Union and other entities, including the United Nations Environment Program (UNEP), aimed to establish quantitative standards for green area provision. Municipal institutions across various nations set guidelines specifying the minimum green area requirements, typically 12 to 16 square meters per person. While most developed countries surpass these benchmarks—European cities often exceeding 40 square meters per person—they remain pivotal indicators for regions striving to meet or approach these targets.

This necessitates two key measures:

1. Establishing quantitative standards for green area allocation, including the percentage of green spaces within urban areas, offers a straightforward assessment metric. Nonetheless, this approach may need more accuracy in densely populated or high-risk environments. However, the standard typically falls within 10% to 20% of a city's total surface area, with German cities reaching 40% to 50%.
2. Gradation of green space sizes and their spatial distribution: Parks should be strategically distributed throughout urban landscapes to ensure convenient access for residents. Following Symonds' recommendations, parks should be organized across multiple tiers (refer to Figure No. in "Landscape Architecture" by John Ormsbee Simonds, 2006).

Moreover, consideration should be given to:

- Building gardens: These spaces serve recreational and environmental functions, ideally distributed across the city to provide accessible green areas for citizens, as per Symonds' guidance.
- Local green spaces: Ranging from 2500 square meters, these areas should be within a 400-meter radius of residences, providing open and free-access spaces for recreational activities and safe playgrounds for children.
- Neighborhood green spaces: These spaces, which cover a minimum of 50,000 square meters and are situated no more than one kilometer from residential areas, offer venues for recreation, exercise, and relaxation.
- City-level green spaces: These larger areas, beginning at 250,000 square meters, aim to create natural buffers from urban environments. They are accessible to all and potentially subject to admission fees. Additionally, parks with regional or international significance, such as zoos or renowned tourist destinations, are included in this category (Miqdad et al. Ahmed, 2011).



Figure 30. Open areas at the city level (Municipality of Najaf Al-Ashraf, 2021 and Author.2024).

Distribution of parks in Qatar according to the following standards

They are turning attention to the administrative distribution of municipalities in the State of Qatar to assess the allocation of parks relative to population density. Special attention is given to neighborhoods with limited income, where field studies have revealed the adverse effects of inadequate park and green space availability. Furthermore, insights gleaned from conducted questionnaires shed light on the impact of limited income, with observations indicating that individuals often resort to nearby parks or, depending on public transportation accessibility, may venture to more distant locations for recreation.

Tannous et al. (2010) revealed the distribution of urban green spaces and the accessibility of 33 public parks and gardens. I covered approximately 1,132 acres in Doha, Qatar, providing roughly one acre per 1,200 metropolitan residents. Conversely, the Public Diversion and Parks Association (NRPA) highlighted that Doha's park management fell far below the US standard, with a mere 9.9 land sections per 1,000 inhabitants.

These green spaces predominantly align along or near the Persian Gulf shore, encompassing parks and gardens in prominent areas like The Pearl, Sheraton, Corniche, Al Bidda, and the Exhibition Hall Balsamic Craftsmanship. Smaller parks such as Al Gharrafa, Al Khulaifat, and Nuwaija Gardens contribute to the urban greenery. The metropolitan layout, characterized by expansive routes like Salwa Street and Al Rayyan Street, reflects an outward-reaching matrix originating from the old city center. Historical urban plans from the 1960s by Symonds and Reiter outlined green space targets per family and individual, respectively. Despite international efforts in the 1990s to establish green space standards, many cities still strive to meet or exceed these benchmarks, ranging from 12 to 16 square meters per person.

A recent Ministry of Municipality report indicates significant progress. Qatar now boasts 114 parks, a 51% increase, and a green area covering 12.9 million square meters, including 3 million square meters of public gardens. Adopting treated water for irrigation has increased by 75%, while the zoo celebrates the birth of 217 young animals. Over the past decade, garden areas have surged by 136.8%, translating to a remarkable rise in per capita green space from 2.4 m² in 2015 to 9.1 m² in 2020, reflecting a growth rate of 275%, despite the arid climate and desert conditions of the region (Source: Badawi.S, 2023).

4.2.1 Existing parks with population and required area until 2032 for Doha and Al Rayyan Municipality:

Despite the distinguished development taken by the Ministry of Urban Planning, the municipality, and the concerned authorities in improving the infrastructure in the old industrial area in particular, where the city worked to remove car waste from in front of garages and agencies, to provide an opportunity for pedestrians through new constructions and development of sidewalks and pedestrian crossing places, the... The increasing population density requires the creation of more spaces, so the change includes the heart of the old industrial area, the Al-Attiyah Market area next to the technical inspection, and the Grand Al-Attiyah Mosque. Looking at the plan drawn up through the tables, the gap becomes clear for 2030 despite the significant and discernible improvement in the room dimensions.

The number of parks and green spaces. Considering the Asian city, we find that it has a large cricket court. There is a need to green the area on the main industrial street, extending Abu Hamour Street from the industrial area to Doha. However, one must look at the study area, which constitutes a large gathering and workers' connection to this place. The presence of a park helps. Significantly, to transform the harmful social

customs of workers spreading out and sitting in plazas and small nodes, we will see this in analyzing the observations from the field of study in interpreting the information.

Since the industrial area neighborhood, which contains low-income people, is situated close to the city and inside the Doha municipality of Al-Rayyan, we review the following two tables in Figures 7 and 8, which show the number of parks and open spaces in the two towns and compare them with the population until 2032. There is a Lack of green spaces compared to population density (Doha Municipality Vision and Development Strategy, 2017)

Park Type	Existing Parks		Standards & Guidelines			2017			2032		
	No	Area (ha)	Proposed Area Ranges	Average Area	Catchment Pop.	Total Demand No. 2017	2017 Gap No.	Required Area(ha)	Total Demand No. 2032	2032 Gap No.	Required Area
Neighborhood Park	13	3.4	0.1 - 0.25	0.2	1200	724	711	121	670	657	111.67
Local Park	31	29.1	0.4 to 2	1.2	3000	289	258	310.10	268	237	284.33
District Park	0	0	2 to 5	3.5	30000-50000	15	15	52.50	15	15	52.50
Town Park	7	58.8	5 to 15	10	50000-100000	8	1	10.0	8	1	10.0
Metropolitan / Municipality Park	2	138.2	60 to 200	130	200000	4	2	304.36	4	2	262.49
National Park	1	222	N/A	N/A	2 million +	N/A	N/A	N/A	N/A	N/A	N/A

Figure 31: Doha Municipality Public Parks Program source: (Doha Municipality Vision and Development Strategy 2017).

Park Type	Existing Parks		Standards & Guidelines			2017			2032		
	No	Area (ha)	Proposed Area Ranges	Average Area	Catchment Pop.	Total Demand No. 2017	2017 Gap No.	Required Area(ha)	Total Demand No. 2032	2032 Gap No.	Required Area
Neighborhood Park	26	6.6	0.1 - 0.25	0.2	1200	395	369	63	530	504	85.63
Local Park	36	29	0.4 to 2	1.2	3000	158	122	146.39	212	176	211.06
District Park	0	0	2 to 5	3.5	30,000 – 50,000	8	8	28.0 0	8	8	28.00
Town Park	1	10	5 to15	10	50,000 - 100,000	4	3	30.00	4	3	30.00
Metropolitan / Municipality Park	0	0	60 to 200	130	200000	2	2	308.09	3	3	413.18
National Park	0	0	N/A	N/A	2 million +	N/A	N/A	N/A	N/A	N/A	N/A

Figure 32: AL-Rayyan Municipality Public Parks Program, source: (Al-Rayyan Municipality Vision and Development Strategy 2017)

4.2.2 Calculation of per capita green space in Qatar based on the Medellín 2013

Land Use Plan:

Medellín mentioned in his plan titled (Land Use) (2013) that shows the per capita green area that relies on the WHO proposal that $(X^*) = 15$ square meters per inhabitant, as the thriving city seeks to increase the per capita share of green space to enhance living quality and air quality, the following methodology is distributed:

Per capita green area = total green area within the city limits divided by the entire city's population (Medellin, 2013).

4.2.3 Qatar's per capita share compared with some Arab countries and European Union countries

Table 10. shows the per capita share of green spaces in some cities worldwide (source: Al-Zafarani,2007; edited by (Author,2024)).

No	Country	City	Per Capita m2-Housing
1	Germany	Berlin	33.6
2	Austria	Vienna	124.7
3	Belgium	Brussels	29.2
4	Denmark	Copenhaun	35
5	Spain	Madrid	11.5
6	Finland	Helsinki	122.4
7	France	Marseille, Toulouse	21.4 , 4.3
8	United Kingdom	Glasgow	55.6
9	Italy	Rome	23.4
10	Sweden		42.1
11	UAE		13
12	Saudi Arabia		7.8
13	Egypt	Cairo	1.5
14	Qatar		1

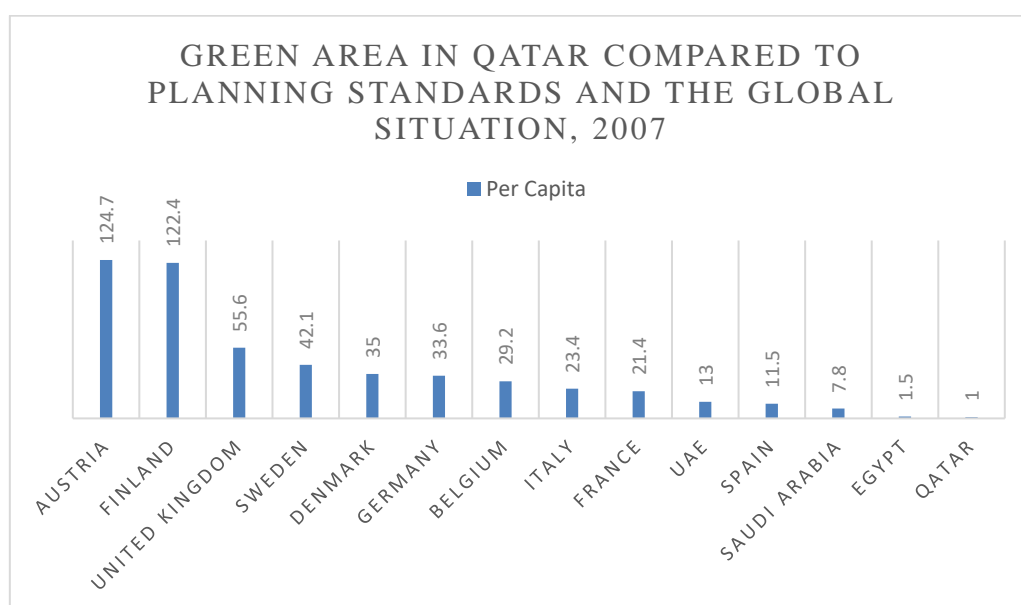


Figure 33. Qatar's per capita share compared with some Arab countries and European Union countries (source: Al-Zafarani, 2007; edited by (Author,2024)).

The table lists various cities, their respective countries, and the per capita housing area in square meters. Vienna, Austria, tops the list with 124.7 m² per person, followed closely by Helsinki, Finland, with 122.4 m². On the other end of the spectrum, Cairo, Egypt, and Qatar have the lowest per capita housing areas at 1.5 m² and one m², respectively. Other notable cities include Berlin, Germany (33.6 m²); Brussels, Belgium (29.2 m²); and Copenhagen, Denmark (35 m²). Spain's Madrid has a relatively low figure of 11.5 m². In France, Marseille and Toulouse show significant variability with 21.4 m² and 4.3 m², respectively. The United Kingdom's Glasgow stands at 55.6 m², while Rome, Italy, has 23.4 m². Sweden has 42.1 m² per capita, and the UAE has 13 m². Saudi Arabia is also on the lower end, with 7.8 m² per person.

4.2.4 Initiatives of the Gulf countries to expand the per capita share of green spaces

In recent years, several cities in the Middle East have made significant strides in increasing green spaces to enhance urban livability and environmental sustainability. In 2021, Dubai's per capita green space reached 26.3 square meters, surpassing the United Nations' minimum standard of 15 square meters, achieved through advanced agricultural systems and AI-managed irrigation (Al Bayan,2022). Saudi Arabia's Green Riyadh Program, part of Vision 2030, aims to increase Riyadh's per capita green space from 1.7 m² to 28 m² by planting 7.5 million trees and creating community-friendly open areas (A sustainable KSA.Vision.,2024).

The Sultanate of Oman aims to boost per capita green space from 10 to 12 square meters and develop an extensive network of services and community facilities across the city to cater to population needs efficiently and safely. (Oman News Agency,2024).. Bahrain's Al Bayan Park project, part of broader municipal enhancements, focuses on expanding green spaces to meet community

needs(alayam.,2024). In Kuwait, a study revealed disparities in green space distribution, prompting calls for budget allocations to develop more parks (Alanna, 2022). Baghdad is also actively expanding and rehabilitating green spaces under directives, with recent projects including new parks and corniche developments (Iraq News Agency, 2023). Lastly, Qatar has seen a dramatic increase in public parks from 56 in 2010 to 143 in 2022, with per capita green space rising from 1 to 14.6 square meters and over a million trees planted under a national initiative (Qatar News Agency, 2023). See Figure No.



Figure 34. Qatar’s per capita share compared with GCC countries between 2022 and 2024 (Source: Author,2024).

Table 11. shows Qatar’s per capita share compared with some GCC countries between 2022 and 2024 (Source: Author,2024).

City	Per Capita Green Space (2022/2024)	Key Initiatives	Source
Dubai	26.3 m ²	Advanced agricultural systems, AI-managed irrigation	Al Bayan, 2022
Riyadh	1.7 m ²	Planting 7.5 million trees, creating community-friendly spaces to reach m ²	A Sustainable KSA.Vision., 2024
Oman	Ten m ²	Developing an extensive network of services and community facilities	Oman News Agency, 2024
Bahrain	N/A	Al Bayan Park project focused on expanding green spaces	Alayam, 2024
Kuwait	N/A	Calls for budget allocations to develop more parks	Al Anba, 2022
Baghdad	N/A	Actively expanding and rehabilitating green spaces	Iraq News Agency, 2023
Qatar	14.6 m ²	Dramatic increase in public parks, national tree planting initiative	Qatar News Agency, 2023

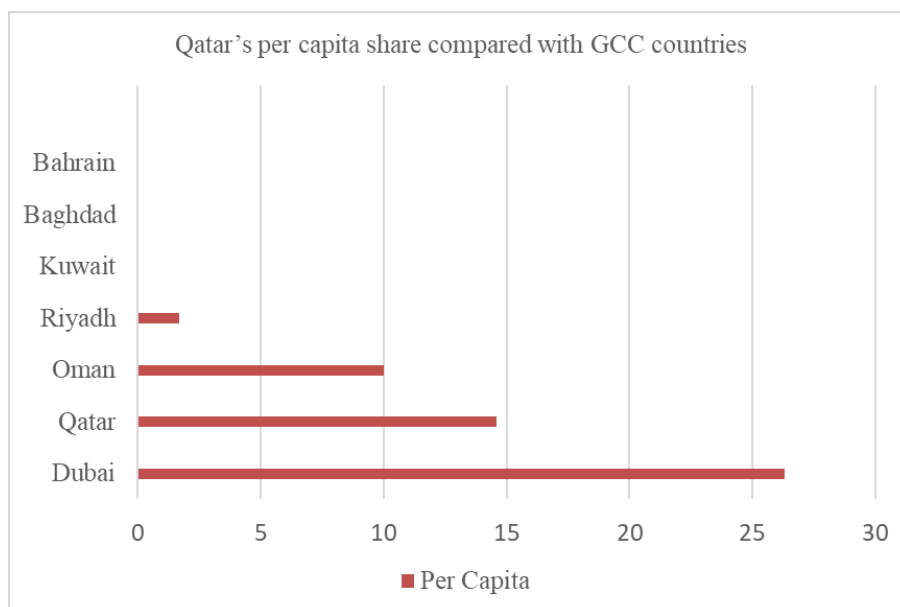


Figure 35. Qatar’s per capita share compared with GCC countries between 2022 and 2024 (Source: Author,2024).

Even so, even if Qatar's per capita share increased in 2022, we find that this rate decreased in 2023 at the expense of the minimum level of the UNEP (United et al.) because of the high population rate in Qatar, which in May 2023 reached (3001781) (Planning and Statistics Authority 2023) Green space per capita is equal to the total amount of green space in the city limits Divided by the city's total population. (Fuller, R. and Gaston, K 2009), (Canceled, H.; and Bahmanpur, H..2012).

$(43861133) \text{ sqm} \div (3001781) \text{ Person} = 14.6 \text{ sqm}$. It is less than the minimum limit of 15 square meters from the United Nations Green Leisure Environment Program.

4.2.5 *Green Space Area in Qatar*

A report by the Ministry of Municipality and Environment stated that the area of vegetation cover increased from 1,250,849 m² in 2010 to about 4,562,445 m² in 2019 and that green spaces in Doha alone will reach 2,607,959 m² at the end of the current plan, in addition to planting 36,073 new trees and 1,414,618 m² in the municipality.

Al Rayyan includes 31,496 new trees. The green spaces in Umm Salal reach 4,429,486 square meters, containing 18,233 new trees. The green spaces in Al Daayen rise to 1,667,609 square meters, containing 6,686 trees. The green spaces in Al Khor and Al Dhakhira reach 1,532,321 square meters and contain 8,605 new trees. In the municipality of Al Shahaniya, the green areas reach 15,507 square meters and contain 4,550 new trees.

The green areas in Al Wakrah reach 187,735 square meters, including 17,381 new trees. Green areas in the Al Shamal municipality remain the same, while 2,150 new trees are being planted. The report indicated that the percentage of growth in the number of parks and plazas at the end of 2019 was about 136.75%. The increase in their

total area was 59.36%, as the number of parks and plazas increased from 48 parks in 2010 to 116 parks and plazas at the end of 2019. They are distributed as follows: Doha 74, Al Rayyan 20, Al Khor and Al Dhakhira 20, Al Daayen 8, Al Wakra 7, Umm Salal 6, Al Shamal 5, and Al Shahaniya 3 (Bedewi Salah, 2020).

4.2.6 *Per capita share of green space in the State of Qatar at the end of 2019*

The per capita share of green space reached 1.9 m² at the state level at the end of 2019 instead of 0.74 m² at the end of 2010, and its distribution in the municipalities is as Table follows:

Table 12. Per capita share of green space in the State of Qatar Municipality at the end of 2019 source: (A report of Municipality and Environment obtained by Lusail,2020).

No	Municipality	Per Capita m ² - in 2010	Per Capita m ² In 2019
1	Al Shamal	10.65	16.66
2	Ad Dawhah (Doha)	0.81	2.08
3	Al Khor & Dhakhira	1.24	2.7
4	Al Daayen	0.25	2.3
5	Umm Salal	0.096	1.12
6	Al Wakra	.36	0.41
7	Al-Rayyan and Al-Sheehaniya	0.44	1.95

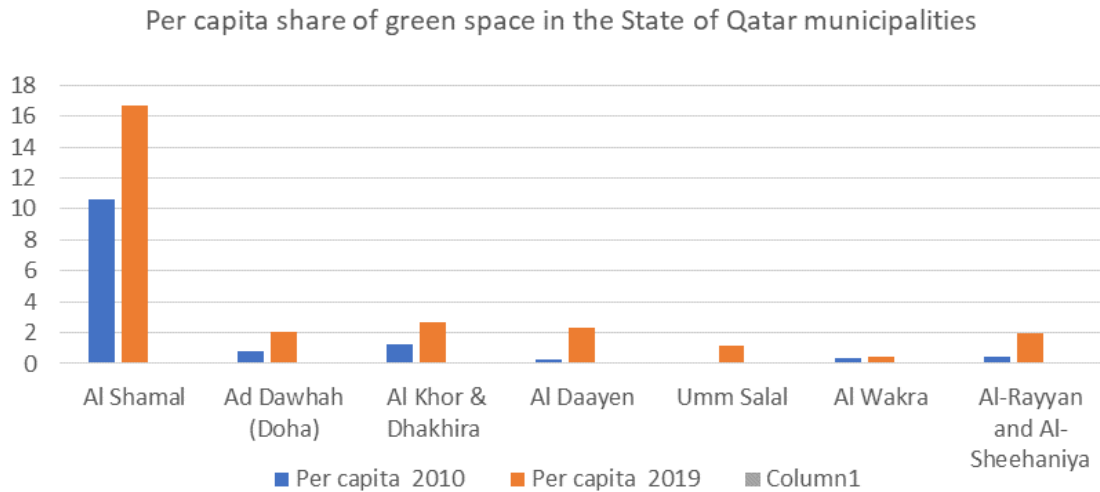


Figure 36. Comparing Qatar’s per capita share of green space in the State of Qatar at the end of 2019, source Lusail,2020 edit by (Author,2024).

4.2.7 *Unbalanced distribution of public parks:*

Parks in Qatar are not distributed according to the spatial distribution of the population. According to estimates of walking distance coverage (the geographical and demographic scope of a particular service), only 17.2% of the population of Doha, the country's capital, has a park within walking distance. The problem is exacerbated by user requests for each area, which vary depending on the number of populations served (catchment area) (Qatar National master plan,207).

Standards must be set for parks, open spaces, and walking distances to achieve equitable distribution for all sectors of society.

The walking distances are 400 meters for the local park and 250 meters for the neighborhood park. A five-minute walk, about 400 meters, has been adopted as a comfortable distance for most people. A distance of 250 meters for dry climates. (Qatar National master plan,207) (Planning principles and standards for developing open areas, recreational and sports services)

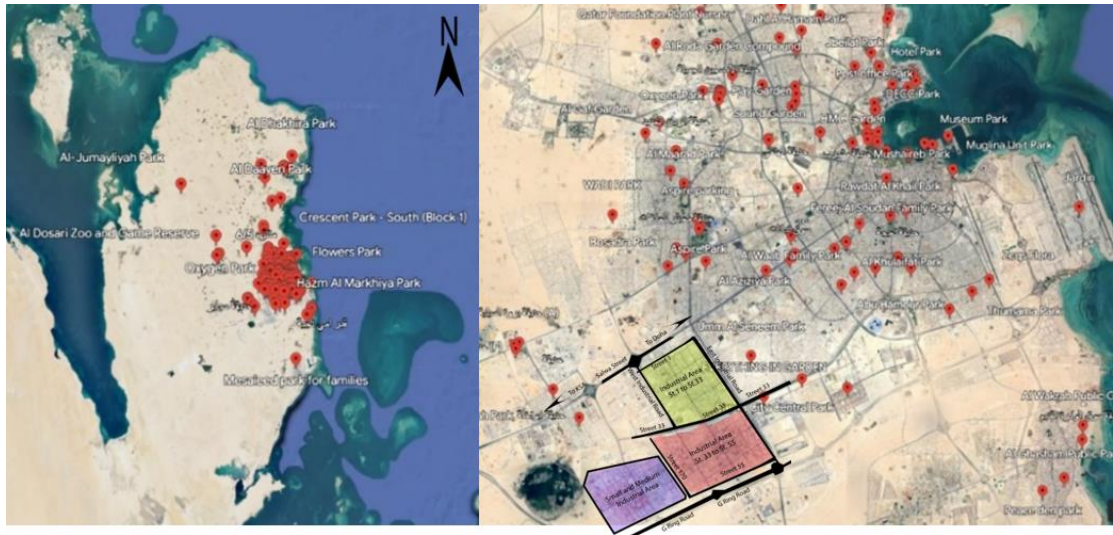


Figure 37. Location of parks in Qatar, Red color, source: (Google Earth, 2023).

When comparing the availability of parks for single individuals, we observe one designated park catering to singles: Al-Ghanim Park, approximately 14.5 kilometers away from the industrial area. Symbolically referred to as the "Old Al Ghanim Bachelor Park," it naturally attracts many single residents. While several public parks occasionally designate days for family visits, Al-Ghanim Park is a dedicated space for singles.

Conversely, it is 9.5 kilometers from the nearest park and 1.5 miles from Crescent Park. Additionally, a single-family park is accessible in certain areas, such as Umm Al Seneem Park, located approximately 4.5 kilometers away. However, visiting these parks entails both time and financial investment.

Table 13. Total of parks in Qatar, source: Qgis, Municipality and Oun Apps, Google Maps and Author, (2024)

No	Area (In Sq meter)	Park Name	Park classification	Park District	Zone	Municipality	Parks Type	Dist. from Ind. Km
1	1000	Abu Hamour Park	Neighborhood Park	Al Maamoura (56	56	Al-Rayyan Municipality	Family	7.44
2	2000	Fereej Al Ali Family Park (East)	Neighborhood Park	Naija 43	43	Doha Municipality	Family	12.3
3	2000	Al Yousufiya Park	Neighborhood Park	Madinat Khalifa South	34	Doha Municipality	Family	14.9
4	2000	Abu Sidra Park	Neighborhood Park	Fereej Al Manaseer	55	Al-Rayyan Municipality	Family	3.88
5	2000	Izghawa 51 Garden	Neighborhood Park	Izghawa 51 Garden	51	Al-Rayyan Municipality	Family	17
6	2000	Jeryan Nejaima Park	Neighborhood Park	Jeryan Nejaima	68	Doha Municipality	Family	19.7
7	2000	Muait her Park	Neighborhood Park	New AlRayyan	53	Al-Rayyan Municipality	Family	6.1
8	2000	Al Azizia Park	Neighborhood Park	Al Aziziya	55	Al-Rayyan Municipality	Family	5.68
9	2000	Faraj Al Ali Family Park (West)	Neighborhood Park	Naija 43	43	Doha Municipality	Family	11.7
10	2000	Al Hilal Park	Neighborhood Park	Al Hilal	42	Doha Municipality	Family	13

No	Area (In Sq meter)	Park Name	Park classifica tion	Park District	Zon e	Municipa lity	Parks Type	Dist. from Ind. Km
11	3000	Um Al Khaba Park	Neighbor hood Park	Umm Lekhba	31	Doha Municipal ity	Family	16.2
12	3000	Al Waab Park 1	Neighbor hood Park	Al Waab	55	Al- Rayyan Municipal ity	Family	7.79
13	3000	Nuwai ja Park 1	Neighbor hood Park	Naija 44	44	Doha Municipal ity	Family	10.7
14	3672	Muait her Public Park 2	Neighbor hood Park	Muaither 55	55	Al- Rayyan Municipal ity	Family	8.4
15	4523	Old Al Ghani m Park	Neighbor hood Park	Old Al Ghanim 16	16	Doha Municipal ity	Bachel or	14.5
16	14580	Al Thakhi ra Park	Neighbor hood Park	Al Thakhira	75	Alkour &Althakh ira Municipal ity	Family	79.8
17	12000	Al Kaban Park	Neighbor hood Park	Alkaban	77	Al Shamal Municipal ity	Family	87.5
18	13000 0	Umm Al Senee m park	Neighbor hood Park	Aumm Alsanee m	55	Al- Rayyan Municipal ity	Family	4.4
19	13480	Al Jumail iya Family Park	Neighbor hood Park	AlJumaili ya	73	AlSheeha nyia Municipal ity	Family	81.5
20	11117 2	Al- Huwai la Park	Neighbor hood Park	Doha Madinat Khalifa.S	33	Doha Municipal ity	Family	23
21	4927	Al Rayya n Family Park	Neighbor hood Park	New Al Rayyan	53	Al- Rayyan Municipal ity	Family	12.5
22	7016	Madin at Khalif	Neighbor hood Park	Doha	34	Doha Municipal ity	Family	25

No	Area (In Sq meter)	Park Name	Park classifica tion	Park District	Zon e	Municipa lity	Parks Type	Dist. from Ind. Km
23	9683	a.S Madin at Khalif a. N	Neighbor hood Park	Doha	32	Doha Municipal ity	Family	25
24	5836	Al Kharai tiyat Family Park	Neighbor hood Park	Kharaitiy at	33	Umm Salal Municipal ity	Family	32.7
25	2604	Umm Lakhb a	Neighbor hood Park	Umm Lakhba	31	Doha Municipal ity	Family	25.9
26	1724	Freej Alaly. E	Neighbor hood Park	Freej Alaly	43	Doha Municipal ity	Family	15.5
27	2394	Freej Alaly. W	Neighbor hood Park	Freej Alaly	43	Doha Municipal ity	Family	15.3
28	2275	Jeryan Nujee ma Park	Neighbor hood Park	Jeryan	68	Doha Municipal ity	Family	32.5
29	4240	AbuSi dra	Neighbor hood Park	Aousidra	66	Al- Rayyan Municipal ity	Family	7.6
30	4447	Alab West	Neighbor hood Park	Alab	54	Umm Salal Municipal ity	Family	32.2
31	3536	Ain Khale d Park	Local Park	Ain Khaled	56	Al- Rayyan Municipal ity	Family	9.2
32	3632	Nuwai jah Park 3	Local Park	Naija 44	44	Doha Municipal ity	Family	15.5
33	4000	Muait her Family Park No, 1	Local Park	Muaither 55	55	Al- Rayyan Municipal ity	Family	13.5
34	4000	New Garde	Local Park	Naija 44	44	Doha Municipal	Family	14.3

No	Area (In Sq meter)	Park Name	Park classifica tion	Park District	Zon e	Municipa lity	Parks Type	Dist. from Ind. Km
		n Nuaija Family . P				ity		
35	3969	Thuma mah Family . S Park	Local Park	Al Thumam a 46	46	Doha Municipal ity	Family	15.9
36	4000	Wasit Park	Local Park	Dahl Al Hamam	32	Doha Municipal ity	Family	27.1
37	3536	Al Souda n Park 1	Local Park	Fereej Al Soudan 54	54	Al- Rayyan Municipal ity	Family	17.4
38	4000	Al Ghariy a Park	Local Park	Dahl Al Hamam	32	Doha Municipal ity	Family	13.5
39	5000	Lebaib Park	Local Park	Leabaib	70	Al- Daayen Municipal ity	Family	9.5
40	4689	Thuma mah Park	Local Park	Al thumama 47	47	Doha Municipal ity	Family	12.6
41	5000	Al Abraj Park	Local Park	Onaiza 63	63	Doha Municipal ity	Family	25.5
42	5000	New Al- Rayya n Park 2	Local Park	New AlRayya n	53	Al- Rayyan Municipal ity	Family	12.5
43	5000	Al Sailiya Park	Local Park	Al Mearad 55	55	Al- Rayyan Municipal ity	Family	8.9
44	5000	Lejbail at Park	Local Park	Lejbailat	64	Doha Municipal ity	Family	27.8
45	6000	Alebb Garde n	Local Park	Al Ebb	70	Al- Daayen Municipal ity	Family	29.5

No	Area (In Sq meter)	Park Name	Park classifica tion	Park District	Zon e	Municipa lity	Parks Type	Dist. from Ind. Km
46	6000	North Al Sakha ma Park	Local Park	Al Sakhama	70	Al- Daayen Municipal ity	Family	43.1
47	6000	Al Mamo ura Family Park	Local Park	Al Maamour a 43	43	Doha Municipal ity	Family	14.2
48	6579	Duhail Park	Local Park	Duhail	30	Doha Municipal ity	Family	23.6
49	7000	Gharaf a Park	Local Park	Al Gharrafa	51	Al- Rayyan Municipal ity	Family	24.2
50	16760	Al Hitmi Park	Local Park	New Al Hitmi	37	Doha Municipal ity	Family	23.4
51	7000	New Slata Park	Local Park	New Slate	40	Doha Municipal ity	Family	16.2
52	7000	Qatar Green Centre Park	Local Park	Hazm Al Markhiya	67	Doha Municipal ity	Family	27.1
53	5648	South Al Sakha ma Park	Local Park	Al Sakhama	70	Al- Daayen Municipal ity	Family	43.1
54	9000	Al- Rayya n Park 11	Local Park	New AlRayya n	53	Al- Rayyan Municipal ity	Family	13.6
55	98000	Rawda t Alkhe el	Local Park	New AlRayya n	53	Al- Rayyan Municipal ity	Family	16
56	5099	Simais ma Garde n	Local Park	Semaism a	70	Al- Daayen Municipal ity	Family	60.8
57	10000	Al	Local	Al Luqta	52	Al-	Family	18.8

No	Area (In Sq meter)	Park Name	Park classifica tion	Park District	Zon e	Municipa lity	Parks Type	Dist. from Ind. Km
		Luqta Childr en's Park	Park			Rayyan Municipal ity		
58	10389	Al Khulai fat Park for Wome n (North)	Local Park	Al Maamour a 43	43	Doha Municipal ity	Family	16.7
59	10000	Busam ra Park	Local Park	Al Maamour a 44	44	Doha Municipal ity	Family	16.6
60	11800	Al Marwa b Garde n	Local Park	Madinat Khalifa South	34	Doha Municipal ity	Family	12.3
61	11173	Al Marro na Park	Local Park	Madinat Khalifa South	34	Doha Municipal ity	Family	17
62	13000	Onaiza Park	Local Park	Onaiza 65	65	Doha Municipal ity	Family	26.6
63	7502	Hazm Al Markh iya Park	Local Park	Hazm Al Markhiya	67	Doha Municipal ity	Family	25
64	14547 m	Izgha wa Family Park	Local Park	Izghawa 51	51	Al- Rayyan Municipal ity	Family	32.1
65	19000	Public Nurser ies Park	Local Park	Doha Internatio nal Airport	48	Doha Municipal ity	Family	18.3
66	3500	Jaw Park	Local Park	Al Wakra	90	Al Wakra Municipal ity	Family	24.9

No	Area (In Sq meter)	Park Name	Park classifica tion	Park District	Zon e	Municipa lity	Parks Type	Dist. from Ind. Km
67	4200	Park, D.I. Airpor t	Local Park	Old Airport	45	Doha Municipal ity	Family	16.2
68	1908	Park, Al Manas eer	Local Park	Alrayan	55	Al-Rayan	Family	11.2
69	80000	Museu m Park	Local Park	Doha- Aslata	18	Doha	Genera l	19.5
70	17000	Abu Dhalo uf Park	Local Park	Abu Dhalouf	78	Al- Shamal Municipal ity	Family	125
71	3500	Park, Wadi Al Jalta	Local Park	Alwakra	90	Alwakra Municipal ity	Family	73.3
72	2094	Al Kharti yat Plaza Park	Local Park	Al Kartiyat Plaza Park	71 7	Umm Salal	Family	18.7
73	4376	Park, Leabai b	Local Park	Duheel. N	30	Al- Daayen Municipal ity	Family	30.4
74	5000	AQU A Park Qatar	Local Park	Mebeere k	80	Al-Rayan Municipal ity	Family	23.6
75	3350	Al Ghash am Public Park	Local Park	Alwakra	90	Alwakra Municipal ity	Family	26.4
76	62200	Park 65	Local Park	Doha	33	Doha Municipal ity	Family	24.3
77	14000	Park 67	Local Park	Doha	34	Doha Municipal ity	Family	28.3
78	1802	Al Uosify a	Local Park	Doha	34	Doha Municipal ity	Family	16
79	10389	Al	Local	Abusamr	80	Al Rayan	Family	16.7

No	Area (In Sq meter)	Park Name	Park classifica tion	Park District	Zon e	Municipa lity	Parks Type	Dist. from Ind. Km
		Khauli fat Park	Park	a		Municipal ity		
80	5935	Al Gubee lat	Local Park	Doha	64	Doha Municipal ity	Family	27.4
81	7313	New Atlant a	Local Park	Doha	18	Doha Municipal ity	Family	16
82	13510	Oniaza	Local Park	Aldafna	63	Doha Municipal ity	Family	27.5
83	6181	Al Jalta Park	Local Park	Alkhor	76	Alkour &Althakh ira Municipal ity	Family	70.3
84	14580	AlTha heera Park	Local Park	Author	75	Doha Municipal ity	Family	11.7
85	60245	Sharq Park	Local Park	Doha	28	Doha Municipal ity	Genera l	19.8
86	8300	AlSak hama North Park	Local Park	Umm Salal	71	Umm Slal Municipal ity	Family	43.2
87	56000	Abu Nakhl a Park	Local Park	Mebaree k	81	Al- Rayyan Municipal ity	Family	12.5
88	23173	Onaiza Park	District Park	Onaiza 65	65	Doha Municipal ity	Genera l	26.6
89	24000	Doha Club Park	District Park	Al Khulaifat	28	Doha Municipal ity	Genera l	30.6
90	28000	Al Qassar Park	District Park	Legtaifiy a	66	Doha Municipal ity	Genera l	27.7
91	29000	Al Mutha f Park	District Park	Salat	18	Doha Municipal ity	Genera l	21
92	37000	Al Manna Park	District Park	Leabaib	70	Al- Daayen	Genera l	31.1

No	Area (In Sq meter)	Park Name	Park classifica tion	Park District	Zon e	Municipa lity	Parks Type	Dist. from Ind. Km
		l Garde n				Municipal ity		
93	38000	Souq Waqif Park	District Park	Al Jasra	1	Doha Municipal ity	Genera l	18.6
94	47000	Airpor t Park	District Park	Doha Internatio nal Airport	48	Doha Municipal ity	Genera l	17.7
95	79000	Al Dafna Sherat on Park	Town Park	Al Dafna 61	61	Doha Municipal ity	Genera l	24.9
96	80000	Islami c Museu m Park	Town Park	Corniche		Doha Municipal ity	Genera l	21.9
97	88000	Cresce nt Park	Town Park	Lusail City	69	Al- Daayen Municipal ity	Genera l	38.2
98	93297	Al Dafna Pa24.9 rk	Town Park	Al Dafna 60	60	Doha Municipal ity	Genera l	24.9
99	93297	Dahl Al Hamm am	Town Park	Dahl Al Hamam	32	Doha Municipal ity	Genera l	26.4
100	93000	Al- Rayya n Park	Town Park	Old Al- Rayyan	52	Al- Rayyan Municipal ity 02	Genera l	21.3
101	13000 0	Pearl Qatar	Town Park	Pearl	66	Doha Municipal ity	Genera l	32.4
102	13100 0	Oxyge n Park	Town Park	Old Al- Rayyan	52	Al- Rayyan Municipal ity	Genera l	18.8
103	14000 0	Rawdh Rawda t Al	Town Park	RawdhaR awdat Al Khalil	24	Doha Municipal ity	Genera l	16.2

No	Area (In Sq meter)	Park Name	Park classifica tion	Park District	Zon e	Municipa lity	Parks Type	Dist. from Ind. Km
		Khail Garde n						
104	57000 0	Katara Hills	Town Park	Al Gassar 66	66	Doha Municipal ity	Genera l	28.7
105	79600 0	Aspire Park	Town Park	Baaya	54	Al- Rayyan Municipal ity	Genera l	9.5
106	3350	luwee na Park	Town Park	Al Wakra	90	Al Wakra	Genera l	21.6
107	56000	Al Shama l City Park, Al	Town Park	Al Shamal	79	Al Shamal Municipal ity	Genera l	121
108	26069	Al Sheeh aniya Park	Town Park	Alshahan yia alatpoury a	80	Alsheelha nya Municipal ity	Family	49
109	23720 8	Al Khour Park	Town Park	Author	74	Author Municipal ity	Genera l	17.6
110	47000	Al Wakra Gener al Park, Al Wakra	Town Park	Al Wakra	90	Al Wakra Municipal ity	Genera l	26.2
111	17450 00	Al Bidda	Metropol itan Park	Rumaila 12, Wadi Sail 12 and Bidda 12	12	Doha Municipal ity	Genera l	20.3
112	11532	Dar Al Kutub Park	Local Park	Alghani m alateeq	6	Doha Municipal ity	Genera l	19.4

Table 14. General and Bachelor Parks in Qatar (Author,2024):

Sl. No	Area (In Sq meter)	Park Name	Park classification	Park District	Zone	Municipality	Parks Type	Dist . from Ind. Km	close ness
1	23173	Onaiza Park	District Park	Onaiza 65	65	Doha Municipality	General	26.6	No
2	24000	Doha Club Park	District Park	Al Khulifat	28	Doha Municipality	General	30.6	No
3	28000	Al Qassar Park	District Park	Legta ifiya	66	Doha Municipality	General	27.7	No
4	29000	Al Muthaf Park	District Park	Salat	18	Doha Municipality	General	21	No
5	37000	Al Mannal Garden	District Park	Leaba ib	70	Al-Daayen Municipality	General	31.1	No
6	38000	Souq Waqif Park	District Park	Al Jasra	1	Doha Municipality	General	18.6	No
7	47000	Airport Park	District Park	Doha Int. Air.	48	Doha Municipality	General	17.7	No
8	79000	Al Dafna Sheraton Park	Town Park	Al Dafna 61	61	Doha Municipality	General	24.9	No
9	80000	Islamic Museum Park	Town Park	Corniche		Doha Municipality	General	21.9	No
10	88000	Crescent Park	Town Park	Lusail City	69	Al-Daayen Municipality	General	38.2	No
11	93297	Al Dafna Pa24.9rk	Town Park	Al Dafna 60	60	Doha Municipality	General	24.9	No
12	93297	Dahl Al Hammam	Town Park	Dahl Al Hammam	32	Doha Municipality	General	26.4	No
13	93000	Al-	Town	Old	52	Al-	General	21.	No

Sl. No	Area (In Sq meter)	Park Name	Park classification	Park District	Zone	Municipality	Parks Type	Distance from Ind. Km	close ness
		Rayyan Park	Park	Al-Rayyan		Rayyan Municipality 02		3	
14	130000	Pearl Qatar	Town Park	Pearl	66	Doha Municipality	General	32.4	No
15	131000	Oxygen Park	Town Park	Old Rayyan	52	Al-Rayyan Municipality	General	18.8	No
16	140000	Rawdhat Al Khail Garden	Town Park	Rawdhat Al Khail	24	Doha Municipality	General	16.2	No
17	570000	Katara Hills	Town Park	Al Gassar 66	66	Doha Municipality	General	28.7	No
18	796000	Aspire Park	Town Park	Baaya	54	Al-Rayyan Municipality	General	9.5	No
19	3350	luweena Park	Town Park	Al Wakra	90	Al Wakra	General	21.6	No
20	56000	Al Shamal City Park, Al	Town Park	Al Shamal	79	Al Shamal Municipality	General	121	No
21	237208	Al Khor Park	Town Park	Author	74	Author Municipality	General	17.6	No
22	4523	Old Al Ghanim Park	Neighborhood Park	Old Al Ghani m 16	16	Doha Municipality	Bachelor	14.5	No

The table provides an overview of general and bachelor parks in Qatar, detailing their area, classification, location, and distance from industrial areas. It categorizes parks into district and town parks, with one neighborhood park specified for bachelor use. Notable district parks include Onaiza Park and Airport Park, while significant town

parks encompass Aspire Park and Katara Hills. The parks vary in size, with areas ranging from 3,350 to 796,000 square meters, and are situated across various municipalities such as Doha, Al-Daayen, Al-Rayyan, Al Wakra, Al Shamal, and Al Khor. Distances from industrial areas span from 9.5 km to 12,1 km, reflecting the parks' accessibility and distribution within the country.

Table 15. General and Bachelor Parks in Qatar, source: Qgis, (Municipality and Oun Apps; Google map., 2024).

Park Name	Distance from Industrial Area
Al-Ghanim Park	14.5 kilometers
Crescent Park	38.2 kilometers
Aspire Park	9.5 kilometers

4.2.8 *Distance from Industrial area to other parks and public spaces*

The tables depict the distances between the industrial area and its adjacent park areas, originating from the Al-Attiyah market in the industrial zone, which acts as a central transportation hub. They present the proximity of 20 parks to the industrial area along with transportation options such as public buses, taxis, metro, walking, and bicycles. Additionally, they categorize the parks into family or public, listing the distances in kilometers.

Analysis of satellite imagery from Google Maps revealed that the metro lines, comprising green, red, and golden lines, do not extend to the industrial area. Instead, public transportation is facilitated by a single line running along two main streets connecting Doha to the industrial area. Salwa Street runs from the heart of Doha to the industrial zone, while Abu Hamour Street links Doha to the industrial area, with secondary roads interconnecting them.

The study identified Umm Al Seneem Family Park as the closest park to the industrial zone, situated 4.2 km away. Aspire Park follows it at 7.8 km and Al Waab Family Park at 10 km. The remaining 17 parks are located from 12.4 km to 22.1 km. The considerable distances pose challenges for walking or cycling, mainly because of the area's year-round high temperatures.

Given the absence of a metro line and the impracticality of walking or cycling, reliance on public transportation (buses) and taxis becomes imperative. However, the study highlights drawbacks such as lengthy bus routes passing numerous stations and higher taxi fares compared to buses.

Google Maps satellite imagery was utilized to evaluate the journey from the industrial area to Doha and nearby parks. This is a thorough summary of the distances and transportation options available.

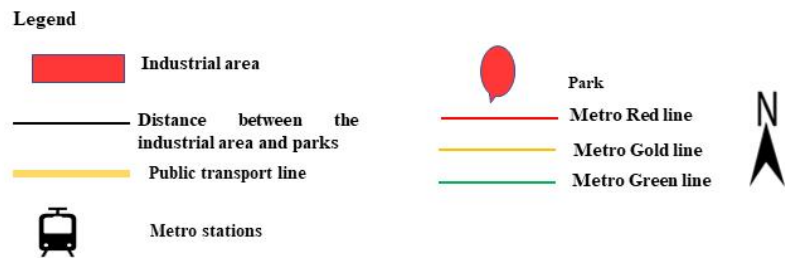
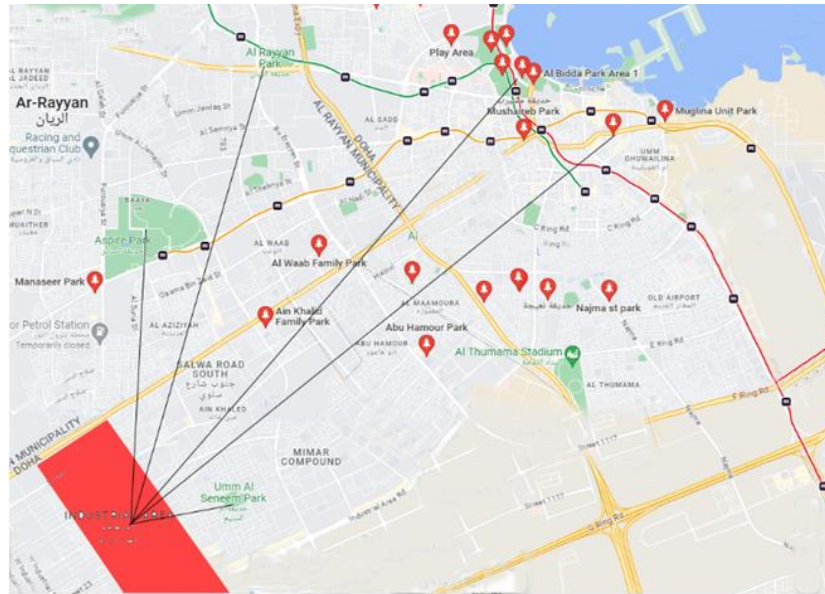


Figure 38. Demonstrates park's distance to the industrial area Source: (Author, 2024).

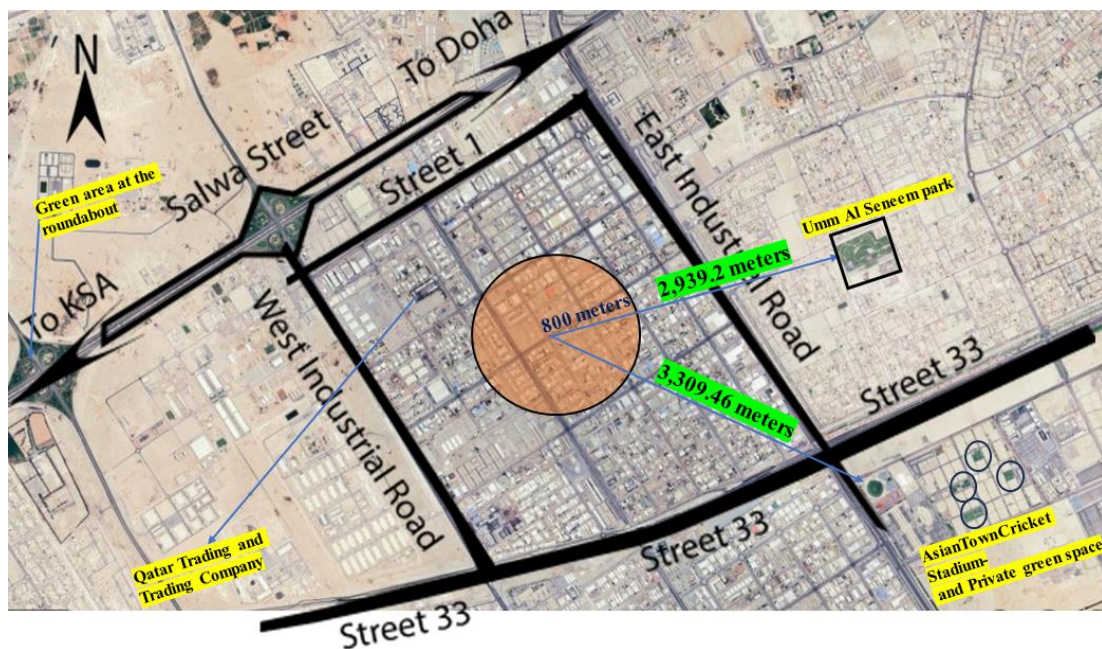


Figure 39. Pedestrians shed 800 meters (R) from the industrial area to the nearby Umm Al Seneem Park, Cricket Stadium, Source (Google. E, and Author., 2024).

The map indicates a noticeable absence of parks near the industrial area, save for a lone exception: Umm Al Seneem Park, approximately 2,939 meters away. However, accessing this green space necessitates a journey of 4,400 meters by car or bus, as pedestrian access is restricted in this locale. This stark contrast highlights the discrepancy from the pedestrian theory's ideal, where the nearest park should be conveniently accessible within a five-minute walk.

Table 16. Distance and time required to reach the park from the Industrial Area using bus, taxi, and walking source. (Qgis, Municipality and Oun, G.Maps, and Author, 2024)

Nearest parks according to Time of transportation	Distance by Km		Access Time in Minutes		
			Bus	Taxi	Walking
Umm Al Seneem	4.4	Near	25	8	50
Aspire	7.8	Near	49	12	109
Mebaireek	13.3	Far	83	18	134
Rawdat Al Khail	13.1	Far	56	20	164
Alghanim Bachelor park	15.6	Far	78	23	201
AL-Bidda	18.1	V.Far	77	24	208
Souq Waqif Park	18.6	V.Far	80	26	200
Barahat Al-Jufari O. S	15.6	Far	70	25	197

4.2.9 Calculation of per capita green space in Qatar based on the Medellín 2013 Land Use Plan

In his 2013 plan on Land Use, Medellín advocated for increasing per capita green location within the city to improve life quality and air quality, aligning with WHO's suggestion of 15 square meters per inhabitant (*X). A methodology was outlined to assess this: the percentage of green area was computed by dividing it by the zone's total area. At the same time, By dividing the entire population of the zone by the amount of green space available, the per capita park provision was calculated.

Doha had the most green parks (47) out of all the municipalities under study,

closely followed by Al-Rayyan and Al-Daayen. Nonetheless, the study region's 34 zones included parks. There were differences in park acreage and provision ratios between the zones, and there was an inverse relationship between population density and per capita park space. This suggests a need for a more nuanced approach to park distribution, considering population counts as a crucial factor.

Zones with higher park provision ratios typically exhibited lower population densities, challenging the conventional emphasis on population density in park design. Several planned park spaces in Al Dafna, Al Qassar, Lusail, and Onaiza emphasized affluent residential and commercial zones intended to attract visitors citywide rather than solely serve local communities.

In contrast, zones with higher population densities, like Madinat Khalifa South, Hamad Medical City, and Old Al Ghanim, faced challenges in providing adequate green space per capita, particularly for migrant laborer populations. A notable observation was the negative correlation between population density and per capita green cover, as seen in Figure (*).

Population data from The Global Gridded Population (GPWv4) 2020 was utilized to assess the portion of the populace that parks serve. Of the zones, only a tiny percentage (12%) had parks catering to the whole population, and nearly half had less than 50% living within walking distance of a park. Zones with fewer than 10% walking park access were especially problematic; they were primarily found in the most densely populated area, the Doha municipality.

Seven zones within the Doha municipality were identified where parks served less than 10% of the population. These zones, including Al Nasr, Al Sadd, Bin Mahmoud, Old Airport, Fereej Abdel Aziz, Industrial Area, and Wholesale Market, were primarily inhabited by low-wage Asian workers. Each zone exhibited distinct

characteristics, ranging from retail-dominated areas to mixed-use zones with varying levels of land use planning.

Overall, the study underscores the need for equitable park distribution and access, especially in densely populated areas with significant migrant populations, to enhance urban livability and well-being.

When planning laws were loosened in 2016, employees in industrial units could live in newly built garages or temporary stores, which increased their presence in the industrial area (Lockerbie, 2020b).

To produce a numerical breakdown of population types based on median income or home value in particular zones, statistical associations had to be more accessible due to data limitations. However, other studies on similar neighborhoods—which were previously mentioned—show that migrant workers—particularly those with low incomes—frequently live in neglected regions. The 'distribution of labor gatherings' map (Planning & Statistics Authority, 2010) further emphasizes this trend. This vulnerable group is underrepresented, especially low-wage migrants, which puts their access to recreational facilities at risk. Socioeconomic constraints make this requirement even more pressing. The Al-Rayyan municipality needs more parks, just like Doha does.

To serve its population. However, given the municipality's larger population of both locals and migrants, it could be argued that the existing park network across Qatar inadequately caters to natives as well. A comprehensive assessment of the deficiency in recreational opportunities in Al-Rayyan necessitates an examination of the housing layout among native Arabs, whose residences typically include landscaped yards conducive to relaxation and recreation.

There are several factors to consider when analyzing these observations. One of

the primary challenges is the high population density in certain areas, which makes it complex and resource-intensive to acquire land for park expansion. The procurement process is lengthy and costly, often requiring assessments and calculations of fair compensation. In densely populated areas of Doha, obtaining vacant property is particularly challenging. Furthermore, parks and public recreational spaces generally need more funding, exacerbating the issue. Another factor is the government's reluctance to invest in regions with a significant labor population but limited economic returns, which may contribute to the observed distributional bias. While it is impossible to know without additional data, current findings suggest that migrants bear the brunt of this bias.

A retrospective analysis of park development reveals a concentration of park expansions in suburban regions post-2010, with inner areas receiving even less attention and thus needing more representation. Three primary attributes are considered to identify areas with higher demand for parks: population density, demographic composition (labor concentration), and housing type (apartments). Previous studies have used a need index to estimate demand levels, incorporating social and economic characteristics. However, the provision of neighborhood gardens often fails to align with actual needs, highlighting issues of social justice, land distribution, and provision of parks and recreational spaces.

Regions with high residential population densities, such as Old Doha and Al Rayyan, need parks most. The demand index in Zone 25, which includes Fereej Al Mansour and Bin Dirham residential areas, is the highest. Foot traffic in this area is significant, as it is far from Rawdat Al Khail Park, which has recently been expanded and renamed. Other regions within Doha municipality, characterized as low-income due to their substantial migrant worker population, also require park facilities. These

areas include Industrial Area, Doha Aljadeeda, Umm Ghuwailina, Musheireb, Al Najma, and Old Al Ghanim, and are numbered 27, 16, 15, 13, 26, 14, 45, and 57, respectively. Of these, the industrial area requires parks the most, as it is close to only one park, Umm Al Seneem Park (family), which is 4.4 kilometers away and inaccessible. Recent government policies prohibiting single individuals from residing in central city areas have led families to relocate to the industrial area, increasing population density. Other mentioned parks are relatively closer to neighborhoods at varying distances, addressing some of the recreational needs within these communities.

A city's per capita The calculation of green area involves dividing the overall green area inside the city limits by the total population. 2013, this method was used to calculate Medellin's per capita green area. Despite Qatar's per capita green area increasing in 2022, it decreased in 2023 due to the high population rate, falling below the minimum level set by the United Nations Green Leisure Environment Program (UNEP). The population of Qatar reached 3,001,781 in May 2023 (Planning and Statistics Authority, 2023). The formula for per capita green space is derived from Fuller and Gaston (2009) and Canceled and Bahmanpur (2012), where the total green area within the city limits is divided by the city's total population. For Qatar in 2023, with 43,861,133 square meters of green space overall and a population of 3,001,781, the per capita green space amounted to 14.6 square meters, falling below the UNEP's minimum requirement of 15 square meters.

The table below outlines eight neighborhoods in Doha Municipality classified as dense and inhabited mainly by low-income workers and residents. Despite their proximity to parks, the distance to reach them is considerable, with the nearest park being two kilometers away. For instance, the industrial area is 4.4 kilometers from Umm Al Seneem Park. Assuming all neighborhood residents visit these parks, the

combined green space per capita is calculated as 0.8 square meters per person. This indicates a severe deficiency in green spaces in these low-income areas, with some regions needing more greenery.

Table 17. Zone and P: Housing, Population General Establishments, source: (Qatar Census, 2020 and Author 2024).

Sl. No	Neighborhood	Zone	Population	Park No	Park Near	Dist. from near Park. Kl	Sq m2	Per Capita
1	Al-Najma	26	43,695	No	Rawdhat Al Khail Garden	2.5	140000	1.02
2	Mansoura&Bin Darhem	25	65,493	No	Rawdhat Al Khail Garden	3.6		
3	Freej Abdula ziz	14	27,515	No	Rawdhat Al Khail Garden	3.6		
4	Musheireb	13	15,188	No	Souq Waqif Park	2		0.7
5	Old Al Ghanim	16	19,010	No	Souq Waqif Park	2	38000	
6	Dawha al Jadidah	15	22,019	No	Souq Waqif Park	2.6		
7	Umm Ghuwailina	27	39,457	No	Museum Park&Sharq	2.4	80000	1.6
8	Old Al-Hitmi	17	8,413	yes	Museum Park&Sharq			
9	Industrial area	57	313,754	No	Umm Alsanee m	4.4	130000	0.41

The analysis of park accessibility in various neighborhoods of Doha reveals a significant disparity in green space availability. Al-Najma, Mansoura, and Bin Darhem neighborhoods, Freej Abdulaziz, Musheireb, Old Al Ghanim, Dawhah al Jadidah, and Umm Ghuwailina, lack local parks. They are served by parks at distances ranging from 2 to 3.6 kilometers, with per capita green space ranging from 0.7 to 1.6 square meters. Notably, the Industrial Area, with a population of 313,754, also lacks a local park, with the nearest being 4.4 kilometers away, providing only 0.41 square meters per capita. The Old Al-Hitmi neighborhood is an exception, having a local park. This analysis underscores the need for more parks, particularly in densely populated low-income neighborhoods, to improve residents' access to green spaces and enhance their quality of life. An observational study conducted in Souq Alattiya and Street No:13 industrial area aimed to assess workers' social integration and recreational activities in these low-income regions. The study involved field visits to the industrial area during weekdays after working hours, focusing on workers' lives' social and recreational aspects, particularly those with low incomes.

4.3 Observational study: Souq Alattiya and Street No:13 industrial area

The observation relied on investigating the workers' social aspects and interactive activities to measure the extent of their integration as a society in this region, which is classified as low-income. The observational study was divided into two parts. The first part was a field visit to the industrial area of Doha, where we watched what was happening in the social and recreational lives of the workers. This study was conducted between Thursday and Friday because Saturday is a working day for companies and private institutions. Fieldwork on a weekday after five o'clock in the evening and a survey and observation of the workers' lives, especially those with low incomes.

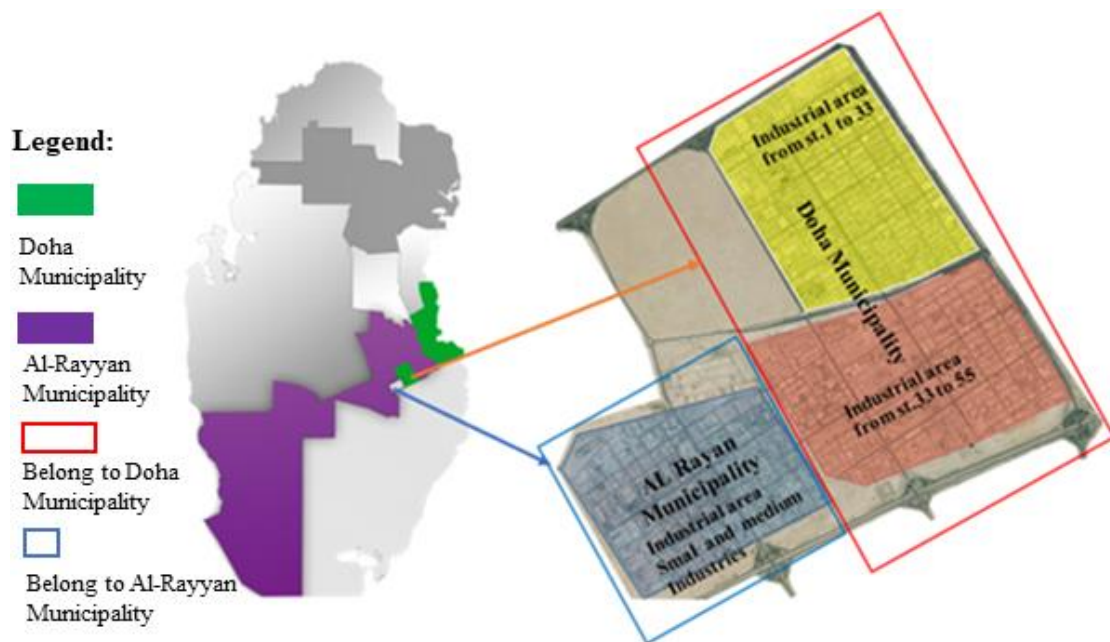


Figure 40. The intersection of Doha and Al-Rayyan is marked by green, yellow, and red, while the blue area for small and medium industries is in Al-Rayyan Municipality—source: (Author, 2024).

The map demonstrates the parks in the industrial area. It shows the intersection of the Municipality of Doha in green with the Municipality of Al-Rayyan in purple at the industrial area, where the industrial area from Street 1 to Street 55 in yellow and red belongs to the Municipality of Doha. In contrast, the blue area for small and medium industries is in Al-Rayyan Municipality (Source: The Author, 2024).

Through observation, it was discovered that many workers were dispersed in a small area next to the Al-Attiyah market. Here, some kiosks sell traditional foods, and the workers congregate there to socialize and interact while enjoying these foods and beverages while standing. Some also sit on the sidewalk, and some ride bicycles to work. Many people practice walking, and he utilizes his bike as a seat instead of the unavailable furniture. It is not classified as a significant green or public place.

Thus, there is no furniture here, but the proliferation of these (kiosks offering

traditional Asian cuisine and beverages) transformed the area into one where people wanted to hang out. Indirectly, there is a space for socializing and gathering with friends and coworkers in these industries and other institutions. At the same time, another portion of the workforce utilizes the Al-Attiyah market as a gathering place to sit, wander, observe, and amuse themselves without purchasing or selling by traversing the industrial district and choosing a random sample of a few streets, the method of Some Asian employees are playing volleyball in front of the street in the area between the factories as they watch the game with a massive crowd as they wait for the loser to emerge. One of them moves forward without considering the oncoming vehicles. The second group, Africans, plays football in the 400-meter-long, approximately 4-meter-wide pedestrian crossing area. They are relating to their larger bodies and lives.

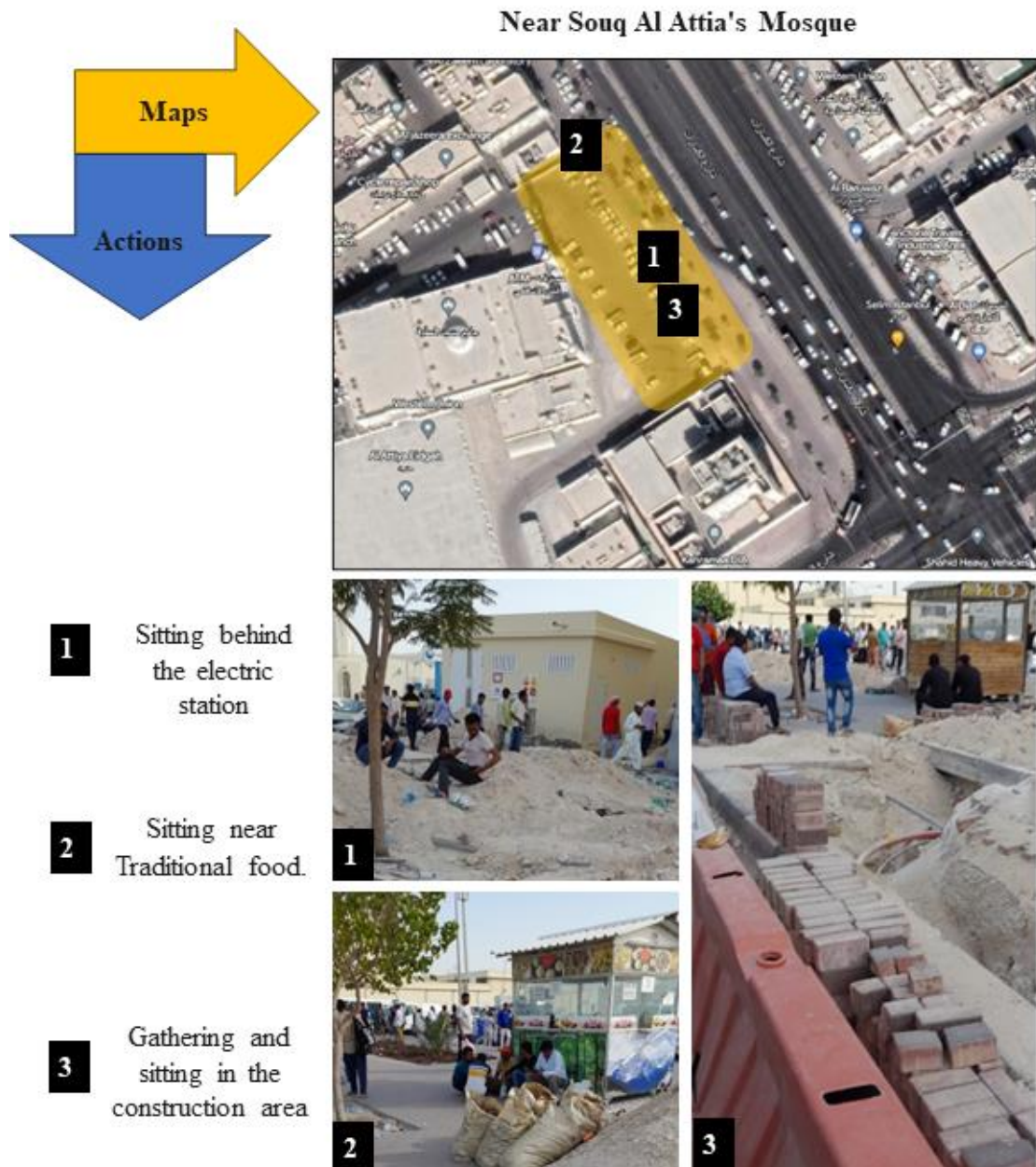


Figure 41. People gathering near a small restaurant for traditional Asian foods near Al-Attia market, source,(Author, 2023)

The Figure 19. display Space near Al-Attia market cloth to the mosque in the industrial area shows us the people sitting, standing, walking, and gathering near the small restaurant for traditional Asian foods. There is a food stall for sealing local Asian food near Al-Attia market, and some people gather in and sit on the sidewalk on the right. (Source: the photo by the Author, 2023)



Figure 42. People playing football and volleyball near, gathering near a small restaurant for traditional Asian food, source,(Google edited by Author,2023).

The figure up Show Street No. 13 in the Industrial Area. People play football and volleyball. The space near the Al-Attia market, close to the mosque in the industrial area, shows us people sitting, standing, walking, and gathering near the small restaurant for traditional food. Asian foods (Source: the photo by the author and maps from Google edited by the Author,2023).

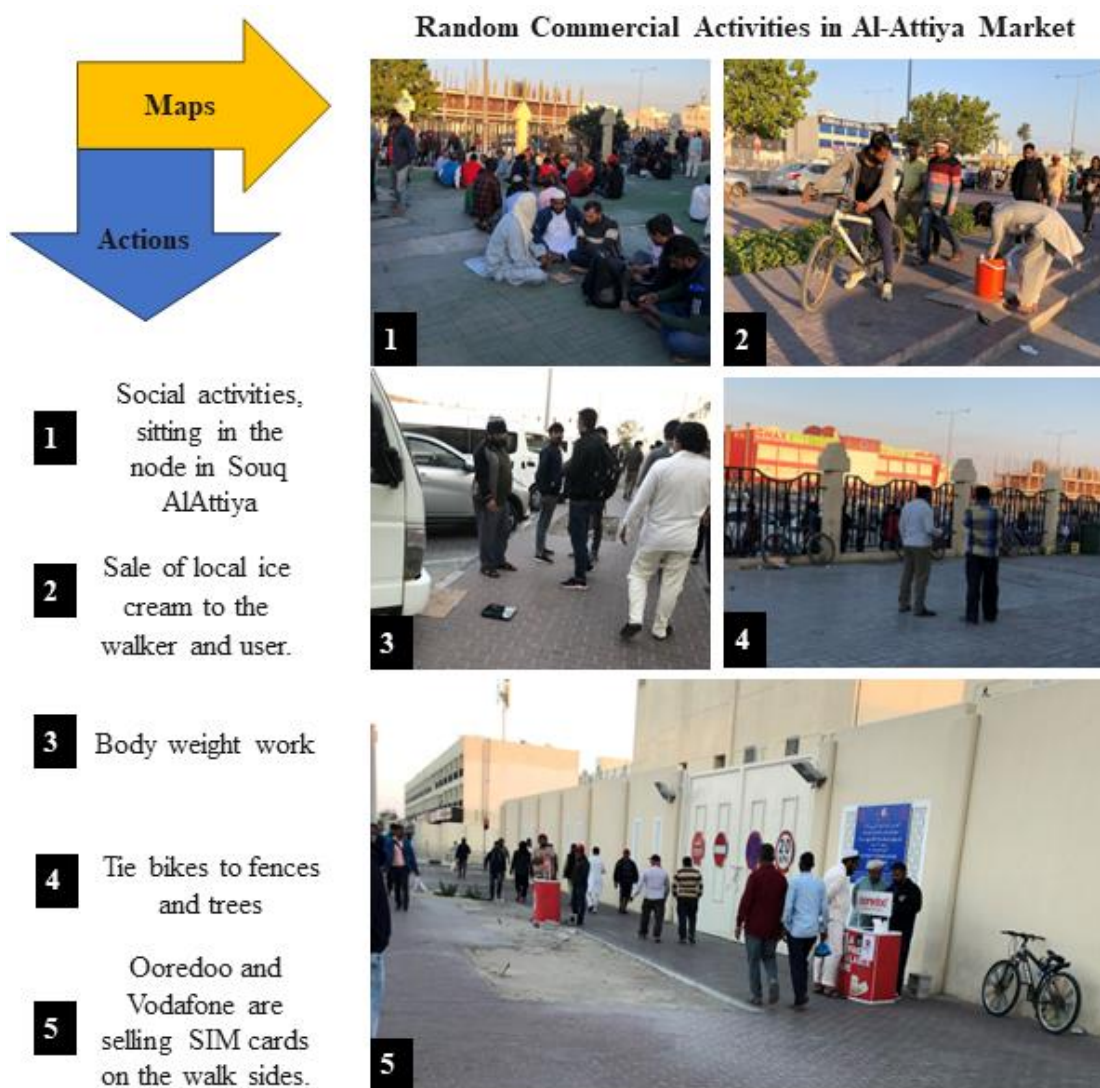


Figure 43. Random Commercial Activities in Al-Attiya Market source (Author, 2024)

The photos in the figure show some of the activities and practices in the small squares and corridors at Al-Attiya Market; top left, workers sitting on the ground in

social activity; right, one of them is selling local ice cream; center left, a scale is used to weigh objects for passersby, center right they attach swivel wheels to the fences, bottom A mobile kiosk carrying the logo of Ooredoo and Vodafone to trade and sell phone SIM cards in a pedestrian crossing area(source: Author 2024).

4.4 The Implications of Inadequate parks in low-income neighborhoods

The absence of accessible parks within neighborhoods has engendered a plethora of adverse repercussions, notwithstanding the emergence of specific favorable outcomes through alternative avenues for social interaction among laborers and park patrons. This assertion is substantiated by the findings gleaned from a comprehensive survey distributed among 70 individuals. The ensuing exposition will delineate the outcomes of the said questionnaire after the explication of the observed phenomena.

In the subsequent segment of this inquiry, the market vicinities of Al-Jufairi and Al-Najada were subjected to random selection within the urban expanse of Doha. These locales represent pivotal public spaces where laborers congregate for recreational engagement. The systematic monitoring of the behaviors and interactions among these laborers facilitated the discernment of favorable and unfavorable conduct patterns. Among the affirmative attributes of these locales is the ample provision of public transportation services, owing to their centrality as pivotal transit hubs within the Qatari public transportation network. This accessibility confers considerable financial savings upon laborers, who would otherwise expend substantial sums on transportation expenses, given the arduous trek of approximately 18 kilometers from the industrial precincts to Doha. Consequently, the feasibility of pedestrian, bicycle, or even group taxi commutes needs to be improved, exacerbating the financial strain on laborers.

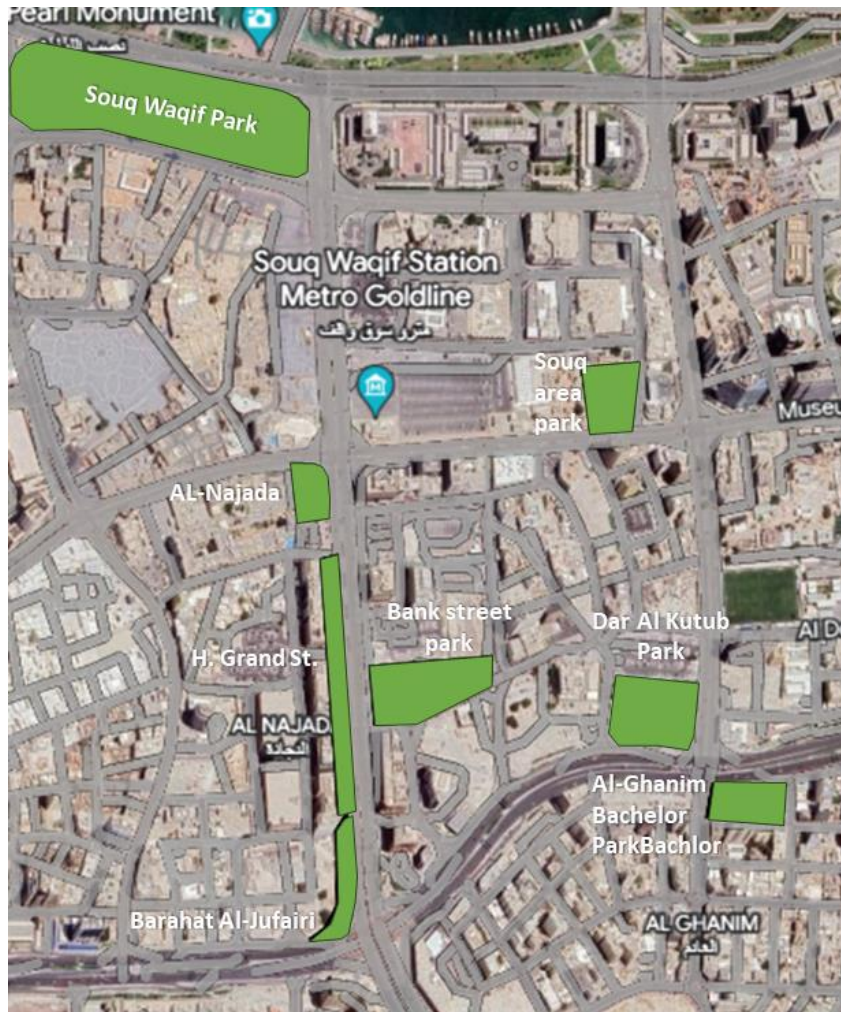


Figure 44. The parks are in Doha city center, 16 km from the industrial area's source (Google Earth edited by the Author, 2024).

The figure shows the Parks and spaces in Souq Waqif, Alnajada, Barahat Aljufari, Alghnim Bachelor Park, Hamad Street, Bank Street Park, the Souq green space, and the newer Dar AlKutub Park, 16 km from the industrial area—source: Google Earth edited by the Author, 2024.

The absence of a metro station within proximity exacerbates congestion within the area, designated as the city's central nexus, owing to the substantial influx of laborers. Upon the cessation of work activities, laborers residing approximately 16 kilometers away from the industrial locale disperse toward verdant and accessible

spaces, including Al-Najada, Al-Jufairi, Souq Waqif, Banks Street, and the Souk Al-Watan precinct. Evidently, amidst these environs, discernible patterns of social conduct manifest through communicative exchanges and interpersonal engagements among labor cohorts. Such behaviors encompass communal seating arrangements, interactive dialogues in small groups, audiovisual entertainment consumption, recreational pursuits, strolling activities, and consumption of victuals and beverages.

Notably, the demographic composition primarily comprises males of diverse national origins, with minimal female presence, confined to cautious traversal between Bank Street and Souq Waqif. This pedestrian route, characterized by haphazard street layouts bereft of traffic regulation mechanisms, engenders peril for pedestrians and motorists alike. Moreover, the proliferation of impromptu encampments around sidewalk peripheries, utility installations, and bicycle stands further impedes pedestrian thoroughfares. The absence of sufficient street furniture and spatial provisions exacerbates pedestrian congestion, compounded by the indiscriminate parking practices of select limousines and Uber vehicles, contingent upon the availability of laborers, thus disregarding designated parking zones.

The resultant accumulation of residue and refuse, symptomatic of high human density, undermines the locale's ambiance and hygiene. The adverse impact on female constituents within these domains stems from privacy deficits and discordance with prevailing socio-cultural norms. Safety concerns arise regarding utilizing widely dispersed automated teller machines (ATMs), notably along Grand Hamad Street. The efficacy of ATM utilization is compromised by extensive queues, attributable to the inconsiderate conduct of queueing individuals, thereby impeding access to banking facilities.

In summary, inadequate transportation infrastructure, the proliferation of

informal social spaces, and attendant behavioral dynamics engender multifaceted challenges encompassing pedestrian safety, urban aesthetics, and gender-inclusive spatial access within the delineated urban precincts. Efforts toward alleviating these issues necessitate strategic urban planning interventions, encompassing infrastructural enhancements, regulatory frameworks, and socio-cultural sensitivities, to foster equitable and sustainable urban environments conducive to the diverse needs of its inhabitants.



Figure 45. Workers on Grand Hamad Street, interacting in pedestrian walkways, create an obstacle to the pedestrian movement (source: Author, 2024)

The left-top photo shows workers passing the roads randomly and the proper top illegal parking. The social interaction of workers standing and sitting in the pedestrian walkways on Grand Hamad Street constitutes an obstacle to pedestrian movement—source: Author, 2024.

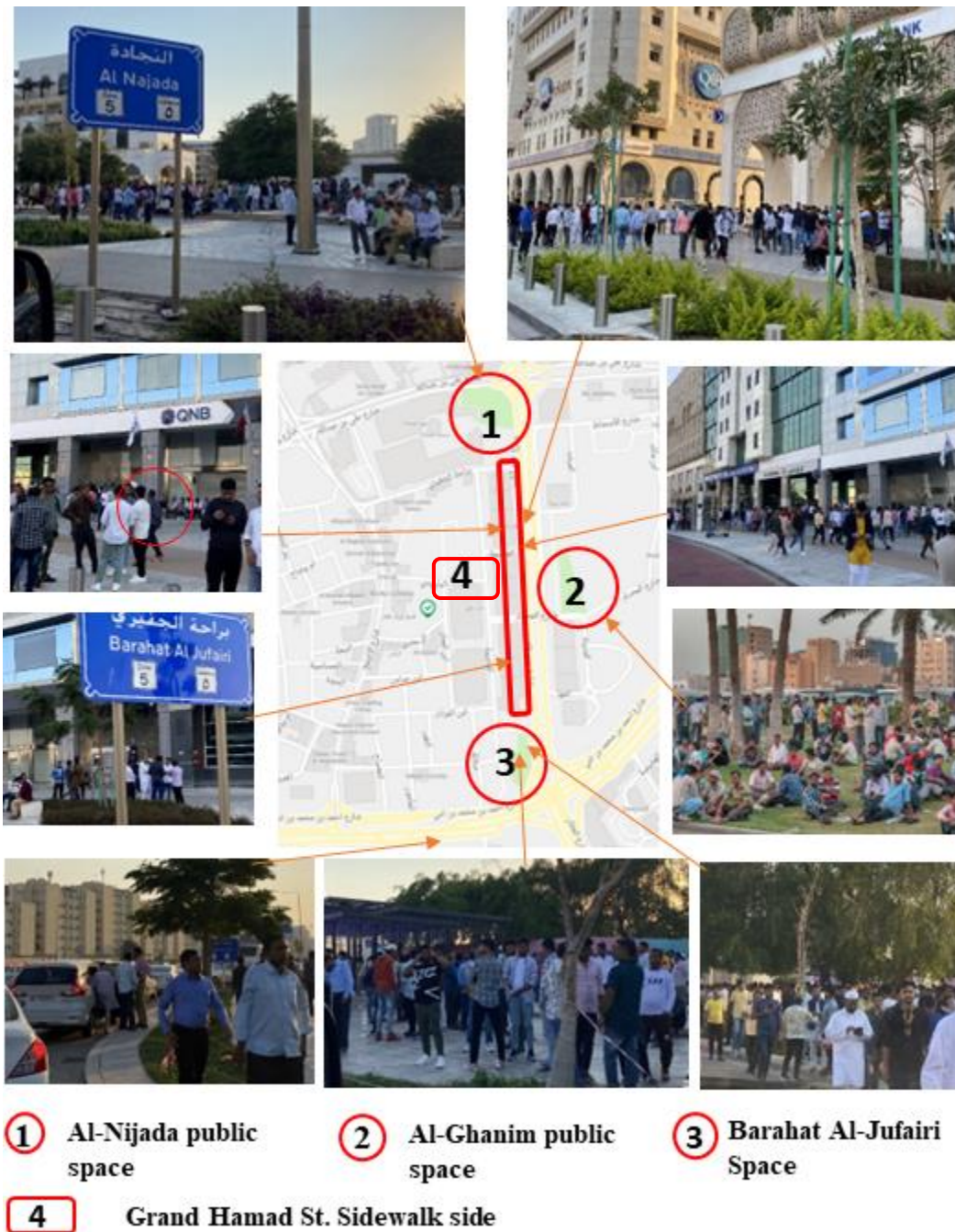


Figure 46. Photos depict workers' behavior in Al-Najada, Barhat Al-Jusfairi, and Al-Ghanim public spaces, source(Author,2024)

The photos show workers' behavior in four places on Hamad Grand Street: Al-Najada, Barhat Al-Jusfairi, and Al-Ghanim public spaces (16 km from the industrial

area). Source: All photos by the Author except the photo of AL-Ghanim public space (<https://www.asergeev.com/pictures/archives/compress/2013/1219/22.htm>).

Table 18. Distance from the industrial area and transportation. (G.Maps and Author 2024)

No	Nearest Park to the industrial area	Type of parks & O.S		Distance Km	Transportation				
		Family	General		Metro	Taxi	Bus	Cycling	Walking
1	Aspire		yes	7.8	no	yes	yes	no	no
2	MIA		yes	22.1	no	yes	yes	no	no
3	Al-Corniche		yes	17.1	no	yes	yes	no	no
4	Al-Rayyan Green Space		yes	14.6	no	yes	yes	no	no
5	Souq Waqif		yes	16.4	no	yes	yes	no	no
6	Old Airport Park	yes		17.8	no	yes	yes	no	no
7	Al-Salata	yes		13.1	no	yes	yes	no	no
8	Rawdat Al Khail		yes	13.1	no	yes	yes	no	no
9	Al-Khulaifat	yes		12.4	no	yes	yes	no	no
10	Al-Mamoura Garden	yes		12.7	no	yes	yes	o	no
11	Al-Nuaiga family	yes		14.4	no	yes	yes	n	no
12	Fereej Al Sudan Family	yes		13.5	no	yes	yes	no	no
13	Al-Nuaiga family (South)	yes		14.4	no	yes	yes	no	no
14	Waab Park	yes		10.0	no	yes	yes	no	no

No	Nearest Park to the industrial area	Type of parks & O.S Family	parks Gen eral	Distan ce Km	Transportation				
					Metro	Taxi	Bus	Cycling	Walki ng
15	Umm Al Seneem	yes		4.2	no	yes	yes	yes	yes
16	Al-Najada open space		yes	16	no	yes	yes	no	no
17	Barahat Al-Jufari O. S		yes	15.6	no	yes	yes	no	no
18	Alghanim Bachelor park		yes	16.4	no	yes	yes	no	no
19	Mebaireek	yes		13.3	no	yes	yes	no	no
20	AL-Bidda		yes	18.1	no	yes	yes	no	no
21	Dar Al Kutub Park		yes	19.4	no	yes	yes	no	no
22	Al Muthaf Park		yes	21		yes	yes	no	no

As previously discussed, the per capita green space criterion gives information about how accessible public parks and promenades are in Qatar, particularly their distribution throughout the country. In the metropolitan area of Doha, roughly one acre of green space is available for every 1,200 residents, totaling 1,132 acres. To put this into perspective, the Association for National Parks and Recreation (NRPA) reports that the United States has 9.9 acres of parkland for every 1,000 individuals in parks and recreation organizations. This means that the public park and promenade services in Metropolitan Doha are almost a dozen times smaller than the national average for the USA. It is worth noting that many of the parks and promenades in the city are situated along the Persian Gulf shoreline, such as those found at The MIA, Al-Corniche, Al-

Bidda, Sheraton, and Pearl. Smaller parks, including al-Gharafa, Al-Khulaifat, and Al-Nuaiga, also cater to their respective neighboring communities. The table below analyzes the distance and travel time to the nearest park measured by Google Maps: the park distance of 4.2 Umm Alseneem Park, Aspire park 7.8 km, and Mebaireek 13.1 from the Industrial Area, considering bus and taxi, and walking options.

Table 19. Low-income workers frequent parks. (Google Maps and Author 2024)

Park Name	Distance by Km		Access Time in Minutes		
			Bus	Taxi	walking
Umm Al Seneem	4.2	Near	25	8	50
Aspire	7.8	Near	49	12	109
Mebaireek	13.3	Far	83	18	134
Rawdat Al Khail	13.1	Far	56	20	164
Alghanim Bachelor park	15.6	Far	78	23	201
AL-Bidda	18.1	V.Far	77	24	208
AL-Najada	16	Far	69	23	195
Barahat Al-Jufari O. S	15.6	Far	70	25	197

4.5 Analytical Studies: Exploring Observations and Questionnaires

The sample size was unexpectedly small, particularly given the size of the surveyed area. This was primarily due to many workers' reluctance to respond for various reasons, including fear and, at times, a lack of proficiency in English and Arabic. This highlights the importance of providing translations and involving interpreters in future surveys to facilitate the process. The survey used a random sampling method to study the effects of inadequate parks in the industrial area of Doha. One of the positives of this approach is the diversity in the number of participants, enhancing the reliability and validity of the results. Thus, the results provide a clear and accurate reflection of the experiences and opinions of residents and visitors, underscoring the need for parks to improve mental health, physical activity, social interactions, and environmental

conditions in low-income neighborhoods.

Although the sample size of 36 individuals may be limited, it represents a crucial first step in understanding the implications of inadequate facilities in the industrial area. Insights gained from this survey will be used to design a more comprehensive study with a more prominent and representative sample.

The survey was designed to explore the effects of limited park access in low-income areas, particularly in Qatar's industrial region. Divided into two sections, the survey consists of 15 questions and is aimed at residents of Doha's industrial district. Respondents were asked personal questions to help understand their relationship with the neighborhood, including age, gender, and whether they live, work, or visit the area. The second section focuses on their experiences with recreational and social activities, such as visiting nearby parks. The poll aims to get feedback on the effects of subpar parks in low-income areas, including the implications for social, material, and personal relationships. Respondents were encouraged to express themselves freely.

The survey was conducted to gather input from a diverse group of individuals, including both residents and visitors, to recreational areas, parks, and other green spaces. A total of 36 individuals completed the questionnaire, and the charts and figures below represent their responses. The data were carefully analyzed to ensure an accurate and comprehensive assessment of the various themes. The analysis adopted for this survey was an Inferential analysis. This approach involved collecting numerical data through structured questions and analyzing the responses to identify patterns and trends. Using charts and figures to represent the respondents' answers further supports the Inferential nature of the analysis. This method effectively summarizes the data, allowing for the measurement of the impact of inadequate parks on various aspects such as mental health, physical activity, social interactions, and financial burdens in low-

income neighborhoods. This analysis will inform the final result.

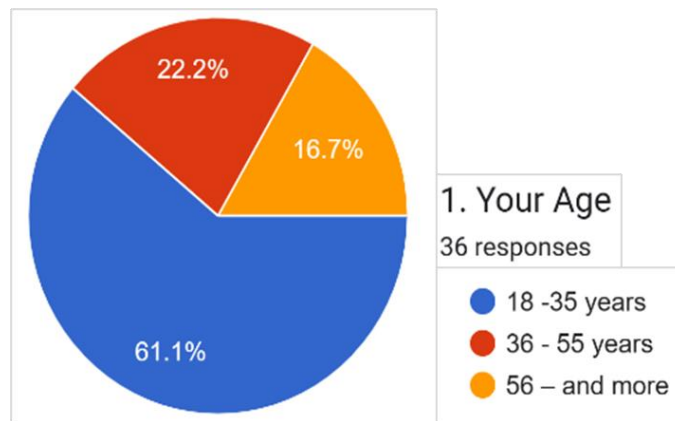


Figure 47. Qu1. The age respondents.

The first question included three different ages, as it turned out that the most active recreational activities are (18–35 years), with a rate of 61.1%.

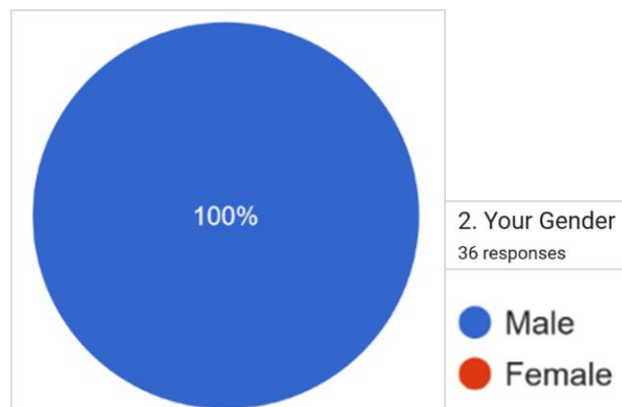


Figure 48. Qu2. The Gender respondents.

The second question clarified that all those who live in low-income neighborhoods in industrial areas are male (100%), which may negatively affect their frequenting of parks.

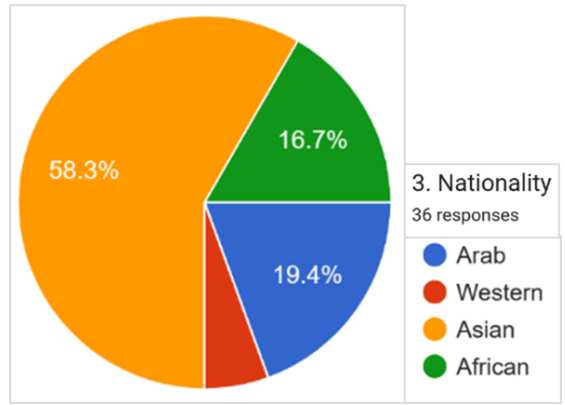


Figure 49. Qu3. Most of the nationalities are Asian (58%), Arab (19.4%), and African (16.7), and a few people are from the West.

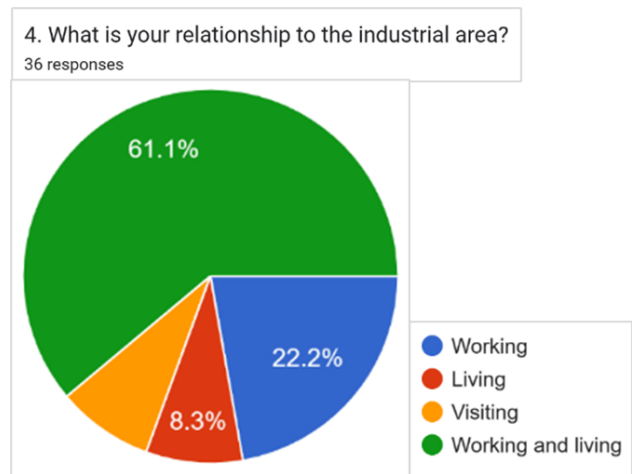


Figure 50. Qu4. This shows that 61% of people work and live in the industrial area.

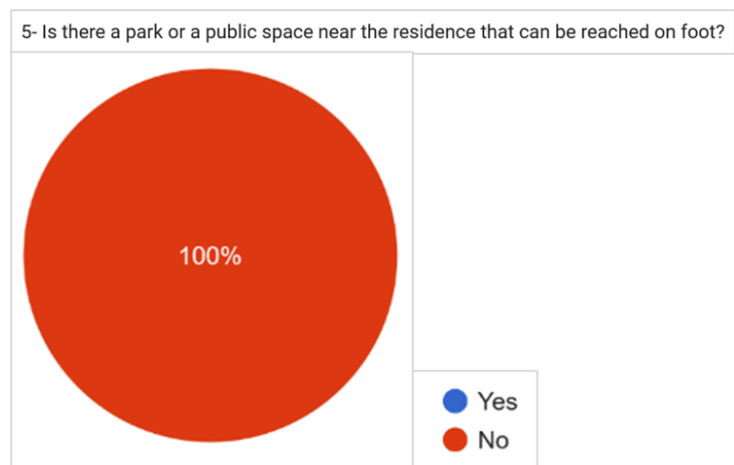


Figure 51. Qu5. Indicate that there was no park in the industrial area.

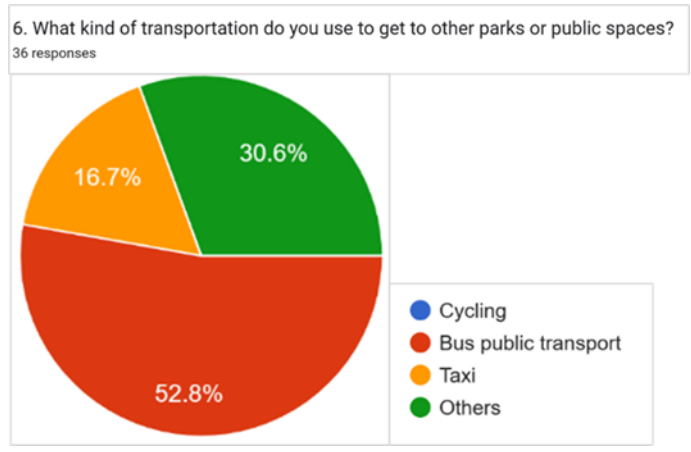


Figure 52. Qu6. 52% use buses, 30% use other means like company cars, and 16% use taxis, not Metro, walking, or cycling.

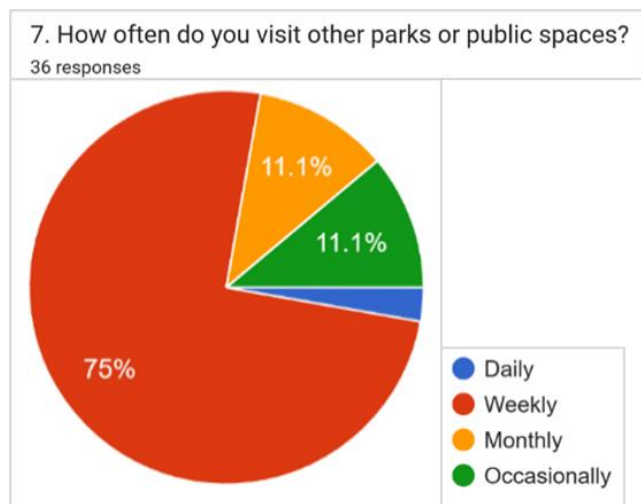


Figure 53. Qu7. Most park visitors go weekly by 70% because the parks are far from living areas.

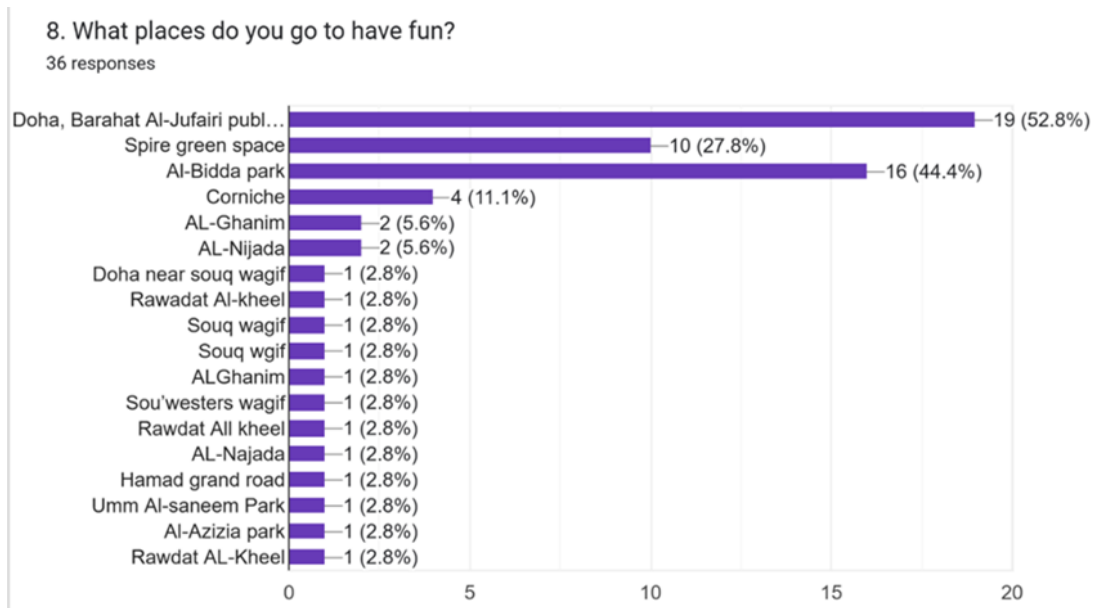


Figure 54. Qu8. The places of entertainment.

The 8th question answered that most of the places of entertainment frequented by People who reside in locations with low incomes are parks within the city of Doha due to their ease of access through the central bus station in the Al-Ghanim area and because the bus is less expensive than other means of transportation, as there is no metro line from the Industrial area. Also, the parks in Doha can be frequented by bachelors, such as Al-Ghanim Park, which was metaphorically named Al-Ghanim Park for Singles.

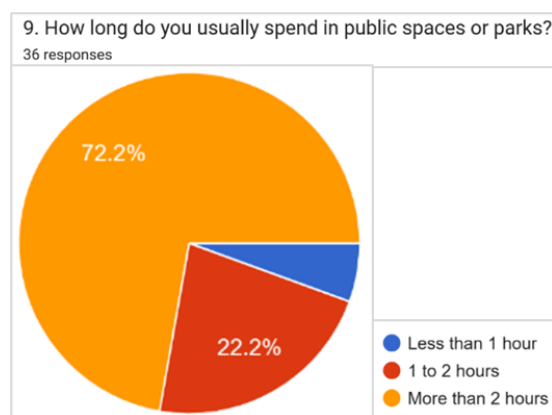


Figure 55. Qu9. It shows that 72% spend more than 2 hours, so they stay and eat.

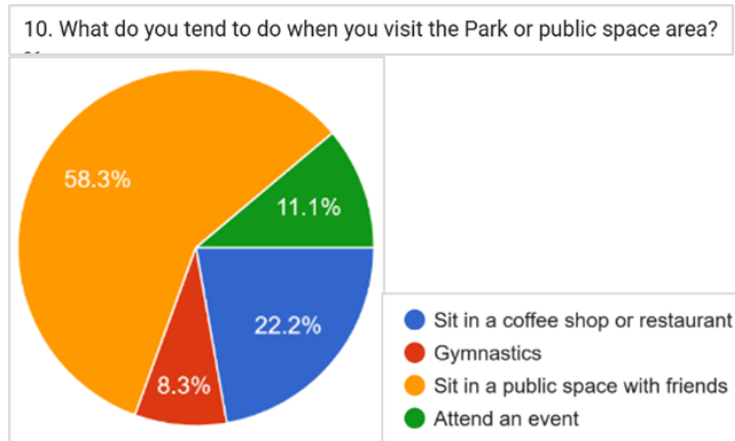


Figure 56. Qu10. Shows that most people join together with their friends.

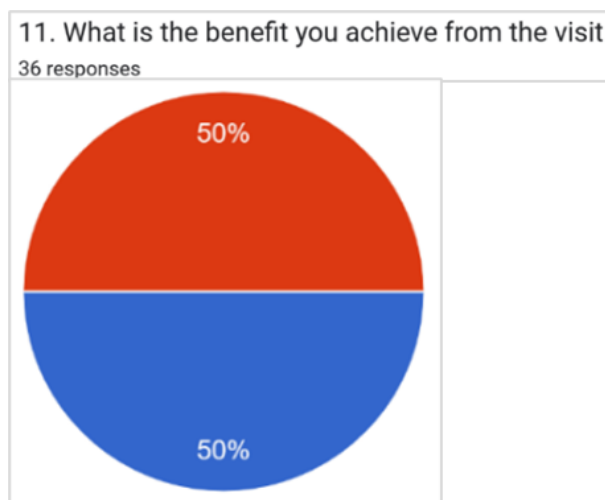


Figure 57. Qu11. Shows that equality of social relations and recreation helps their interactions.

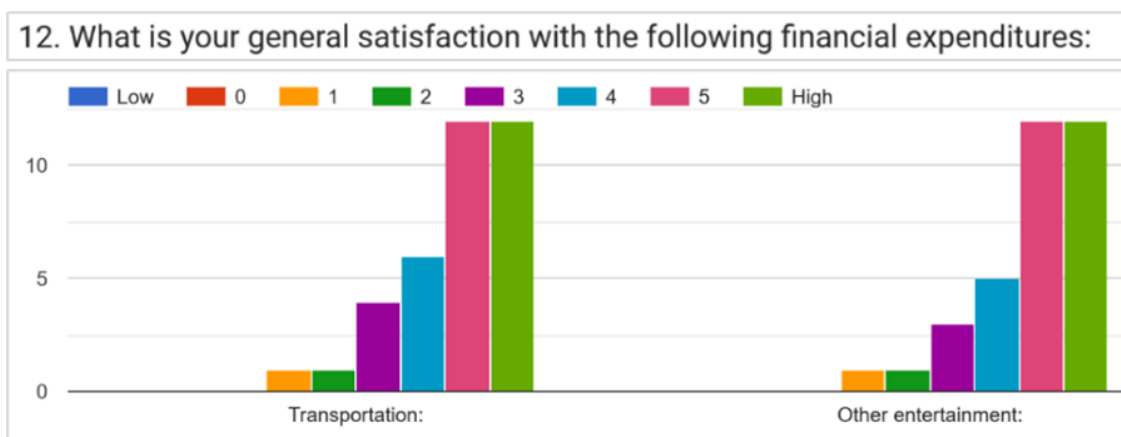


Figure 58. Qu12. Financial expenditures

. Most were worried about the financial expenditures because they were all low-income

workers, so transportation and other expenses were hard for them.

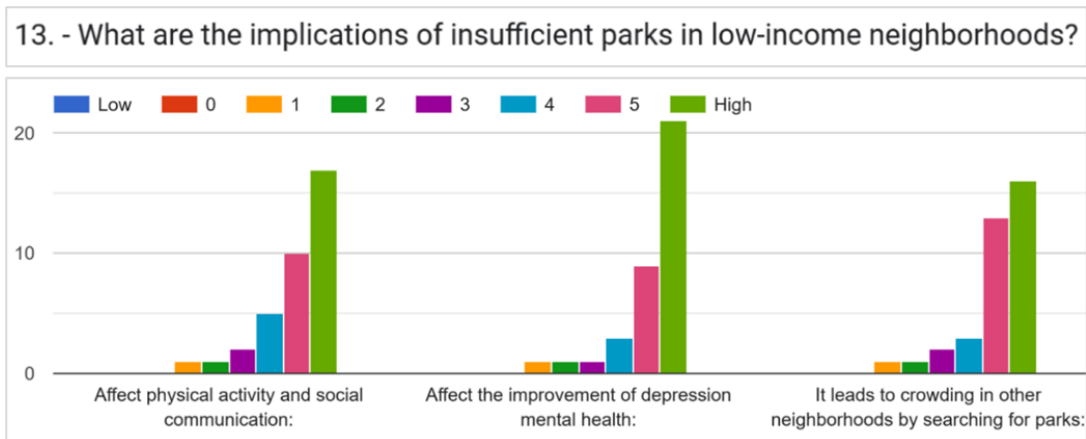


Figure 59. Qu13. The implication of insufficient parks in low-income neighborhoods.

The implication of insufficient parks in low-income neighborhoods. The bar chart shows the implication of insufficient parks in low-income neighborhoods: they highly affect the improvement of depression and mental health; they also affect physical activity and social communication; and they lead to crowding the neighborhood by searching for parks.

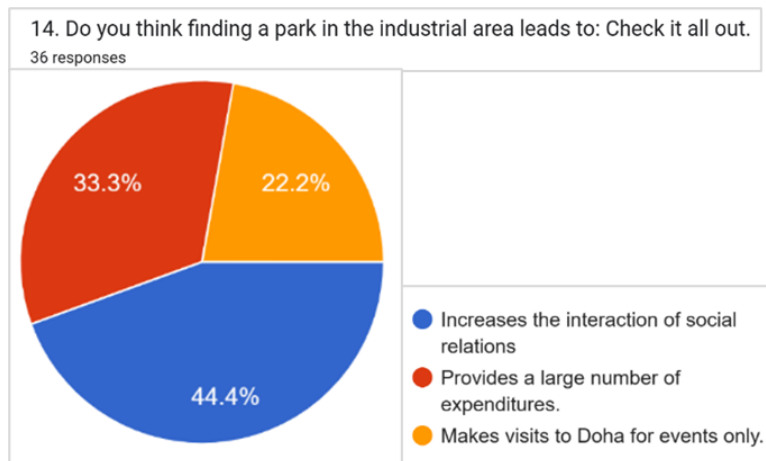


Figure 60. Qu14. Importance of parks in industrial areas.

This shows that if their park is in an industrial area, it is essential to increase the

interactions of social relations, provide a large amount of expenditure, and reduce the density of people in metropolitan areas.

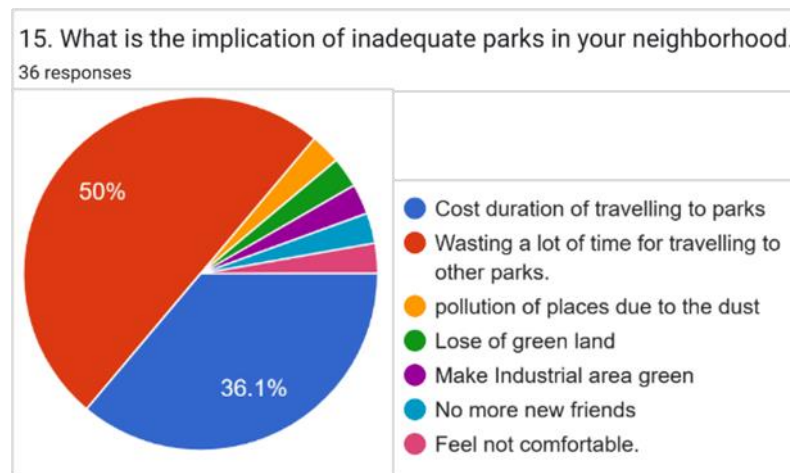


Figure 61. Qu15. The implications of inadequate parks in low-income neighborhoods

The implications of inadequate parks in low-income neighborhoods are as follows: first, wasting much time traveling to other parks; this is 50%; second, 36.1% of the cost duration of traveling to parks; and third, the effect of pollution of places due to the dust in industrial areas because of the loss of green areas.

4.6 Summarising the survey Questionnaires findings

Table 20. Summarize the findings of the questionnaire survey: source, Author 2024.

Question Number	Question	Findings
2	Age?	The majority (61.1%) of respondents belong to the age group of 18-35 years.
3	Gender?	All respondents in the low-income neighborhood in the industrial area are male (100%).
4	Nationality	The majority of respondents are Asian (58%), followed by Arab (19.4%) and African (16.7%).

Question Number	Question	Findings
5	What is your relationship to the industrial area?	61% of respondents both work and live in the industrial area.
6	Can a park or public park near the residence be reached on foot?	Every park is available in the industrial area.
7	How often do you visit other parks or public spaces?	52% use buses, 30% use other means like company cars, 16% use taxis, and none use Metro, walk, or cycle.
8	How do you use transportation to other parks or public spaces?	Most respondents (70%) visit parks weekly due to their distance from living areas.
9	What places do you go to have fun?	Respondents frequent parks within Doha city, especially Al-Ghanim Park, due to accessibility via the central bus station and lower transportation costs than other means.
10	How long do you usually spend in Barahat Al-Jufairi?	72% spend more than 2 hours, indicating prolonged stays for leisure activities, including dining.
11	What do you tend to do when you visit the Park or public space area?	The majority of respondents visit parks with friends.
12	What is the benefit you achieved from the visit?	Equal social relations and recreation benefits were highlighted.
13	What is your general satisfaction with the following financial expenditures: Transportation?	Most respondents expressed concern about financial expenditures due to their low-income status.
14	What are the implications of insufficient parks in low-income neighborhoods?	Insufficient parks negatively affect mental health, physical activity, and social communication, leading to neighborhood crowding.
15	Is finding a park in the industrial area possible?	The importance of parks in industrial regions to enhance social interactions, reduce congestion in metropolitan areas, and alleviate financial burdens was emphasized.
16	What is the implication of inadequate parks in your neighborhood?	Implications include wasted time traveling to other parks (50%), increased costs associated with travel (36.1%), and

Question Number	Question	Findings
		environmental pollution due to the loss of green areas in industrial zones.

The analytical questionnaire survey conducted to investigate the implications of inadequate parks in low-income neighborhoods, mainly focusing on the industrial area in Qatar, yielded insightful findings. The respondents, predominantly males of Asian descent, highlighted the absence of parks within their neighborhood, necessitating travel to parks in Doha City, primarily via buses, due to limited transportation options. Despite the challenges posed by financial constraints, respondents frequently visited parks for socialization and recreation, spending considerable time engaged in leisure activities.

The absence of parks within the industrial area significantly impacts mental health, physical activity, and social interactions, exacerbating congestion and environmental pollution. Consequently, there is a strong consensus among respondents regarding the importance of establishing parks within industrial areas to enhance social cohesion, alleviate financial burdens associated with travel, and mitigate environmental degradation. These findings underscore the urgent need for policymakers to prioritize the development of parks in low-income neighborhoods to foster community well-being and mitigate the adverse effects of urbanization.

4.7 Summary

In this fourth chapter, a comprehensive analysis of the industrial area in Qatar was conducted, and the multiple dimensions that shaped the quality of life and general well-being of its residents were studied. First, I provided an overview of the current

status of the industrial area, including its spatial arrangement, land use patterns, and demographic composition. Then, explore the socio-economic profile of the area's residents, delving into factors such as income levels and housing conditions. This is followed by a critical assessment of the infrastructure and facilities available within the industrial area, highlighting access to essential services such as transport, healthcare, and leisure facilities.

Furthermore, the prevailing policy frameworks and governance structures governing the industrial park were examined to identify regulatory gaps and potential avenues for improvement. In addition, the distance between the industrial area parks and other public places will be analyzed, and the accessibility of green areas for residents and workers will be evaluated. Using the methodology outlined in the 2013 Medellin Land Use Plan, Qatar's green space per capita was calculated, providing quantitative insights into the availability of green areas relative to population. Through an observational study conducted in specific areas within the industrial area, such as Al-Attiyah Market and Street No. 13, we obtained direct insights into the use of green spaces and their impact on community well-being. Finally, by analyzing data collected from observations and questionnaires, we deepen our understanding of the relationship between green spaces, quality of life, and socio-economic factors within the industrial area.

This comprehensive analysis lays the foundation for informed policy interventions and urban planning initiatives to enhance the overall well-being of the industrial area's residents and workers.

In the next chapter, Chapter Five, the discussion will take place.

CHAPTER 5: DISCUSSION

5.1 Understanding Park Access in Doha's Industrial Zone

The thesis focuses on the Doha Industrial Area as a case study to evaluate how the lack of parks impacts low-income populations. The Doha Industrial Zone is regarded as a hub for local industries because of the enormous number of manufacturers there in food, construction, and industries, making it a hub for employment and housing for workers and employees. Additionally, due to Doha's rapid growth as Qatar's capital, there was a notable rise in population, particularly during the World Cup, which attracted many workers. They are stationed in several parks and open areas in Doha, the capital of Qatar, particularly on Thursdays and Fridays, which was a cause to study there, according to the international standard of the United Nations Recreation Program, which stipulated that the area should not be less than 15 square meters for capita. This study relied on previous studies, which showed a discrepancy between the number of gardens and the population and that there needs to be more green space per person.

The area was found to have existed in the 1960s and measured at most 10 square meters based on observations and analysis of Qatar's parks and green areas. The amount of green space and parks increased until 2022, when it reached the number of (143) parks by 164%. The green area increased until it doubled from what it was, and the per-person share reached (16.2) square meters. However, by 2023 and until May, the population significantly increased while the per-person share decreased until it reached (14.6) square meters. This proportion is often more significant in Qatar because the country is thought to have the world's most excellent single-family housing density. However, our survey research on the locations of the parks and their separation from the industrial area revealed that most of these parks are centered around the industrial

sector and are located 4.1 kilometers from the core of Doha.

The closest park is 4.1 km away. Given Qatar's climate, this distance is deemed to be outside of the range of a person's ability to walk, which is assessed to be 300 meters. Workers look for another park since, despite everything, Umm Alsenaim Park is intended for families. It was discovered through a questionnaire study that the absence of parks impacted the physical appearance of the employees who reside in low-income areas. Moreover, it is due to the time and expensive material expenses of getting to nearby parks because the closest park must be reached by bus. To avoid the effects of the lack of parks, which significantly affects production efficiency, the psychological state of workers, a lack of social and recreational interaction, air pollution, and high temperatures., this necessitates the difficulty of reaching bus stations, which requires more walking, and for the proportion of green spaces to be fair, the population of areas with accurately low income.

5.2 Challenges of Fewer Parks for Low-Income Areas

Due to its population density and limited income, the industrial area is classified as one of Qatar's low-income neighborhoods. Insufficient Access to Parks and Other Green Areas Impacts the community's social, economic, and general well-being in different ways. This discussion addresses the implications of this shortcoming, considering the unique context of Qatar's industrial zone.

Health Inequalities and Living Standards Poor parks are frequently associated with higher obesity rates and physical inactivity, as residents lack safe and accessible spaces for recreational activities. This lack of physical activity can exacerbate health disparities among low-income populations. Furthermore, limited exposure to green spaces can lead to increased stress levels and issues with mental health, ultimately

reducing the general standard of living among residents.

The shortage constitutes what we reviewed in previous studies in terms of social justice theory, which casts a shadow over Urban planning and environmental justice, as well as the uneven distribution of parks and green areas reflect issues related to social justice and low-income neighborhoods in industrial areas often face neglect in terms of developing social infrastructure. Before the 2022 World Cup, street infrastructure was developed in Qatar, and some corridors, supermarkets, and malls were created, but the most essential form was the provision of parks. This perpetuates environmental injustice, as marginalized communities bear the brunt of industrial pollution in the absence of adequate compensatory green infrastructure. Social cohesion and community development

Parks serve as lively social centers where community members gather, interact, and participate in various activities. In its absence, social cohesion may weaken within the industrial zone for expatriate workers, who use the industrial zone as a place of work and residence, and this hinders opportunities for building a positive society. This may perpetuate social isolation and reinforce existing social and economic disparities, as residents may lack access to available networks and resources.

There are also economic impacts. Inappropriate gardens can also have financial repercussions on society by searching for gardens in remote places, as is happening now by going to Doha, where economic impacts result for workers and negative implications for society.

Addressing the effects of inadequate parks in low-income neighborhoods requires a multifaceted approach that includes policy interventions and community advocacy. Local authorities and urban planners must ensure that parks are adequately accessible to marginalized people and prioritize the equitable distribution of green

spaces. This requires collaborative efforts between municipal councils, community organizations, and residents to advocate for comprehensive urban planning policies.

Improving access to parks is also aligned with several Sustainable Development Goals, including SDG (living on land), SDG (sustainable cities and communities), and SDG (excellent health and well-being). By promoting exercise, social cohesion, and environmental sustainability, park investment contributes to broader sustainable development efforts and reduces inequality.

In conclusion, the implications of inadequate parks in low-income neighborhoods within industrial areas such as Qatar are far-reaching, affecting health, social cohesion, environmental justice, and economic development. Addressing these impacts requires concerted efforts from policymakers, urban planners, and community stakeholders to prioritize equitable access to green spaces and promote inclusive urban development strategies. By recognizing the importance of parks as essential components of vibrant, healthy communities, we can work to create more equitable and sustainable urban environments for all residents.

Answers to the research inquiries: Research Question 1

What impact does the lack of parks and other green areas have on the everyday motivation and quality of life of people living in low-income neighborhoods in Qatar's Industrial Area?

The lack of green areas and parks in low-income neighborhoods within the Qatar Industrial Area significantly affects residents' daily lives and work motivations. Without accessible recreational areas, residents lack physical activity, relaxation, and social interaction opportunities. This absence contributes to sedentary lifestyles, leading to health problems such as obesity, stress, and decreased overall health. Moreover, the lack of green spaces deprives residents of natural environments that can

enhance mood and cognitive function, which violates place attachment theory and ultimately affects their productivity and motivation to work. In addition, parks often serve as community centers where residents gather and participate in social activities, promoting a sense of belonging and community cohesion. Therefore, the absence of parks and green spaces not only affects individual's physical health but also undermines their social connections and overall satisfaction with their living environment, subsequently affecting their personal and professional motivation.

Research Question 2

2. Is there a relationship between the low incomes and inadequate parks in the Qatar Industrial Area?

Indeed, a correlation can be observed between low incomes and insufficient parks within the Qatar Industrial Area. The economic constraints faced by individuals residing in areas characterized by low incomes often impede their ability to advocate for or financially support the development and maintenance of recreational spaces. Consequently, municipal authorities may allocate fewer resources to creating and upkeep parks within such locales, exacerbating the need for green areas.

Furthermore, the socio-economic disparities inherent in low-income communities can perpetuate a cycle in which the lack of accessible parks and recreational amenities restricts opportunities for physical activity, social interaction, and community engagement. This absence detracts from residents' overall quality of life and contributes to broader public health concerns, such as sedentary lifestyles and health disparities.

Thus, the correlation between low incomes and inadequate parks in the Qatar Industrial Area underscores the intersecting challenges of socio-economic inequality and urban planning priorities, warranting concerted efforts to address economic

disparities and the equitable distribution of public amenities.

Research Question 3

How does the scarcity of green spaces affect social behavior among residents in low-income neighborhoods within industrial settings?

The scarcity of green spaces profoundly affects social behavior among residents in low-income neighborhoods within industrial settings. Green spaces facilitate social interactions, community engagement, and collective activities.

In their absence, residents may experience heightened social isolation and reduced opportunities for socialization and bonding. This scarcity can lead to declining community cohesion, as individuals need more common gathering spaces to connect with their neighbors and participate in shared recreational activities. Moreover, the lack of green spaces may exacerbate existing social inequalities, as affluent neighborhoods tend to have better access to such amenities, further marginalizing low-income communities. Additionally, without adequate green spaces, residents may resort to alternative, often less suitable areas for socializing, potentially increasing tensions or conflicts within the community. The scarcity of green spaces in low-income industrial neighborhoods hinders social interactions and community cohesion, perpetuates socio-economic disparities, and undermines the residents' overall well-being.

This table Figure (23) concisely overviews the multifaceted implications of inadequate parks in low-income areas, emphasizing the importance of addressing these issues through comprehensive policy interventions and community advocacy.

Table 21. Provides a concise overview of the multifaceted implications of inadequate parks in low-income areas: source, (Author 2024)

Focus areas	Description	Implication
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Economic	The cost of traveling to faraway accessible parks	Low-income communities need help to afford to travel by taxi. Economic impacts on workers and negative implications for society
Social	Enable an environment for social interaction.	Reduces have the opportunity to interact when settlers are away from families
Time	Travelling time to faraway accessible parks	Reduce quality of life
Health Disparities	Lack of safe and accessible recreational spaces	Increased stress levels and mental health problems
Environmental Justice	Unequal distribution of parks	reflects issues related to social justice and issues related to social justice
Negative behavior	Workers use alternative places for gardens, such as nodes and intersections in front of buildings and streets.	The emergence of street vendors, unlicensed taxis, and failure to respect the privacy of families
Sustainable Development	Lack of park	Impact on the Sustainable Development Goal (Life on Earth)

5.3 Proposed Solutions: Long-Term Sustainability Planning

Among the recommendations of the study, as in the case of the industrial zone, there must be a shift in the land's intended use to make parks. One illustration of this is that there (a technical inspection of cars) with an area of 46,522 sq Meters in Mesaimmer. In contrast, the area of technical inspection in Mesaimmer is equal to 4,646 Sq Meters (the area was measured through the Qatar Information website Geographical area), which is ten times the area required for technical inspection, as only 10% of the total area is used for technical inspection. It is a strategic location for the industrial area, Souq Al-Attiya area, which is the oldest market in the industrial area. It is a transportation center for the various cities of Doha, and many workers gather there, especially on Thursdays and Fridays. These workers sit in

nodes, intersections, and dividing spaces on the ground and sidewalks. An empty area is also between the industrial zone and the Metairie neighborhood.

It is changing the purpose of land use to create parks by using the sizeable technical inspection land as a park due to its strategic location as an engineering point in the middle of the industrial area and its proximity to markets and transportation. An important area, such as a park in the heart of the industrial area, provides a strategic solution to mitigate the effects of insufficient parks in low-income neighborhoods. This discussion explores this initiative's potential benefits and impacts in the context of Qatar's industrial zones.

Improved access and use:

By converting the technical examination ground into a park, residents of low-income neighborhoods gain better access to green spaces for recreation and leisure activities. The park's strategic location, centrally located within the industrial area and close to markets and transportation hubs, ensures easy access for residents, encouraging greater use of space.

Promoting health and well-being

Establishing a park in the middle of an industrial area enhances public health and well-being among residents. Access to green spaces eases physical exercise, social interaction, and relaxation opportunities, thus addressing health disparities associated with inadequate recreational facilities. Moreover, green spaces and open spaces can mitigate the harmful effects of industrial pollution on respiratory health, providing a respite for residents.

5.4 Summary

This chapter, Understanding Park Access in Doha's Industrial Zone, challenges of Fewer Parks for Low-Income Areas, and Proposed Solutions: Long-Term

Sustainability Planning, focuses on the crucial issue of park access within Doha's Industrial Zone. We examine the challenges low-income areas face and propose solutions for long-term sustainability planning. We highlight the significant implications of this discussion for urban development and social equity.

The chapter begins by addressing the challenges arising from the limited availability of parks in low-income areas of Doha's Industrial Zone. These challenges include accessibility, equity, and the negative impact on the quality of life for residents and workers. We explore how the scarcity of green spaces exacerbates existing socioeconomic disparities and affects the community's overall well-being.

Moving forward, we present a comprehensive set of proposed solutions to address park access issues in Doha's Industrial Zone through long-term sustainability planning. These solutions aim to enhance park accessibility, improve green infrastructure, and foster community engagement. Key recommendations include establishing new parks and green spaces, revitalizing existing facilities, and adopting inclusive urban planning policies. We emphasize the importance of collaborative efforts among government agencies, urban planners, community stakeholders, and non-profit organizations to ensure the effective implementation of these solutions.

Overall, this discussion underscores the importance of recognizing park access as a fundamental aspect of urban development and social equity. By identifying challenges and proposing sustainable solutions, we strive to create healthier, more livable environments for all of Doha's Industrial Zone residents, particularly those in low-income areas.

CHAPTER 6: CONCLUSION

6.1 Summary of Findings

The implications of inadequate parks in low-income neighborhoods within Qatar's industrial areas are profound and multifaceted. Insufficient access to green spaces exacerbates existing social and economic disparities and poses significant challenges to residents' health, well-being, and overall quality of life. Addressing these challenges requires concerted efforts from policymakers, urban planners, community organizations, and residents alike.

The need for open and green areas has become one of the problems facing residents of large cities with a decrease in the proportion of allocated spaces, especially in low-income neighborhoods and older neighborhoods, which reduces the functional efficiency of open and green spaces. Regions. This leads to searching for places and parks to enjoy the city's atmosphere, and from here comes the necessity of creating large green gathering spaces that connect the various sectors of the town and are distributed in a balanced manner that helps improve the environment. Human, social, and health environment. After evaluating previous studies, questionnaires, and case studies through observation, the following results were compared with those of the current study. The survey titled *Accessibility to a Change in the Intended Use of the Property to Create Parks*. For example, consider that there is a Times similar to its counterpart in the United States.

The global garden standard, but a case study showed a lower percentage. The study should have addressed the need for a park in the industrial area and the difficulty of residents reaching nearby parks due to the need for a metro line. Despite the significant expansion in the number of gardens and cultivated areas, the percentage is

still less than the global standard for per capita gardens at once, which is a significant improvement. Where Doha Municipality established Rawdat Al Khail Park. The area of this park is 140,000 square meters, but it is 13.1 kilometers away from (a limited-income industrial area). The trip takes an estimated 164 minutes on foot, 56 minutes by bus, and 20 minutes to get there by taxi, which places a financial burden on the workers and the municipality of Al-Rayyan, which is adjacent to the industrial area neighborhood.

Access is only 300 meters away. Simmond and Medellin 2013) compared with a study of micro-area landscape design, explaining the effect of landscape variables on pedestrian health, as well as the importance of green spaces in terms of psychological comfort and social interaction between workers, as well as eliminating pollution and dust in the case of green spaces, as a result, due to similarity of observations between landscape components, land use, and neighborhood satisfaction. The current study is also concerned with pedestrian health, transportation, and driver safety: green areas, their proportions, spaces compared to planning and design standards, globalization, and its impact on social life.

The study "The Implications of Inadequate Parks in Low-Income Neighborhoods - Qatar, Industrial Area" aligns with the Qatar National Master Plan and the Qatar National Development Framework 2032 by emphasizing sustainable urban development, public health, environmental sustainability, inclusive urban planning, and social equity. It highlights disparities in park access, advocating for equitable distribution of green spaces to improve residents' quality of life and health, aligning with the national goals of balanced growth and community engagement. The study's focus on community needs and participatory planning supports the framework's objectives of fostering social cohesion and involving residents in decision-making. By

providing data-driven insights and recommendations, the study informs policy-making and urban planning, ensuring efficient resource allocation and development of green infrastructure and contributing to environmental sustainability and climate adaptation efforts. Thus, it is a crucial tool for urban planners and policymakers to enhance park accessibility and overall quality of life in underserved areas, directly supporting the QNMP and QNDF 2032 goals. It is aligned with the United Nations Sustainable Development Goals, such as good health and well-being), sustainable cities and communities, and reducing inequality. Addressing this issue is crucial to promoting social justice, improving urban living conditions, and enhancing overall community well-being.

6.2 Recommendations for Policy and Practice

The recommendations offer comprehensive strategies to address the challenges associated with inadequate parks and green spaces in low-income neighborhoods within industrial areas. Prioritizing the equitable dispersion of green areas and parks and expanding the per capita share of these areas ensures accessibility and inclusivity for all residents. Additionally, enhancing the efficiency of green spaces through landscape architecture elements tailored to different age groups can maximize their benefits. Creating green areas with interactive and social atmospheres and facilitating pedestrian and bicycle traffic modes promotes community engagement and healthy living. Moreover, involving residents in participatory planning fosters a sense of ownership and ensures that parks meet their needs and preferences. Integrating health promotion initiatives into park design further encourages physical activity and mental well-being among residents. These recommendations emphasize the importance of collaborative efforts between local authorities, community organizations, and residents to create

vibrant public spaces that promote social cohesion, physical activity, and general quality of life.

This study identifies the minimum national scale necessary for emergency preparedness and adequate visibility. It aims to support minimal growth and provide sufficient space for various types of development, including residential, employment, entertainment, retail, and other projects. A comprehensive master plan for development must be meticulously organized to accommodate these diverse development types.

The study proposes light metering and limitations for minor uses, requiring thorough evaluation, potentially within a comprehensive analysis of the city of Doha. This would include an implementation strategy for regulations affecting developers and stakeholders. According to the Development Guidelines (2016), the national park serves over 2 million people, the capital/municipal park (100,000-300,000 people) requires 60-200 hectares, the city park (50,000-100,000 people) needs 5-15 hectares, the district park (30,000-50,000 people) requires 2-5 hectares, the local park (serving 3,000 people within a 400-meter radius) requires 0.4-2 hectares, and the neighborhood park (serving 1,200 people within a 250-meter radius) requires 0.1-0.25 hectare(Open et al. Facilities, 2016 Development Guidelines)

In Qatar, the reference walking distances are 400 meters for local parks and 250 meters for neighborhood parks. A 400-meter distance is considered a convenient five-minute walk, while a 250-meter distance is suitable for a dry climate. The proposal includes designing and creating several parks within a 400-meter walking distance, adhering to Qatar's building standards, with a distance of 200 meters for research parks serving 3,000 people and requiring 0.4-2 hectares. An equitable distribution approach should be applied, dividing the total industrial park areas by the standard area to determine the necessary number of parks. (Open Space, Recreation and Sport

Facilities, 2016 Development Guidelines)

Table 22. Summarize the Recommendations for Policy and Practice: source, (Author 2024)

NO	Focus	Policy	Time frame-Long/short-time
1	Equitable distribution of parks by increasing the number of parks	Provide access to the majority of the population cat. Prioritize fair allocation of parks and green spaces in low-income industrial neighborhoods. Allocate resources to develop new parks or enhance existing ones to ensure accessibility for all residents. Gregory.	Long-time
2	Increasing per capita share of green spaces	Increase the availability of green spaces and open areas to support community well-being and accommodate the expanding population, especially in low-income neighborhoods.	Short time
3	Enhancing the efficiency of green spaces through landscape design	Utilize landscape architecture elements to Adapt green areas to the requirements of various age groups to maximize resident benefits and usefulness.s.	Long time
	Creating interactive and social atmosphere in green areas	Design green spaces to foster social interaction and community engagement, particularly in areas with diverse populations.	Short time
4	Activating pedestrian and bicycle traffic modes	Encourage alternative modes of transportation, such as walking and cycling, to improve access to parks and reduce reliance on motorized vehicles.	Short time
5	Facilitating services for park visitors	Provide amenities such as restaurants and facilities catering to the needs of park visitors, enhancing their experience and encouraging frequent use of green spaces.	Long time
6	Increasing physical space and activities in green areas	Expand green spaces and provide amenities such as shading areas and recreational facilities to make parks attractive for residents throughout the day and year.	Sort time
7	Consideration of quality of green spaces for	Recognize the impact of the quality of green spaces on the well-being of marginalized communities and prioritize improvements in these areas.	Long time

NO	Focus	Policy	Time frame- Long/short- time
	disadvantaged residents		
8	Integration of health promotion initiatives into park design	Incorporate health promotion initiatives into park design and programming, providing amenities such as walking trails, fitness equipment, and community gardens to encourage physical activity and mental well-being among residents.	Long time
9	Accessibility and inclusion in park design	Ensure that parks are accessible and inclusive for all residents, including those with disabilities and special needs, by incorporating wheelchair ramps, sensory gardens, and play areas.	Long time
10	Community participation in park planning	Involve residents in participatory planning processes to identify their needs and preferences regarding parks and recreational facilities. Strengthen partnerships between local authorities, community organizations, and residents to co-create and maintain vibrant public spaces.	Long time

6.3 Future Research Directions

This research delves into the effects of insufficient park space in communities of color in Qatar's industrial areas. Its findings underscore the significance of equitable access to green areas in reducing social, economic, and health disparities. A joint effort among policymakers, urban planners, community organizations, and residents is necessary to overcome the challenges posed by the lack of parks. Nonetheless, further studies are essential to effectively address these issues, including exploring various aspects of park accessibility, usage patterns, and the socio-economic impact of park development in low-income industrial neighborhoods.

One key area that requires further exploration involves comprehensively evaluating park accessibility in low-income industrial neighborhoods. Such an assessment should consider factors such as the distance from residential areas, available

transportation options, and the financial burden on residents to access parks. By identifying the barriers to park access, policymakers, and urban planners can devise targeted strategies that enhance inclusivity and accessibility for all residents, irrespective of their socio-economic status.

Effective Park design should cater to the diverse needs of different age groups within industrial neighborhoods. Playgrounds, fitness equipment, and shaded areas can make parks more attractive and accessible to residents, promoting physical activity and social interaction. Investigating the social dynamics within green areas, particularly in diverse industrial neighborhoods, is essential. Understanding how parks facilitate social interaction and community cohesion among residents from different cultural backgrounds can inform inclusive park design and programming.

Parks can contribute to communities' well-being and resilience in low-income industrial areas by fostering a sense of belonging and social connectedness. By analyzing the economic impact of improving park accessibility, policymakers can make informed decisions regarding resource allocation and prioritization of park projects in low-income neighborhoods. Factors such as reduced healthcare costs, increased property values, and potential job creation associated with park investments can provide valuable insights into the cost-effectiveness of park development initiatives.

Examining the correlation between active transportation modes and park usage is imperative in promoting sustainable mobility and improving park accessibility. To enhance residents' overall well-being, research should investigate how encouraging walking and cycling can facilitate access to green spaces. Cities can stimulate active transportation modes and promote accessibility to parks in low-income industrial neighborhoods by investing in pedestrian pathways and bike lanes.

In diverse industrial neighborhoods, the significance of cultural relevance in

park design and programming cannot be emphasized enough. Research should explore residents' cultural backgrounds, park amenities, and activity preferences. By incorporating culturally relevant elements and programming, parks can become inclusive spaces catering to all community members' needs and interests, thus promoting social cohesion and cultural exchange.

Evaluating the quality of existing green spaces and their impact on resident well-being is critical in guiding park development efforts. Research should analyze factors such as park maintenance, cleanliness, and safety and residents' perceptions of park quality. By identifying areas for improvement, policymakers, and urban planners can prioritize investments to enhance the overall quality of green spaces and maximize their positive impact on resident well-being.

Research on participatory park planning processes can provide valuable insights into engaging residents from low-income neighborhoods in decision-making processes. By involving community members in park design and programming decisions, cities can ensure that Parks represent the requirements and preferences of the people they serve. Moreover, fostering partnerships between local authorities, community organizations, and residents can lead to co-created and vibrant public spaces that enhance community well-being.

Incorporating health promotion initiatives into park design and programming is crucial for promoting physical activity, social interaction, and mental well-being among residents. Research should be conducted to evaluate the effectiveness of initiatives like walking trails, fitness equipment, and community gardens. By prioritizing health-promoting features in park design, cities can create environments that support residents' well-being and prevent chronic diseases.

Furthermore, research should focus on designing parks that are accessible and inclusive for all residents, including those with disabilities and special needs. By incorporating features such as wheelchair ramps, sensory gardens, and inclusive play areas, parks can accommodate diverse users and promote social equity and a sense of belonging.

In conclusion, addressing the challenges of inadequate parks in low-income industrial neighborhoods is essential. Future research endeavors should explore various aspects of park accessibility, utilization patterns, and socio-economic impacts to inform policy decisions and urban planning efforts. Ultimately, prioritizing park development and enhancing the quality of green spaces can improve residents' overall well-being and quality of life, promoting lively and inclusive communities.

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APPENDIX

Umm Al-Seneem Park: Summary of the Journey from Google Map

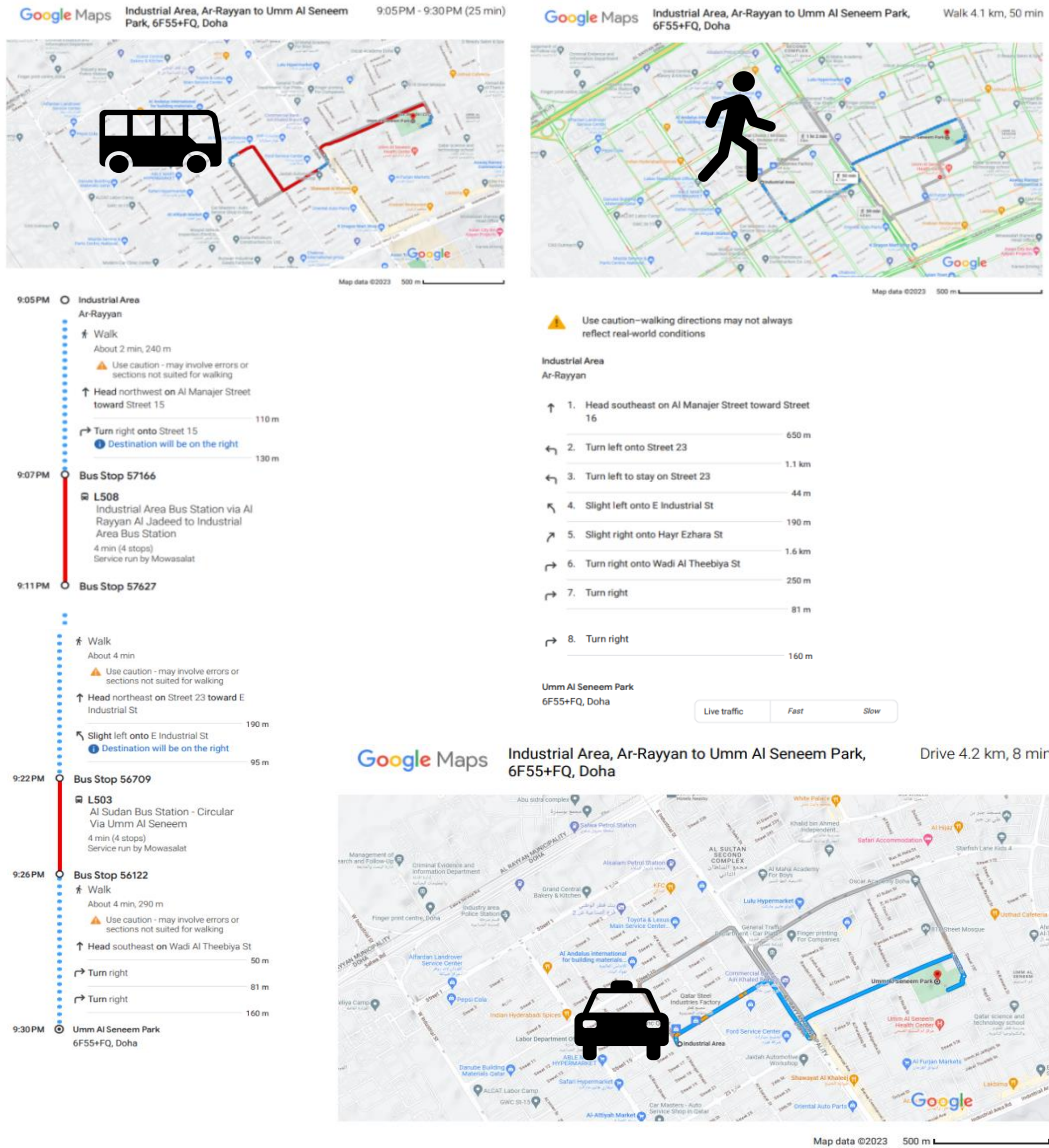


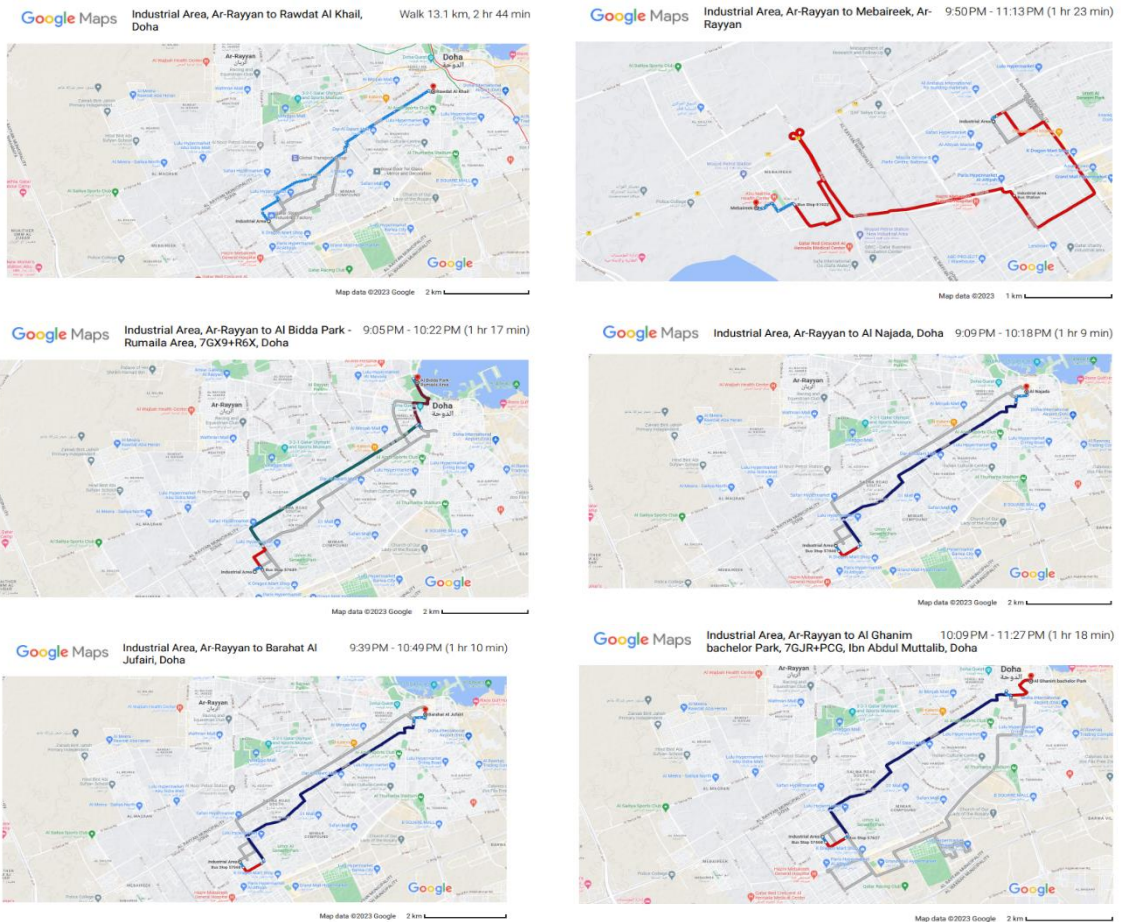
Figure: Maps show the trip duration from Al-Attiya Market (the industrial area to Umm Al-Seneem Park), time by bus, taxi, and walk to reach the parks (source: Google map edit by The Author, 2023).

Aspire Park: Summary of the Journey from Google Map

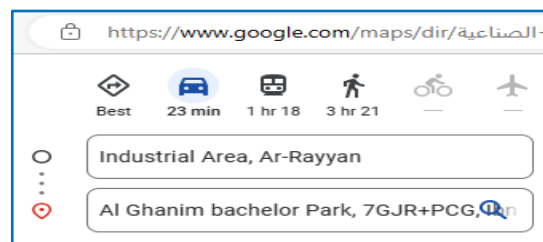


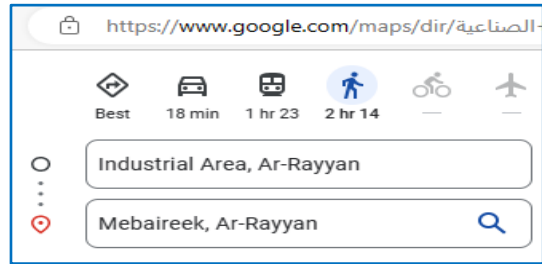
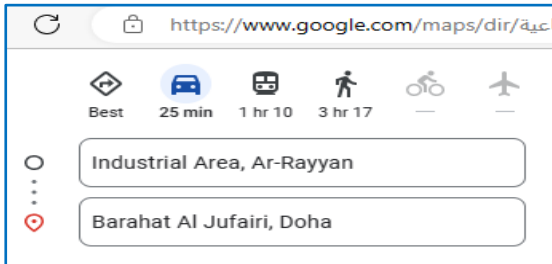
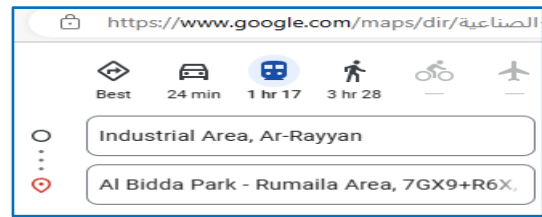
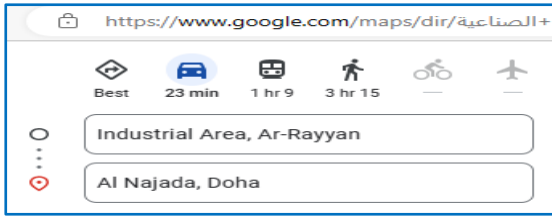
Figure: Maps show the trip summary from Al-Attiya Market (Aspire Park), the time by bus, taxi, and walking to the parks (Source: Google map edit by The Author 2023).

Summary of the Journey from the Industrial Area to Other Parks and Open Spaces traveling by (Bus). from Google Maps:



A summary of the journey from the industrial area to other parks and open spaces, showing how long it takes to get there by bus, taxi, or walking as shown by Google Maps.:





Questionnaire- Survey Form

Qatar University - College of Engineering -Architecture and Urban Planning Department Questionnaire

Hello, I am Hassan Mohamed, a postgraduate researcher in urban planning and design. I am conducting a study on (The Implication of inadequate parks in low-income neighborhoods: the case of the Industrial Area- Qatar), from your experiences during your stay, work, or visit Industrial Area, I hope you complete the questionnaire, which takes not more than a few minutes. Your responses to this assessment are

This questionnaire is divided into two sections:

- Personal information.
- A reflection of the users' experience.

Questionnaire Part 1:

About You

This page requires you to fill out some of your personal information

Part 2: Your Experience in Barahat Al-Jufairi

This page allows you to incorporate your personal experience into the questionnaire

- 1. Your Age ***
Mark only one oval.
 18 -35 years
 36 - 55 years
 56 - and more
- 2. Your Gender ***
Mark only one oval.
 Male
 Female
- 3. Nationality ***
Mark only one oval.
 Arab
 Western
 Asian
 African
- 4. What is your relationship to the industrial area? ***
Mark only one oval.
 Working
 Living
 Visiting
 Working and living
- 5- Is there a park or a public space near the residence that can be reached on foot? ***
Mark only one oval.
 Yes
 No
- 6. What kind of transportation do you use to get to other parks or public spaces? ***
Mark only one oval.
 Cycling
 Bus public transport
 Taxi
 Others
- 7. How often do you visit other parks or public spaces? ***
Mark only one oval.
 Daily
 Weekly
 Monthly
 Occasionally
- 8. What places do you go to have fun? ***
Tick all that apply.
 Doha, Barahat Al-Jufairi public space.
 Spire green space
 Al-Bidda park
 Other: _____
- 9. How long do you usually spend in public spaces or parks? ***
Mark only one oval.
 Less than 1 hour
 1 to 2 hours
 More than 2 hours
- 10. What do you tend to do when you visit the Park or public space area? ***
Mark only one oval.
 Sit in a coffee shop or restaurant
 Gymnastics
 Sit in a public space with friends
 Attend an event
- 11. What is the benefit you achieve from the visit? ***
Mark only one oval.
 More social relations.
 Recreation.
 Not to visit again.
- 12. What is your general satisfaction with the following financial expenditures: ***
Tick all that apply.
Low 0 1 2 3 4 5 High
Transportation:
Other entertainment:
- 13. - What are the implications of insufficient parks in low-income neighborhoods? ***
Tick all that apply.
Low 0 1 2 3 4 5 High
Affect physical activity and social communication:
Affect the improvement of depression mental health:
It leads to crowding in other neighborhoods by searching for parks:
- 14. Do you think finding a park in the industrial area leads to: Check it all out. ***
Mark only one oval.
 Increases the interaction of social relations
 Provides a large number of expenditures.
 Makes visits to Doha for events only.
- 15. What is the implication of inadequate parks in your neighborhood. ***
Mark only one oval.
 Cost duration of travelling to parks
 Wasting a lot of time for travelling to other parks.
 Other: _____

STUDENT PUBLICATIONS

Samer M Osman, Hassan Abdelgadir Ahmed Mohamed, & Ahmad Mohamad Ahmad. (2024). Connectivity in the Old Al-Hitmi Neighborhood. *Kurdish Studies*, 12(2), 678–697. Retrieved from <https://kurdishstudies.net/menu-script/index.php/KS/article/view/1843>

Manuscript ID: sustainability-3027589

Type of manuscript: Article

Title: The Resilience of the Built Environment to Flooding: The Case of Alappuzha District in the South Indian State of Kerala

Authors: Afeef Abdurahman Choorapulakkal *, Muhammed Gbolahan Madandola, Amina Al-Kandari, Raffaello Furlan *, Goze Bayram, Hassan Abdelgadir Ahmed Mohamed

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Sustainable Urban and Rural Development.

https://www.mdpi.com/journal/sustainability/sections/urban_and_rural_development

Adaptive Cities: Urban Planning and Design Contribution for Achieving Climate Resilient