



**An-Najah National University**  
**Faculty of Graduate Studies**

**ASSESSMENT OF PUBLIC OPEN SPACE IN  
PALESTINIAN CITIES AS AN INDICATOR  
11.7.1 OF THE SDGs**

**By**

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## **Dedication**

To my dear parents, who taught me the meaning of giving without expecting anything in return.

To my beloved wife, my companion on this journey and partner in all moments.

To my little son, the smile that lights up my life and the hope that drives me toward the future.

I dedicate to you the fruit of my humble efforts, in gratitude for your kindness and in appreciation of your support.

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I am also sincerely grateful to my colleagues and the experts who kindly provided their insights, with special appreciation to Dr. Ahmed Jaber.

## **Declaration**

I, the undersigned, declare that I submitted the thesis entitled:

### **ASSESSMENT OF PUBLIC OPEN SPACE IN PALESTINIAN CITIES AS AN INDICATOR 11.7.1 OF THE SDGs**

I declare that the work provided in this thesis, unless otherwise referenced, is the researcher's own work, and has not been submitted elsewhere for any other degree or qualification.

**Student's Name:** Saed Abdel Kareem Kamel Saleh

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**Date:** 4/11/2025

## List of Contents

Dedication.....	III
Acknowledgements.....	IV
Declaration.....	V
List of Contents.....	VI
List of Tables.....	IX
List of Figures.....	X
List of Appendices.....	XI
Abstract.....	XII
Chapter One :Introduction.....	1
1.1 Background.....	1
1.2 Problem Statement.....	3
1.3 Importance of the Study.....	4
1.4 Study Objectives.....	4
1.5 Literature Review.....	5
1.5.1 Overview.....	5
1.5.2 Sustainable Development & Goals.....	5
1.5.3 Sustainable Cities and Communities.....	7
1.5.4 Urbanization.....	8
1.5.5 Open Public Spaces.....	11
1.5.6 Case Studies.....	13
1.5.7 Summary of Case Studies.....	17
1.6 Relevance of SDG Indicator 11.7.1 to Sustainable Urban Development.....	18
1.7 Thesis Structure.....	18
Chapter Two :Methodology and Building Evaluation Framework.....	20
2.1 Methodology of Building the Evaluation Framework.....	20

2.2 Data Collection .....	20
2.3 Processing .....	21
2.4 Identification of Study Area .....	22
2.4.1 Testing the Degree of Urbanization Method in Palestine.....	22
2.4.2 Study Area .....	24
Chapter Three : Data Collection and Analysis .....	25
3.1 Profile of the Urban Centers in Northern West Bank.....	25
3.2 Data and Methods .....	26
3.3 Spatial Analysis of Indictor 11.7.1 Calculations .....	27
3.3.1 Identify the UPS.....	27
3.3.3 Estimating the Value of Indictor 11.7.1 .....	34
3.4 Results.....	36
Chapter Four :Assessment of Urban Public Spaces Accessibility .....	38
4.1 Assessment Method .....	38
4.2 Experts Opinions.....	39
4.3 Classification of the Levels of UPS .....	42
4.4 Boundary of Assessment .....	42
4.5 Assessment Process .....	43
4.5.1 Distribution of UPS in Tulkarm Urban Area.....	44
4.5.2 Service Area of UPS in Tulkarm Urban Area .....	44
4.5.3 Accessibility Index Value.....	47
4.6 Results.....	47
Chapter Five: Conclusions and Recommendations .....	49
5.1 Conclusions.....	49
5.2 Recommendations.....	50
5.2.1 Recommendation for Public Spaces and Green Areas .....	51
5.2.2 Recommendation for Urban Street as Part of UPS.....	52

5.3 Recommendation for Future Research .....	52
List of Abbreviations .....	54
References.....	55
Appendices .....	60
الملخص.....	ب

## **List of Tables**

Table 1: Population density in the study area .....	26
Table 2: Urban Public Spaces (UPS) Indictors for Existing Situation .....	35
Table 3 :Urban Public Spaces (UPS) Indictors for Existing and Proposed Situation in Master Plans .....	36
Table 4 :Experts Opinion on Accessibility and Coverage Distances for Urban Public Spaces .....	41

## **List of Figures**

Figure 1: Proposed Methodology Of Building The Evaluation Framework .....	20
Figure 2: Degree Of Urbanization Grid Classification Map.....	23
Figure 3: Ups Distribution Map In Tulkarm Urban Area .....	28
Figure 4: Distribution Of Existing And Proposed Ups In Master Plan In Qalqilya Urban Area. ....	30
Figure 5: Existing Road Network In Jenin Urban Area.....	31
Figure 6: Total Roads (Planned And Non-Planned) In Nablus Urban Area .....	33
Figure 7: Percentage Change In Value Of Indicator 11.7.1 Between Current Situation And Proposed Situation In Master Plan .....	37
Figure 8: Blocks/ Neighborhoods Boundary Of Tulkarm Urban Area For Assessment	43
Figure 9: Distribution Of Ups In Tulkarm Urban Area .....	45
Figure 10: Service Areas Of Ups In Tulkarm Urban Area .....	46

## **List of Appendices**

Appendix A: Data Collection and Analysis Figures.....	60
Appendix B : Expert Evaluation Questionnaire .....	76

**ASSESSMENT OF PUBLIC OPEN SPACE IN PALESTINIAN CITIES AS AN  
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**Abstract**

Rapid urbanization in Palestine is one of the main reasons that led to a significant shortage of public spaces and open areas, which negatively affected the achievement of sustainable development, specifically Goal 11, which relates to resilient, safe and sustainable cities. Indicator 11.7.1 is a measure of the average per capita share of spaces allocated to streets and public areas within urban areas, and this indicator serves as a tool to measure and evaluate the progress made towards achieving the goal.

This study assesses the existing state of urban public spaces in four major cities in the northern West Bank, namely Nablus, Jenin, Tulkarm, and Qalqilya, taking into account rapid urban expansion and a severe shortage of open spaces. The methodology relied on geographic information systems (GIS) to identify urban areas using the United Nations framework for the degree of urbanization (DEGURBA), mapping public spaces and street networks, and conducting a structured expert survey to assess accessibility.

The results reveal a significant shortfall, with public spaces accounting for only 1% of the city's area and streets covering only 13.3%, both of which are well below international standards (15-20% for public spaces and 30-35% for streets). The values of indicator 11.7.1 ranged from 12.1% in Nablus to 25.2% in Qalqilya. An analysis of accessibility in Tulkarm showed that only 52% of the population has adequate access to public spaces, with significant disparities between neighborhoods.

The study concluded that effective planning interventions are needed, including implementing master plan proposes, redeveloping underutilized areas, and enhancing pedestrian infrastructure to promote the availability and accessibility of public spaces. The study also provides a methodological framework for applying indicator 11.7.1 in contexts with scarce data, offering guidance for sustainable urban planning.

**Keywords:** Urban Public Spaces (UPS), SDG Indicator 11.7.1, Accessibility, Geographic Information Systems (GIS), Urban Planning, Palestine, Master Plan.

# Chapter One

## Introduction

### 1.1 Background

The United Nations (UN) defined sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WECD, 1987). Conception of sustainable development includes three interrelated pillars: environmental, economic, and social sustainability.

One of the most important documents and main goals that were issued after 50 years of the Stockholm Conference on the Human Environment held in 1972, which focused on the UN Agenda for Sustainable Development for the year 2030, are the Sustainable Development Goals (SDGs) 2015 to 2030. The SDGs prioritize taking effective measures to address the current global challenges by achieving these goals. The SDGs include 17 goals linked to 169 targets measured by 232 specific indicators. These are designed to achieve an advanced level of sustainable economic growth, protect the natural environment, and foster a high level of social integration (UN, 2015).

One of the most important objectives that the Global Framework for Sustainable Development offers to countries is to support and assist in collecting statistical data by clarifying the mechanisms and methods of measurement and continuous monitoring of progress made on indicators. This enables more informed decision-making and targeted improvements, helping countries move closer to achieving the SDGs by 2030 (UN, 2015).

“Sustainable Cities and Communities” is SDG 11. It focuses on “ensuring inclusive, safe, resilient and sustainable urban and human settlements” by addressing issues related to cities and urban areas such as eliminating slums within urban areas, finding sustainable and effective solutions to transportation problems, especially public transportation, ensuring the right of everyone to access and use public spaces within the urban environment in a safe manner, and addressing problems resulting from high population density such as climate change and natural disasters. Therefore, a major change must be made in the way urban spaces are built and managed (Franco et al., 2020).

When creating sustainable smart cities that focus on SDG 11, 169 targets are to consider. Target 11.7 provides universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities (UN, 2015). It is essential to provide necessary and timely informed decision-making and accelerate progress.

Public spaces, including streets, squares, parks, and playgrounds, form a distinctive form for each city, adding character and urban form on which the city is based. There is no doubt that there are several forms of diverse public places within an urban area. This would include green parks, streets with sidewalks and walkways, public squares used for celebrations, cultural and commercial gatherings, and recreational playgrounds.

In this context, these public areas are essential for all segments of society, and providing these public spaces adequately is also an important factor in the effectiveness of urban areas (UN-Habitat, 2018).

Geographic Information Systems (GIS) are considered important and accurate technologies for monitoring and tracking geographical and spatial progress in measuring the extent to which SDGs have been achieved. This could be achieved by building technical models that specialize in linking several layers together and analyzing them at the quantitative and temporal levels, to follow up on the progress made in the standard indicators used in monitoring the SDGs, specifically SDG 11.

Geographic Information Systems (GIS) are also used to study and analyze the distribution of public spaces within urban areas and to measure and analyze information about the accessibility of public spaces. This is essential for monitoring and tracking urban public spaces, their distribution and accessibility, and for comparing areas and neighborhoods within the city and urban areas and cities with each other.

It also helps in identifying areas that need intervention, in addition to design and evaluating scenarios and solutions for improving public space accessibility. It can simulate the impact of adding, removing, or modifying public spaces or transportation facilities, optimize the location, size, and type of public spaces or transportation facilities to maximize accessibility.

This study addresses indicator 11.7.1 that focuses on the **”average share of the built-up area of cities that is open space for public use for all, by sex, age, and persons with disabilities”**.

Accessibility in indicator 11.7.1 is fundamentally and significantly linked, as the indicator itself measures the share of urban land allocated to open public spaces, while the link between accessibility in the indicator goes beyond simply calculating these spaces, as it examines the possibility of accessing these spaces safely and easily by all members of society.

## **1.2 Problem Statement**

Rapid urban expansion in recent years has led to an imbalance between supply and demand for public open spaces, with urban areas and populations growing significantly. This growth has decreased the availability of urban public spaces, which makes it important to measure and evaluate them using Sustainable Development Goal indicator 11.7.1 to assess the fairness of access to public spaces (Guo et al., 2019; Lan et al., 2022).

To support it, the United Nations, through the International Statistical Commission, has adopted a standardized methodology for defining the boundaries of urban, rural, and city areas, which allows for a consistent application of Sustainable Development Goal 11.7.1 and facilitates international comparisons (UN, 2021). The United Nations recognizes the importance of public spaces, such as streets and parks, in promoting urban productivity, social well-being, and public health (United Nations, 2015). Global data from 911 cities indicate that public spaces cover about 16% of urban areas, with streets accounting for nearly three times the area of open spaces. UN-Habitat has recommended that 45% to 50% of urban land be allocated to streets and open public spaces, with 30% to 35% for streets and 15% to 20% for open spaces (UN-Habitat, 2021).

However, open public spaces in Palestinian cities are scarce due to private land ownership and the lack of planning standards that prioritize public spaces, including inadequate consideration of street design standards and opportunities to integrate green areas into urban streets.

In this study, I would use aerial imagery and GIS data to improve and validate the assessment of SDG 11.7.1 in Palestinian urban areas, and compare the results with international standards. This will help show how much progress we've made toward achieving the Sustainable Development Goals and help improve indicators to get better results by 2030. The study will evaluate the accessibility and coverage of urban public spaces, including squares, parks, streets, sidewalks, and walkways.

### **1.3 Importance of the Study**

The functional characteristics of public spaces and green spaces are that they are important for several categories, including economic, environmental, aesthetic, and social-psychological. They affect the nature of social communication among residents and help reduce psychological stress, especially since there are several evidences that green spaces are linked to physical activity (James et al., 2015).

A well-designed network of streets and open public spaces is an effective part of improving movement within the city. It contributes significantly to improving the quality of life, reducing crime and violence rates, facilitating access to services and opportunities in a fair manner, especially for the most marginalized groups. Furthermore, it helps to make room for the movement of economic activities in the city. This network of streets and public spaces constitutes a common public benefit for all segments of society (James et al., 2015).

As such, the purpose of monitoring progress against the SDG 11.7.1 is to provide necessary and timely information to decision makers and stakeholders to make informed decisions and accelerate progress towards providing universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities. Regular monitoring and reporting should be done every 5 years, allowing for periodic reporting time points until the year 2030. Therefore, the importance of the research is monitoring the progress in sustainable cities indicators and suggesting sub indicators to level up the open spaces and road accessibility in the urban areas, so as to build a framework for achieving the main goals in the future.

### **1.4 Study Objectives**

The objectives of this thesis are to:

- Apply the degree of urbanization method to determine urban areas as one of the tools for achieving the values of Indicator 11.7.1 of open public spaces.
- Assess the public open space as compared to the goal, targets, and indicators of SDG 11 to disclose directions for improvements.
- Study the accessibility to open public spaces in urban areas and its coverage.
- Provide a guideline policy for some indicators in planning and transportation policies that intersect with the contribution to sustainable cities in the study area in particular, and with regard to Palestinian urban centers in general.

## **1.5 Literature Review**

### **1.5.1 Overview**

This section addresses the theoretical background of the topics related to sustainable development and its goals in general and to Goal 11, which is related to the main topic of the thesis in particular. The section sequentially lists the origins of the SDGs and moves to SDG 11 related to sustainable cities and communities, which examines how to move to smart and sustainable cities by the year 2033. Then it focuses on the targets and indicators for SDG 11 and how to use, measure, and monitor these indicators in a successive manner to reach good results. The section also addressed the topic of urbanization and the key points related to how urban areas are formed, reaching the appropriate tools that help in achieving an effective measurement of Indicator 11.7.1. Finally, it presents a sample of related case studies in terms of methodology, analysis, and tools used to achieve the desired results, so as to benefit from them in this thesis.

### **1.5.2 Sustainable Development & Goals**

Sustainability is defined as an approach, method or practice that focuses on using resources in an efficient manner that meets current needs without compromising the needs of future generations (Greenland, 1997; Grant, 2010). Sustainability is also defined as the ability to make appropriate decisions in allocating resources, whether economic or non-economic, in order to achieve desired results at the social, economic, and environmental levels (Grant, 2010). The definition of sustainability varies according to the specializations or related contexts, for example: product sustainability (Dyllick and Rost, 2017), fiscal sustainability (Byrne et al., 2011), urban sustainability (James, 2015), and business sustainability (Bansal and DesJardine, 2014).

Although the term sustainable development dates back to the 1970s; there were several meetings and workshops held to develop the concept and formulate several goals for it. In 1992, the UN Conference on Development and Environment was held in Rio de Janeiro in order to launch a set of goals called the Sustainable Development Goals, which is an effective tool for following up on work on the sustainable development process (Le Blanc et al, 2015).

Over the past two decades, several issues have worsened, including population growth and rising per capita consumption, in addition to social and environmental tensions in the world. These led to increased pressure on the necessity of concluding a historic global agreement to establish a general framework to reduce the effects of these challenges on sustainable development. The agreement between 193 countries in September 2015 resulted in the UN Sustainable Development Goals (SDGs) for 2030, or the so-called “Global Goals” (UN, 2015).

In 2000, the UN introduced the Millennium Development Goals (MDGs) after member states agreed on a sustainable development agenda. These goals were intended to accelerate global development efforts, particularly during the period from 2000 to 2015. The MDGs included eight areas: education, maternal health, poverty, child mortality, environment, diseases, and global partnership. These goals are measured through 21 targets and 60 indicators, and were chosen on the basis of being realistic and easy to measure and monitor (UN, 2018).

Twenty years after the Rio de Janeiro Conference, another UN Conference on Sustainable Development was held in June 2012 in Rio de Janeiro, to develop a new set of SDGs that are consistent with the MDGs, and serve as a framework for global development between 2015 and 2030.

When compared to the MDGs, SDGs represent a more comprehensive and integrated agenda and represent a challenge that countries, whether developed or developing, must implement, as their timeframe is medium to long-term and compatible with the time horizon by 2030 (Dijkstra et al., 2019).

The targets set with the SDGs are highly integrated and applicable on a global scale, and are consistent with national goals and development levels in different countries, as each country sets its national goals guided by the global goals. When the UN set the

goals for the SDGs as a guide for countries to develop mechanisms for implementing and monitoring the general goals, 169 targets were identified distributed over 17 sustainable development goals, where in addition to these goals, 232 standard indicators were identified to measure performance and set appropriate policies to achieve the goals (UN, 2015).

### **1.5.3 Sustainable Cities and Communities**

“Sustainable Cities and Communities”, is goal 11 of the SDGs. The goal focuses on “ensuring inclusive, safe, resilient and sustainable urban and human settlements” by addressing issues related to cities and urban areas such as eliminating slums within urban areas, finding sustainable and effective solutions to transportation problems, especially public transportation, ensuring the right of everyone to access and use public spaces within the urban environment in a safe manner, and addressing problems resulting from high population density such as climate change and natural disasters. Therefore, a major change must be made in the way urban spaces are built and managed (Franco et al., 2020).

SDG 11 aims to encourage urban development in cities and human settlements by facilitating access to and optimal use of basic services, public transport, energy, housing and open spaces, which ensures the provision of opportunities for all. On the other hand, it provides targets, indicators, and tools that help measure and evaluate the levels of providing better urban services to all urban residents, whether in towns or small cities that will become large urban areas in the future (UN, 2023).

The process of achieving this goal in the past years in Palestine has gone through many stages that have greatly affected its achievement. These include the impact of Covid-19, political challenges in the West Bank and Gaza Strip, national policies of the Palestinian government in light of changing circumstances, and other reasons that have threatened progress towards achieving SDG 11 and building a more sustainable urban environment in Palestine. However, these challenges should be taken as incentives to work harder to achieve progress in the process of building sustainable communities in the coming years, as there are some noticeable steps that have been achieved. This would be a real achievement in terms of people-centered planning and improving citizen participation in the local government sector (MOLG and UN-Habitat, 2021).

Looking at the current situation after years of setting the SDGs, specifically the targets related to sustainable and smart cities, it has been noticed that there are gaps in achieving good results in the targets, as some progress has been made in the targets related to urban policies and public transport, while the targets related to addressing the spread of slums and providing adequate public spaces have not achieved noticeable progress, in addition to the existence of disparities between cities and countries in achieving progress between each other (UN, 2023).

Given the great importance of open spaces within the urban environment in achieving sustainability, Indicator 11.7.1 was approved within the SDGs to monitor and follow up on public spaces, evaluate them, and measure the extent to which all members of society have access to and use them in order to achieve positive results in Goal No. 11. SDG 11.7.1 indicator, which is the focus of this thesis, seeks to promote sustainable cities and communities through assessing the open spaces and their accessibility in cities under definition “average share of the built-up area of cities that is open space for public use for all, by sex, age and persons with disabilities” (UN-Habitat, 2018).

The purpose of monitoring progress against this indicator is to provide necessary and timely information to decision makers and stakeholders to make informed decisions and accelerate progress towards achieving this SDG and target. Regular monitoring and reporting should be done every 5 years. In general, monitoring promotes higher accountability, better performance assessment, and strong coordination between central governments and the regional and local governments. It enables cities to collect accurate, timely, disaggregated data and information, and adopting a systemic approach to the city, with clear policy implications that are based on evidence (UN-Habitat, 2018).

#### **1.5.4 Urbanization**

Urbanization is the transformation of rural populations into urban areas, or as it is called "the gradual increase in the proportion of people living in urban areas". This process includes changing the lifestyle and way of life from rural to urban. The term urbanization is an indicator that reflects the nature of the economic and social development of a specific area, and is linked to several factors such as economic growth, population structure, social welfare, and land resources (Sanyaolu et al., 2018).

The urban transformation from rural to urban areas is one of the most important transformations that have occurred in the 21<sup>st</sup> century (UN, 2017). The urban population is estimated at about 4.61 billion people, which constitutes 57% of the world's population (Ritchie et al., 2024). Projections indicate that approximately 90% of this growth will occur among urban populations in economically disadvantaged regions, particularly in Africa and South Asia (UNDESA, 2018).

In Palestine, urbanization is adjacent to the global expansion due to the geopolitical situation, where the average urbanization is 77% (71% in the West Bank and 87% in the Gaza Strip), and these percentages are mainly concentrated in areas politically classified as A and B, according to Oslo Accord (UN, 1995). In addition, 8% of the population living in refugee camps, where these camps are characterized by an urban environment with a significant increase in population slums. It is estimated that the number of people living in urban areas would be 85%. Also, urbanization in Palestine is classified as among the top 25% of urbanized countries, with an urban population growth rate of about 2.8% in 2021 (UN-Habitat, 2022).

Currently, there is no unified global definition of urban area. Rather, some UN reports rely on national standards for the shares of urban areas within countries. However, the problem is that countries rely on different definitions of urbanization and the measures used to determine urban areas. Some countries rely on population numbers, while others use population density or the type of workforce, specifically in non-agricultural work. For example, in Argentina, urban area is defined as localities with 2000 inhabitants or more. Sweden defines the urban areas as built-up areas with 200 inhabitants or more and where houses are at most 200 meters apart. In Japan cities are defined by satisfying some conditions such as (1) 50,000 inhabitants or more, (2) 60% or more of the buildings located in the main built-up areas, and (3) 60% or more of the male working in manufacturing trade or other urban business. While India has defined the urban areas by two conditions; first: any place that has a municipality and committee, and second: places satisfying all of the following three criteria (1) 5,000 inhabitants or more, (2) at least 75% of the male working in non-agricultural, and (3) at least 400 inhabitants per square kilometer (UN-Habitat, 2022).

In Palestine, there is no accurate definition for urban areas but some institutions, such as the Palestinian Central Bureau of Statistics (PCBS), use a classification that classifies Palestinian communities in 3 classes (PCBS, 2019); these are:

- 1- **Urban:** any community managed by a municipal council, regardless of the number of residents and the services provided.
- 2- **Rural:** any community managed by a village council and doesn't meet the definition of urban or camp.
- 3- **Camp:** All centers called camps and managed by the United Nations Relief and Works Agency (UNRWA).

The Atlas of Sustainable Development 2020 classifies the urban areas (for Palestine) as those localities with 10,000 inhabitants or more and rural areas as those localities with less than 10,000 inhabitants and not a refugee camp (UN Palestine, 2020).

After reviewing the theoretical background on urbanization and the expected increase in urban areas in the coming years, and compared to SDG 11, it is important to measure and follow up on indicators related to the SDGs. This should be done, not only at the national level, but also at the level of individual cities, urban, and rural areas, to prepare cities and bring them closer to sustainability. Discussions and studies regarding the boundaries of urban areas have led to the emergence of statistical tools, aiming to determine the most harmonious lands under the name of the population grid, where spatial units in the form of squares of equal size are used all over the world. This is was adopted by the UN in 2020; called the degree of urbanization method (Dijkstra, 2022).

Definitions of the degree of urbanization vary widely between countries. In 2020, the United Nations Statistical Commission endorsed the degree of urbanization as a methodology for defining urban and rural areas. This methodology is an important complement to national definitions, not a replacement, as national definitions often rely on a broader set of indicators, characteristics, and national objectives. It also aims to enable statistical comparisons between cities, urban areas, and rural areas through a set of relevant indicators (Dijkstra et al., 2019).

The degree of urbanization approach aims to provide a complete picture of the urban-rural gradient. It is divided into two main levels; the first is composed of three categories: cities, towns, and semi-dense areas (defined as urban areas), and rural areas.

The second level consists of more details by dividing the towns and semi-dense areas into towns, suburban areas, and semi-suburban areas. The third category (rural areas) is divided into scattered rural areas and other uninhabited areas (Dijkstra et al., 2019).

Applying the UN adopted urbanization degree method to obtain a classification of areas is done through two steps (Dijkstra et al., 2019). First, a regular grid of 1 km<sup>2</sup> is created and all the grid cells are classified into three types based on the concepts that the urbanization method works with. The second step focuses on classifying local units based on the results in the first step and classifying all network cells into urban centers, urban clusters, and rural areas, as follows (Dijkstra et al., 2019):

- 1- Cities: Local units whose population is not less than 50% in urban centers.
- 2- Towns and semi-dense areas: Local units whose population is less than 50% in urban centers and less than 50% in rural areas.
- 3- Rural areas: which contain low population density, which are local units whose population is not less than 50% in rural cells.

### **1.5.5 Open Public Spaces**

Cities are vibrant centers of public life (Gehl et al., 2011). Public spaces are important in shaping the identity of the city, as they are considered assets available to everyone within the urban area. The term public space includes all spaces used in general and open to everyone for free without any commercial requirement (Chan, 2023).

The Charter of Public Space defines public spaces as “all places publicly owned or of public use, accessible and enjoyable by all for free and without a profit motive”. The Charter also states that these spaces are primarily for collective life, people's well-being, and cultural and natural richness (UN-Habitat, 2016). Several tools were created to help clarify this definition, on the basis that these public spaces are available without any barriers and to all segments of society. A toolkit explains what public spaces include, as they include open environments such as streets, sidewalks, walkways, public squares, parks and recreational parks, and also include public places such as public libraries, markets, buildings and public halls (UN-Habitat, 2016). Therefore, a public space has great contributions on the formation and progress of public sphere. Public spaces are the

domain that citizens meet, come across, interact, do activities, and can be represented as areas like streets, paths, parks, and squares (Yılmaz, 2018).

Public open spaces face major challenges, especially in areas facing significant urban expansion, where there is a high population density and residential density that threatens open spaces. There is also much evidence of a significant decline in public spaces in favor of residential, industrial, and commercial uses. Therefore, it is necessary to plan public spaces that connect people within the city effectively and are easily accessible to all members of society (Kanav and Kumar, 2024).

Generally, public space areas in Palestine are relatively low in both urban and rural areas. Palestinian urban areas suffer from rapid urbanization and a significant increase in population density due to political restrictions imposed on expansion outside the borders of these areas. In addition to the political challenges, there are the complexities of land ownership, as most of the lands within cities are originally owned by the private sector, which makes allocating some lands for public spaces difficult. As for urban planning, the mechanism of planning public areas during the past years has not been very successful in facilitating the provision of sufficient places for public use in Palestine, as most of the systems in force focus primarily on the built environment, in addition to the lack of generalization of any planning policies that would be concerned with planning and managing public spaces in Palestinian cities (MOLG and UN-Habitat, 2021).

Given the focus on public spaces as an important criterion in determining the form and quality of life within the city, the planning of open spaces within the urban area is linked to a set of criteria that focus on the characteristics and needs of the users of these public spaces. The accessibility criterion is one of the most important criteria that helps meeting the needs of users (Maruani and Amit-Cohen, 2007). Accessibility can refer to the ease of reaching desired locations and has been applied as a criterion and indicator in assessing the planning capabilities of open spaces within urban environments (Johnston et al., 2009). The World Health Organization has recommended that “all people should be within 300 meters of a green space” (Koninendaik, 2023).

### 1.5.6 Case Studies

The case studies reviewed are divided into two parts. The first aims to review previous studies that focus on the models used in calculating the value of indicator 11.7.1, and the second part focuses on the topic of accessibility to public and green spaces.

Verdi et al. (2022) modeled the basic land use components needed to calculate SDG 11.7.1 indicator for the Athens Metropolitan Area, a representative city of Greece. The model is based on UN guidelines, using satellite imagery, and derived products, along with open GIS for reference data retrieval. A 3-step approach was used, consisting of:

- a) identifying the built-up area of Athens, using a high-density waterproof layer (HRL) to define the urban sprawl of the city, as an alternative to the Landsat imagery proposed by the UN;
- b) mapping urban open spaces (UOS) using spatial analysis through high-resolution PlanetScope and Sentinel-1 images, as well as Normalized Difference Vegetation Index (NDVI) images, to identify the green open spaces that comprise urban open spaces;
- c) estimating the total area of land allocated to streets (LAS), also using VHR PlanetScope images and analysis using the DL algorithm.

Each of these steps presented its own challenges and was combined into an equation to obtain a value for indicator 11.7.1. During the analysis, two experiments were conducted to calculate urban open space: the first using PlanetScope, and the second by adding NDVI results to the analysis. The first method yielded more accurate results, estimating urban open space at 2.72% of the urban city area, while the methods for calculating the area of land allocated to streets yielded more accurate results, estimated the area at 13.11%. The results of the study showed that it can be further developed and used to become one of the methods used globally for calculating the index 11.7.1.

Giuliani et al. (2021) reviewed the literature identifying current constraints and potential methods for measuring physical accessibility to urban green spaces. The study proposed a new method for calculating the EU SDG index using open ground survey data and an accessibility model, and tested the proposed method in four different European cities. This aimed to provide consistent information on urban green spaces and contribute to

the movement towards a harmonized index that to achieving SDG 11.7.1. The used methodology combined satellite ground-based survey data and crowdsourced data (such as OSM) to model the physical accessibility of urban green spaces. The first step of the workflow was to create a NDVI dataset over urban areas to determine the city's built-up area. Second, a mask was created for public versus private areas using a combination of solutions (such as the cadastral registry and Voluntary Geographic Information (VGI) to overlay the mask with the NDVI dataset to determine only vegetated and public areas. This gave an estimate of the total public green space. The final step was to model the physical accessibility of residents to the nearest public green space and calculate accessibility coverage. Two scenarios were used based on walking ability. The fast scenario included adults who can walk 5 km/h, and the slow scenario included children, the elderly, and their accompanying persons, who can walk 3 km/h. This was identified as an effective way to measure accessibility and coverage, as the majority of people use walking, which aligns with the SDG indicator's feature on access to public spaces for all segments of society.

The results showed that the proposed methodology can help provide detailed information on physical access to urban green spaces and generate an EU SDG index aligned with Target 11.7.1 of the UN SDGs Framework. In addition, it can help decompose the indicator at the pixel level with high resolution (10 meters) by capturing both the spatial (e.g. maps) and temporal (e.g. graphs) dynamics of accessibility to urban green spaces. It also showed the difference in results between different cities due to several reasons such as the area of built-up area, distribution of open green spaces, population growth, and the number of people in the city.

Itair et al. (2023) investigated how to enhance the comprehensiveness of urban public spaces as one of the goals of sustainable development. The study took the city of Nablus as a case study in Palestine, where it provided mechanisms for how to create a framework that incorporates eight indicators: spatial distribution, typology, facilities and services, green and humid areas, governance and management, safety, user categories, and user satisfaction. The concept of smart public spaces was also introduced. The study also showed how to use modern technologies in managing public spaces and engaging users in providing information and managing this space in a way

that helps increase the efficiency of facilities and create an environmentally friendly framework for the use of public spaces within urban areas.

The evaluation mechanism was based on information related to public spaces in the city of Nablus according to spatial distribution and important characteristics, in addition to conducting interviews with users of these public spaces. The study revealed a major deficiency in the quality of public places in the city, such as: lack of equitable distribution of public places, low level of security, and lack of easy access for all segments of society, which affects levels of community usage of these facilities. In addition, the study identified weak services and facilities within public facilities. As for accessibility, a radii representing walking distances of 5 and 10 minutes were used. The results indicated that only 30% of the city's neighborhoods have the ability to access public spaces within a five-minute walk, while more than 41% would need more than ten minutes to reach these spaces. The study proposed a framework to demonstrate how smart public spaces contribute to inclusivity in the concept of urban public spaces.

Dahbour (2023) researched the planning and design of open public spaces in Ramallah as a case study for resilient cities. The methodology used assessed the availability and accessibility of open public spaces, with a focus on several evaluation indicators, including quality, accessibility, safety, and social interaction. The evaluation methodology was based on an analysis of open public spaces within the master plan, aerial photographs, and field visits, which included parks, public squares, playgrounds, and recreational areas. The method of assessing accessibility was to calculate the walking time between the nearest built-up area and open public spaces. The results showed that open public spaces within the city accounted for 1.28% of its total area and served about 13% of the total population, which is lower than the recommended international ratio.

Seminato et al. (2023) studied the applicability of public park accessibility criteria in the Italian city of Padova using different methods (based on containers, distance, and attractiveness). When applying the model developed using ten indicators within each measurement pattern, variation was observed in the results of each indicator in the study area, with the distribution of parks within the city playing an important role in the analysis of the results. The study identified key indicators that should be prioritized in assessing accessibility through the model, namely: the average minimum distance

between the park location and the residential area, the percentage of the population living within 300 meters of the parks, and the coverage rate of these parks. The study confirmed the applicability of the proposed model to other areas in different geographical contexts and data. However, the study identified some limitations, including the lack of consideration of economic, social, and cultural factors, as well as user preferences.

Kanav and Kumar (2024) measured the spread of open green spaces in the city of Gurgaon, India, and compared the results with India's national planning guidelines. Accessibility to these spaces was analyzed using geographic information system software and network analysis tools for existing streets. Access distances for each location were determined based on the UK's Available Natural Green Space (ANGSt) criteria. The distances applied were 300 meters for residential areas and neighborhoods, 500 meters for local communities, 2 kilometers for administrative areas, and 5 kilometers for sub-areas.

The study revealed differences in accessibility indicators depending on the distance to each type of OPS. Accessibility was higher in residential areas and neighborhoods, but lower than the World Health Organization's recommendation that green space should be within 300 meters of a residence. The analysis also revealed a clear relationship between high population density and low availability of OPS in central neighborhoods of the city. The study proposes a more integrated planning framework to establish OPS within high-density areas and improve connectivity between OPS through green corridors and pedestrian walkways. Among the study's limitations is its neglect of economic and social aspects and user income levels, which may hinder its ability to accurately measure accessibility.

Kharo et al. (2023) assessed the accessibility of recreational parks in the Hyderabad district of Pakistan using GIS, as well as examining residents' perceptions of accessibility and services provided within recreational spaces. In Pakistan, the recommended distance to urban parks and open spaces should be less than 200 meters. For densely populated urban centers, 18% of the total urban land area should be allocated to planned open spaces. The methodology was initially based on identifying recreational areas and parks in the city through official maps from the city authorities. Then a spatial analysis (multiple ring buffering) was applied in the GIS system at

distances starting from 200, 300, and 400 meters respectively, according to Accessible Natural Green Space Standard (ANGSt) in the UK. The results of the study, compared to existing standards in Pakistan, showed that parks accounted for 0.8% of the city's total area, compared to the standard that recommends 18% of the city's open green space. Park-served areas accounted for 21.24% of the city's total area, which is insufficient for residential areas.

### **1.5.7 Summary of Case Studies**

The previous studies provide some insight towards achieving the objectives of this study. Each one has its own methodology, results, data, location, etc. Understanding this information allows for direct benefit from these studies or for future comparisons with the findings of this thesis.

Studies such as Giuliani et al. (2021) and Verdi et al. (2022) have shown a clear interest in using analytical techniques to obtain values for the index, the value of which this study focuses on. Previous studies aimed to promote the use of these techniques as a source of information in areas where information on public open spaces is difficult to provide, either due to the confidentiality of information provided by official organizations or the lack of accurate and open information. Some sources of information were highlighted, such as high-resolution satellite imagery, the Normalized Difference Vegetation Index (NDVI) dataset, and PlanetScope images. All of these multiple sources would assist in identifying densely populated areas, streets, and public open spaces. Furthermore, those studies demonstrated logical results for the indicator, which can be relied upon and measured, when needed. Studies that explored the issue of measuring accessibility and evaluation methods for the distribution of public green spaces in urban areas relied on GIS and in several ways. For example, Dahboor (2023) relied on measuring the distance between the nearest built-up area and the open public space, while Semenzato et al. (2023) used the average minimum distance between the park location and the residential area, as well as the percentage of residents living within 300 meters of parks. On the other hand, Kanav & Kumar (2024) used the network analysis method in GIS to measure accessibility, while Khahro et al. (2023) examined the evaluation of accessibility to parks in Pakistan using another method in GIS, which is spatial analysis (multiple ring buffering).

As for the work methodology in this thesis, we will focus on determining different measurement distances according to the type of public space and then creating a multi-buffer in order to calculate the percentage of the population living within the coverage areas of these urban public spaces by using the network analyst method in GIS.

### **1.6 Relevance of SDG Indicator 11.7.1 to Sustainable Urban Development**

From an environmental perspective, green public spaces enhance cities' ability to adapt to climate change, supporting Sustainable Development Goal 13 (Climate Action) and Goal 15 (Life on Land). These spaces also serve as venues for informal education and community interaction, promoting Sustainable Development Goal 4 (Quality Education). From a socioeconomic perspective, well-designed public spaces can stimulate local economic activity and employment opportunities, contributing to Sustainable Development Goal 8 (Decent Work and Economic Growth). Furthermore, inclusive and well-managed public spaces promote social cohesion, safety, and institutional trust, contributing to the achievement of Sustainable Development Goal 16 (Peace, Justice, and Strong Institutions) (United Nations Human Settlements Programme, 2018).

Indicator 11.7.1 is therefore a comprehensive measure that supports the integrated achievement of several Sustainable Development Goals, promoting the sustainability and quality of life in urban environments.

### **1.7 Thesis Structure**

The thesis contains five chapters, there are: Introduction and Literature Review, Methodology and Building Evaluation Framework, Data Collection and Analysis, Assessment of Urban Public Spaces Accessibility and Conclusions & Recommendations.

The first chapter includes a general introduction to the idea of the thesis, including the main terms and definitions, the problem of the study, and its objectives also it addresses the theoretical framework for topics related to sustainable development and its goals in general, and Goal 11, which relates specifically to the main topic of the thesis. This includes sustainable development indicators and how they are measured and monitored in urban areas. It also includes a model of relevant case studies in terms of methodology, analysis, and tools used to achieve the desired results, which can be used in this thesis.

Chapter two discusses the methodology and measurement framework for the sustainable development indicator related to public spaces and streets, in addition to defining the study area.

Chapter three, which includes data collection and analysis, deals with the methods of collecting and analyzing the data required in the four urban areas from the relevant authorities in the study area in terms of calculating the distances of public spaces, including streets. It also deals with the analysis and collection of data from structural plans, to provide, in the end, values for one of the objectives upon which the thesis was based.

Chapter four assesses and measures accessibility using a GIS network analyst and generates results for use in the analysis and evaluation process. This assessment was developed in consultation with urban planning and urban road planning experts to determine appropriate coverage distances for accessing various types of public spaces within an urban area.

The concluding chapter of this study will encapsulate the primary findings, discuss the results and present recommendations based on the thesis's outcomes.

## **Chapter Two**

### **Methodology and Building Evaluation Framework**

Studies that address measuring sustainable development indicators related to public spaces, green spaces, and street spaces, and their appropriate proportions in urban areas in Palestine, are very limited. However, studying this subject is important in the urban planning process for streets and land uses. Therefore, one of the key objectives of this thesis is measuring the value of the indicator(s) for urban public spaces; how they are distributed, and how to access them effectively and appropriately for all segments of society? The basic idea behind constructing the methodology is based on establishing a clear mechanism for calculating the value of the SDG indicator 11.7.1.

The thesis examines urban centers in the northern West Bank by analyzing the urban planning process for these centers and applying the thesis objectives to them. The following sub-sections present the used methodology to achieve the study objectives.

#### **2.1 Methodology of Building the Evaluation Framework**

First, it is proposed to select the boundaries of the master plans for urban centers in the northern West Bank in Palestine, as the master plans are considered the boundaries of the urban and regulatory areas, for which municipalities are responsible for planning.

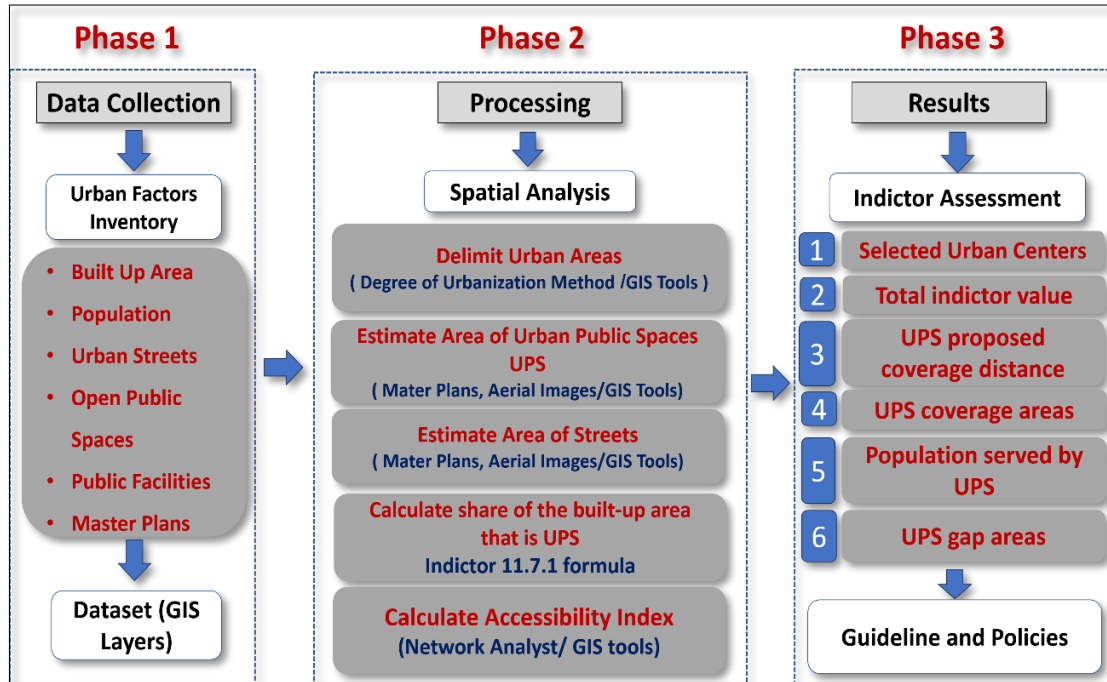
The proposed steps are in two phases. The first is based on the existing situation, whether existing streets or the locations of open public spaces within the boundaries of master plans. These will be analyzed, and their accessibility index will be measured. The second phase is based on analyzing the existing and proposed conditions, including unopened streets or side offsets of open but not yet utilized streets, in addition to the public spaces proposed within the master plan that have not yet been utilized.

After examining the two phases, a comparison will be made to determine the extent of change brought about by the effective urban planning process in achieving positive results in the indicator value. The results would then form the way for proposals and recommendations that will contribute to the process of developing mechanisms to achieve positive values for the SDGs, particularly SDG 11.

Figure 1 shows the layout of the methodology.

**Figure 1**

*Proposed methodology of building the evaluation framework*



## 2.2 Data Collection

The collected data for the assessment of urban public spaces indicator and accessibility depends on the specific objectives of the assessment. However, some common types of data include:

- 1. Maps and Satellite imagery:** GIS maps and CAD drawings (Master Plans) were used to visualize the location of public spaces in the cities and to assess their compliance with the indicator requirements.
- 2. Existing reports and studies:** reports, papers, studies and surveys related to public spaces in the city and the accessibility to the urban public spaces prepared by researchers, organizations, and municipalities.
- 3. Site visits:** in person sites visits to the municipalities and selected institutions or organizations that have the data needed.
- 4. Expert participation:** Experts insights, through a questionnaire, to select the average appropriate distances needed by residents to access public spaces within Palestinian cities.

### 2.3 Processing

Processing focuses on the selected methods and GIS tools to define the database in GIS profile, and modeling and analysis to calculate the measures leading to monitor the indicator. This would be a four-step process:

**First:** spatial analysis to delimit the city/urban area by degree of urbanization method in GIS. This step focuses on creating a regular grid of 1 km<sup>2</sup>, and all the grid cells are classified into three types based on the concepts of the urbanization method.

**Second:** spatial analysis to identify an existing urban public space (UPS). This could be followed by field work and visits to validate data (as needed), assess the quality of spaces, and determine the total area occupied by the verified UPS in the master plan.

**Three:** spatial analysis to estimate the total area allocated to streets, sidewalks, and walkways. The master plans with the existing and proposed streets will be considered, through aerial images and using GIS and AutoCad tools.

**Four:** estimation the share of the city's built-up area that is UPS.

After completion the previous spatial analysis steps, the value of the indicator value will be calculated using the formula:

**Share of built-up area that is open space in public use (%) =**

$$\frac{\text{(Total surface of OPS + Total surface of land allocated to streets)}}{\text{Total area of the city}} \dots\dots\dots (1)$$

**Five:** spatial analysis to estimate the accessibility index. This step focuses on examining the connectivity and accessibility for public spaces in urban areas by using network analyst tools in GIS. This will help to determine the coverage and gap areas and the percentage of accessibility. First, we have to define the main hierarchy of UPS in the city and their coverage areas in meter squares (m<sup>2</sup>) such as: green spaces for housing, neighborhood, community and city, playground and public facilities like public schools, social halls, hospitals, and municipalities by reviewing literature and taking into consideration Palestinian experts' opinions. Second, we will determine the specific distances for UPS categories to code them in the network analyst in the GIS. Those previous steps will help to determine the area served by UPS and area gaps. Finally, we will estimate the number of people served by existing public spaces as a result of the

accessibility index equation in those areas and identify how we can achieve the targets for the SDG indicator 11.7.1 in the future.

After the compilation of all process phases, we can get some results about applying the degree of urbanization method for Palestinian urban area, current values for indicator 11.7.1 compared with recommended values, and the accessibility index for open spaces; its coverage and gap areas.

## **2.4 Identification of Study Area**

### **2.4.1 Testing the Degree of Urbanization Method in Palestine**

Based the UN definition of urban and rural areas, the general application of the degree of urbanization method (DEGURBA) is explained, using GIS to obtain urban and rural classifications.

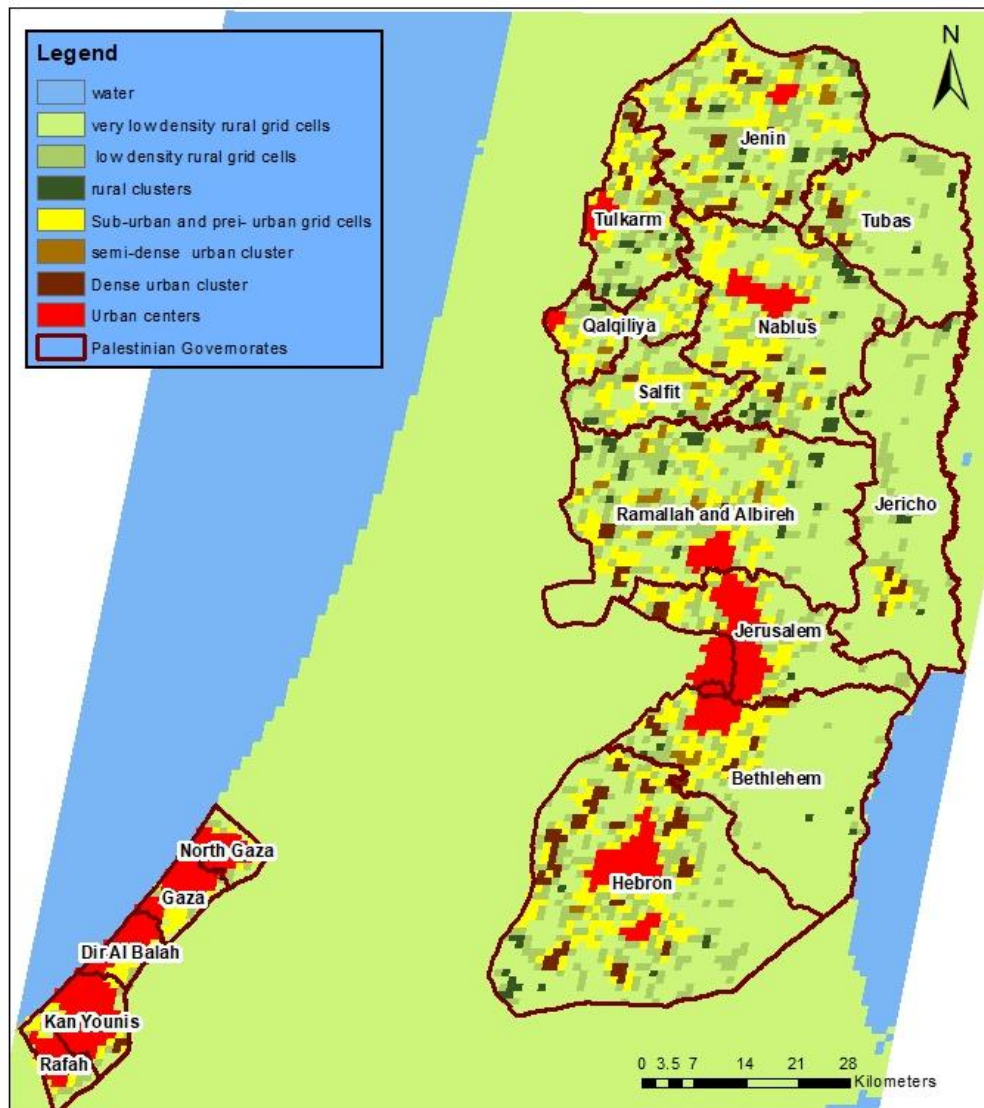
**First step** is to obtain the available dataset for Palestinian built-up areas in 2023 from the Global Human Settlement Layer (GHSL) website (Pesaresi, et al., 2024), where specific data was produced for each of the 86 countries that participated in the regional workshops organized by UN-Habitat. International data was developed for these member countries, where Palestine is included with a specific dataset. In addition, the survey also requires population data for Palestinian communities, which is obtained from the 2017 general population census by the PCBS, with growth rates (PCBS, 2018).

**Second step** is to use the GIS toolbox to create a population grid. A regular grid of 1 km<sup>2</sup> is created, and then the population data with a built-up surface raster dataset is combined to create a population grid.

**Third step** is to create a degree of urbanization grid, as shown in Figure 2, to classify urban and rural areas according to size and population density using population grid cells.

**Figure 2**

*Degree of urbanization grid classification map*



**Fourth step** is to classify Palestinian communities into urban and rural areas based on administrative boundaries and the degree of urbanization grid. The urban centers in which the study is based on where UPS are identified, as shown in (Figure A.1; in the Appendix). The boundaries shown on the map are administrative boundaries based on data used for Palestinian areas. These urban centers will be reviewed to achieve a more precise definition for use in the thesis.

Palestinian urban centers, which were identified based on built-up areas and population density constitute 15.5% of the area of Palestinian communities, including cities, towns, villages, and camps. They also constitute 67.7% of the population residing within these centers. In comparison with the classifications of Palestinian communities, as mentioned

in the first chapter, it is clear that there are some Palestinian cities that did not appear in the results of measuring the degree of urbanization, such as the cities of Tubas, Jericho, and Salfit. The reason for this is that the urban and population density measured in the model did not reach the level of urban cities defined by the UN.

#### **2.4.2 Study Area**

As indicated before, the rapid urbanization has been occurring in recent years and that the population concentration will become largely within urban centers and cities. After applying the urbanization degree method for the Palestinian communities, the focus is on measuring the indicator for OPS within the urban centers. Therefore, the northern West Bank is selected as a study area, specifically the resulting urban centers (cities of Jenin, Tulkarm, Qalqilya, and Nablus), as shown in Figure A.2. This will be used to measure the value of indicator 11.7.1 and the value of accessibility to UPS.

The urban area of Tubas was excluded from measuring the indicator from the study area, since it did not meet the characteristics of urban centers, according to the application of the urbanization degree method.

## Chapter Three

### Data Collection and Analysis

Urban centers have faced high population density and rapid urbanization in recent years. Land prices have doubled, and there is a significant shortage of available land and space for public use and streets. Urban centers are now highly concentrated in the heart of urban areas. Hence, the need to study and analyze these Palestinian urban centers has emerged, in order to explore appropriate solutions and mechanisms to create effective opportunities and alternatives for sustainability.

In this chapter, the data collection and analysis outcomes are presented. It provides a detailed analysis of the northern West Bank, specifically the four main cities. UPS areas, as well as street areas within the boundaries of the master plans, have been identified.

#### 3.1 Profile of the Urban Centers in Northern West Bank

The urban centers located within the study area in the northern West Bank cover an area of approximately 68 square kilometers, equivalent to 4.3% of the total study area. According to the 2017 census (Central Bureau of Statistics, 2018), the population living in these urban centers was approximately 375,738, representing about 35% of the population of the northern West Bank. These urban centers were identified using the urbanization level measurement model. The four urban centers in the study area were derived, namely the main cities of Nablus, Jenin, Tulkarm, and Qalqilya. The boundaries of these centers are based on the approved master plans of the municipalities. It encompasses all urban activities within these communities, and its boundaries are functionally and urbanistically approved.

The population density of urban centers in the study area is an important indicator in highlighting the importance of the thesis, specifically UPS, which should be provided within crowded urban centers where tall buildings are expanding at the expense of open areas. It was calculated by dividing the population within the urban center by the area of the urban area defined by the boundaries of the master plans. The results presented in Table 1 showed a significant increase in population density compared to the general average population density in Palestinian urban areas for the year 2020, which amounted to 1,333 persons/km<sup>2</sup>.

**Table 1***Population density in the study area*

Urban Center	Area of the Master Plan (Km <sup>2</sup> )	Population 2017 (Person)	Population Density (persons/Km <sup>2</sup> )
Nablus	29.4	182,845	6,219
Tulkarm	13.8	80,886	5,861
Jenin	21.5	60,325	2,806
Qalqilya	4.3	51,683	11,922

### 3.2 Data and Methods

To define the data required for the thesis within the study area regarding public spaces and the most accurate methods for collecting them compared to the methods identified in the case studies, the study relied on aerial photographs for the year of 2024 published by the Ministry of Local Government. This was done in parallel with the master and urban plans of the municipalities in the four urban centers to identify public spaces and streets within the urban centers. This thesis relied mainly on the approved master plans for cities such as Nablus (2013), Tulkarm (2005), Jenin (2010), and Qalqilya (2009). These plans are significantly outdated and require updating and urban expansion, which is consistent with the objectives and findings of the study.

ArcGIS was used to mapping data, creating maps, and calculating the areas of public spaces with the help of specialized engineers from the municipalities of the cities within the study area. This included identifying streets with sidewalks designated for pedestrians, identifying parks and public spaces, distinguishing them from private property, and identifying the locations of public transportation stations within urban areas. As for the data collection methodology, a quantitative method was used, whereby data was collected on the boundaries of urban areas and neighborhoods within them, as well as the population and its distribution within the city for 2017, which is the last official census conducted in the Palestinian territories. Data was also collected on street lengths and widths, the spatial distribution of public spaces, their areas, and their representation on city maps.

As for the data analysis methodology, both quantitative and qualitative approaches were used by distributing questionnaires to experts to obtain their opinions on the distances to access public spaces. The questionnaire was designed to contain quantitative and qualitative data aimed at helping in developing a suitable evaluation and analysis method for the distribution and accessibility of public spaces, specifically in the West Bank. It was distributed to 12 urban planning experts, who work in various jobs such as universities, governmental, and civil organizations. The qualitative data consisted of the nature of the expert's specialization and study, in addition to his/her view of the distribution of public spaces and their percentage within Palestinian cities, as these experts work in urban planning in Palestinian cities. The details are laid out in Figure A.3.

### **3.3 Spatial Analysis of Indicator 11.7.1 Calculations**

#### **3.3.1 Identify the UPS**

Based on data collection and field surveys, the UPS utilized within the study area are divided into several types. These are main public parks, public playgrounds, public transportation stations, local entertainment areas within neighborhoods, open public squares, sidewalks that are used and suitable for walking, and the city's main roundabouts.

In Nablus, 1.3% is the percentage of public use areas shown in Figure A.6, which consisted of sidewalks such as Rafidia Street and some streets designated for pedestrians within the urban center, in addition to the main and local public parks, some of which contain green spaces, playgrounds, and public facilities for sitting and public use. There are also the main and local public transportation stations, where the percentage was low compared to the area of the large city, which is significantly lower than the percentage recommended by the SDG and UN-Habitat; 15-25%.

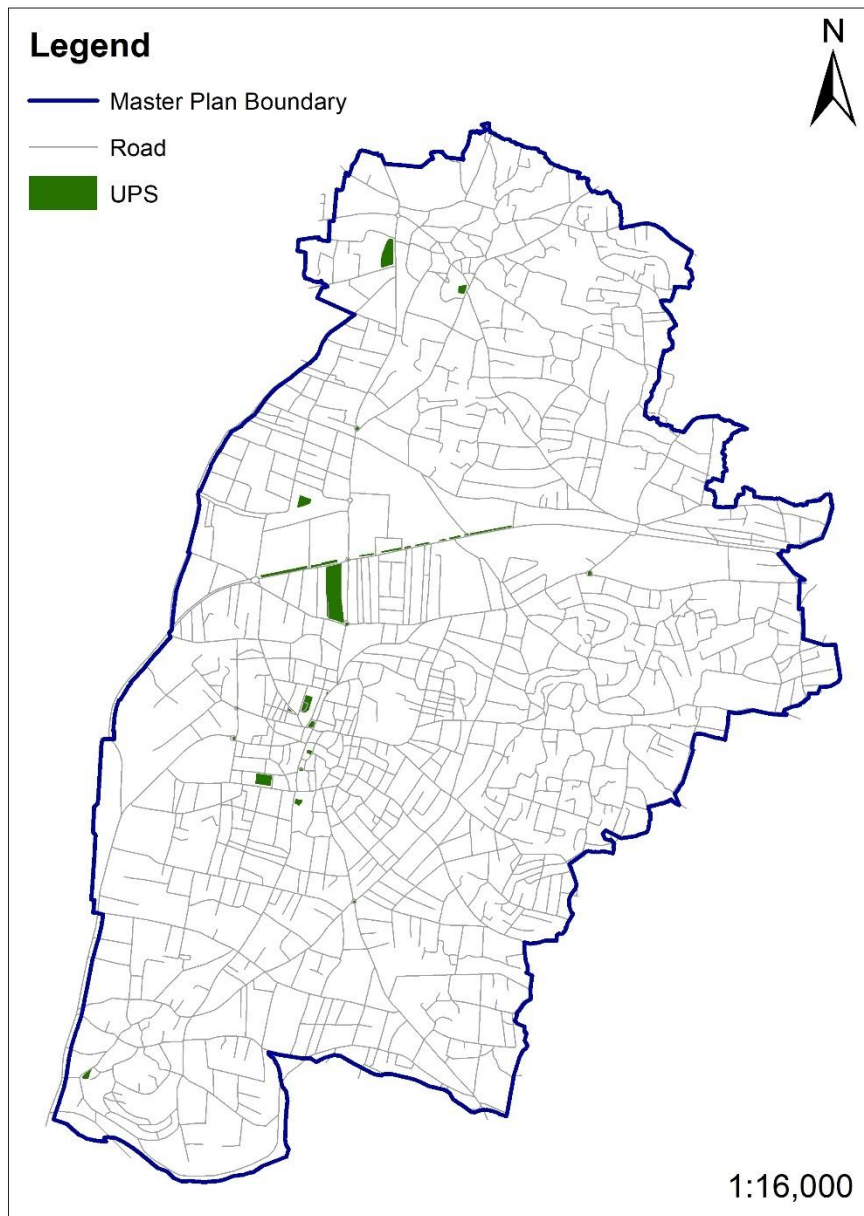
In comparison with other urban centers such as Tulkarm, the percentage reached 0.46%, which is very low (see Figure 6), as there are no main parks for the city and the distribution of spaces within the urban area is poor, as the presence of public spaces within the master plan was not taken into account when urban planning for the city was completed in 2005.

As for Jenin, the percentage reached 0.8% of the urban area, as shown in Figure A.5, where there is a good distribution in general, but the percentage is very low. Finally, in the city of Qalqilya, the percentage of public spaces reached 1.6% of the urban area, as

shown in Figure A.4, which is the highest percentage compared to other urban centers, but this is due to the small area of the city and the basic reliance on the main park that serves the city and the surrounding areas.

**Figure 3**

*UPS distribution map in Tulkarm Urban Area*



The current master plans for the urban cities within the study area contain the urban vision for the development of the city, including the existing open public spaces, in addition to the proposed places for establishing public spaces and exploiting them during the period of the master plan. After reviewing the master plans and field inspection of the exploited public spaces, it became clear that there are some other places that can be worked on and

exploited to increase the public spaces within the urban area and raise the value of the index, thus increasing the quality of the urban environment in the cities.

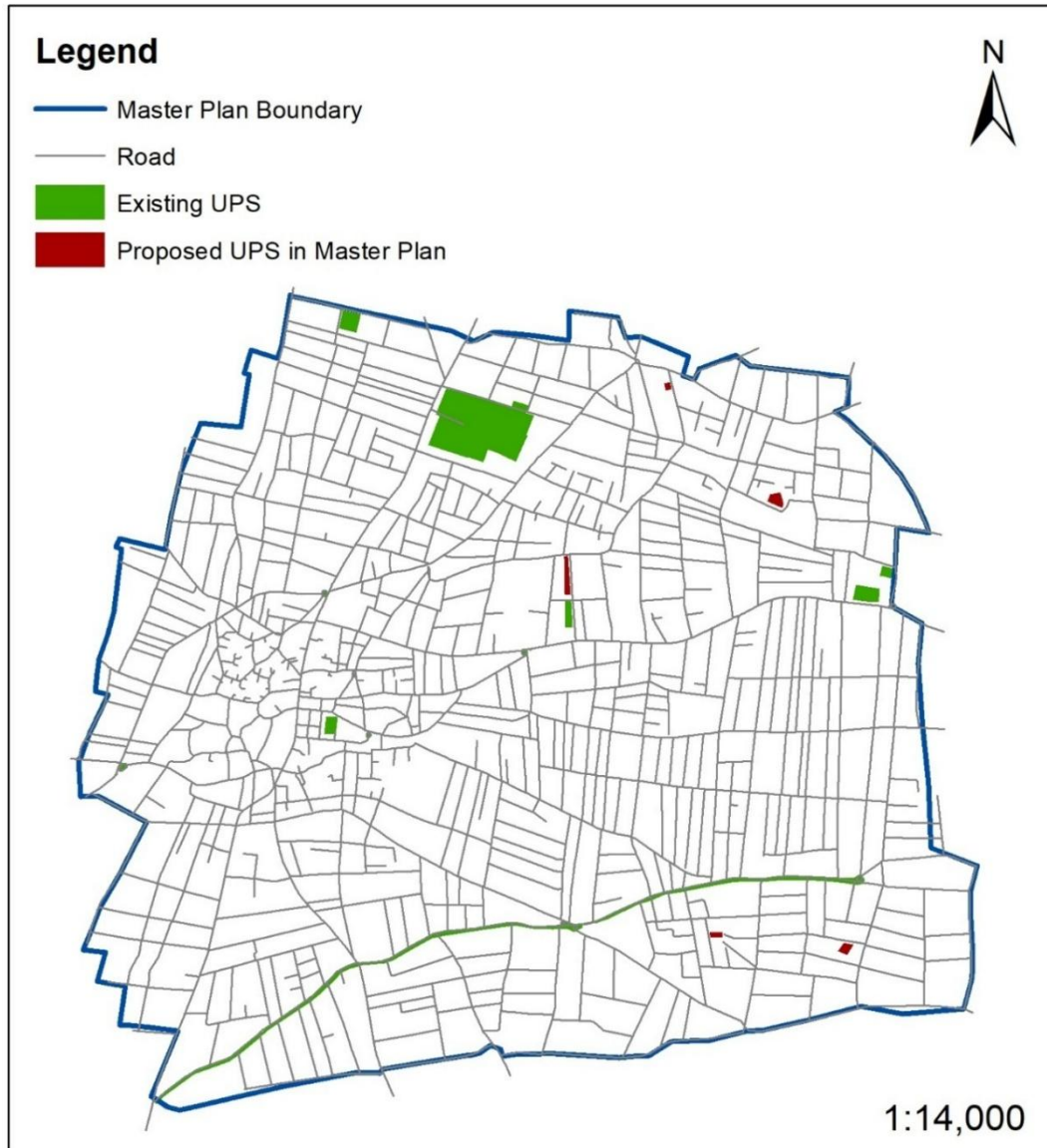
Therefore, to make an integrated analysis, the researcher only collected and analyzed data on the public spaces that were proposed in the master plan, which fall under the name of green spaces, public spaces, or parks. It should be noted that the labelling in these master plans differs from one area to another, as the planning process for the mentioned urban centers is relatively old and specific to each plan. This was used to find opportunities to develop these public spaces to raise their percentages spaces within the urban area.

The results showed that the percentage in Nablus increased from 1.3% to 2%, as there is a larger number of proposed public spaces that are better distributed in the urban area, as shown in Figure A.15. They are considered approved and can be developed, despite not meeting the international standard percentage for public spaces. In Qalqilya, a limited number of public spaces were identified for potential use and development; however, they are too few to significantly or effectively expand the overall public space, as illustrated in Figure 4. Qalqilya has the highest population density due to the presence of political challenges and the difficulty of urban expansion in the city, which led to a clear limitation of public spaces. Similarly, Tulkarm clearly suffers from a lack of public spaces, with the exception of a small area in the southern part of the city, as shown in Figure A.13. As for Jenin, the percentage increased from 0.8% to 1.2% after finding proposed public spaces within the master plan and well distributed within the city, with the exception of the western region of the plan, as shown in Figure A.14.

The researcher notes that there is a significant decrease in the percentage of public spaces within the urban centers in the study area and the limited area of these spaces, if they exist. This is mainly due to the limited land within the urban centers and their high value, which calls for studying the urban situation within these centers and attempting to update the master plans to provide opportunities to propose and develop suitable public spaces.

**Figure 4**

*Distribution of Existing and Proposed UPS in Master Plan in Qalqilya Urban Area.*



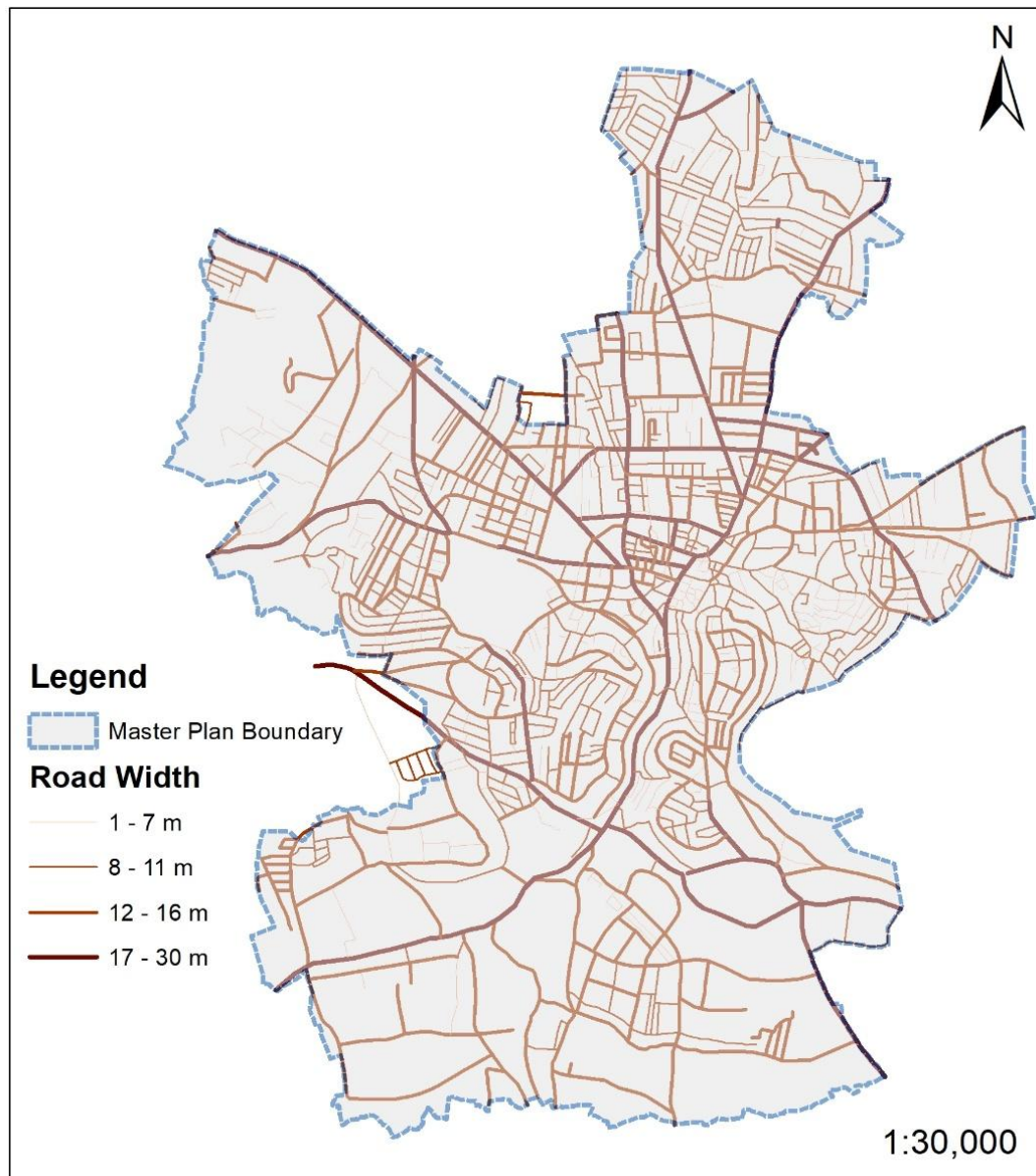
### **3.3.2 The Total Area Allocated to Streets**

The indicator focuses on estimating the actual street area and its utilized width by identifying the streets and measuring their lengths and widths in an integrated manner with the sidewalks and green islands. The data was collected from aerial images and cities plans. The percentage of existing streets in Nablus reached 10.8% of the city's area. This percentage is very low compared to international standards of 30-35%, as shown in Figure A.6. As for the city of Qalqilya, it reached 23%, which is the largest percentage compared to other urban areas within the study area. This is due to the limitations of expanding the

city boundaries to a greater extent, which encouraged greater use of all spaces allocated to streets, as shown in Figure A.5. In Tulkarm, the percentage of spaces allocated to streets reached 13.3%, as shown in Figure A.4, which is also low. As for Jenin, the percentage reached 14.8% of the city area, as shown in Figure 5.

**Figure 5**

*Existing Road Network in Jenin Urban Area.*



To measure the potential for achieving a higher street share within the urban area, and in line with the urban vision developed in the city's master plan, the areas of planned streets within the master plan are measured. This includes the total extent of streets planned to include vehicle lanes, pedestrian crossings, dividing islands, and roundabouts. When

measuring the first part of the indicator, it was noted that there are a large number of streets whose maximum capacity was not utilized, despite having been planned to be optimally urbanized to serve the city. This is in addition to unplanned local roads and paths used to reach certain locations that were not included in the streets within the master plan.

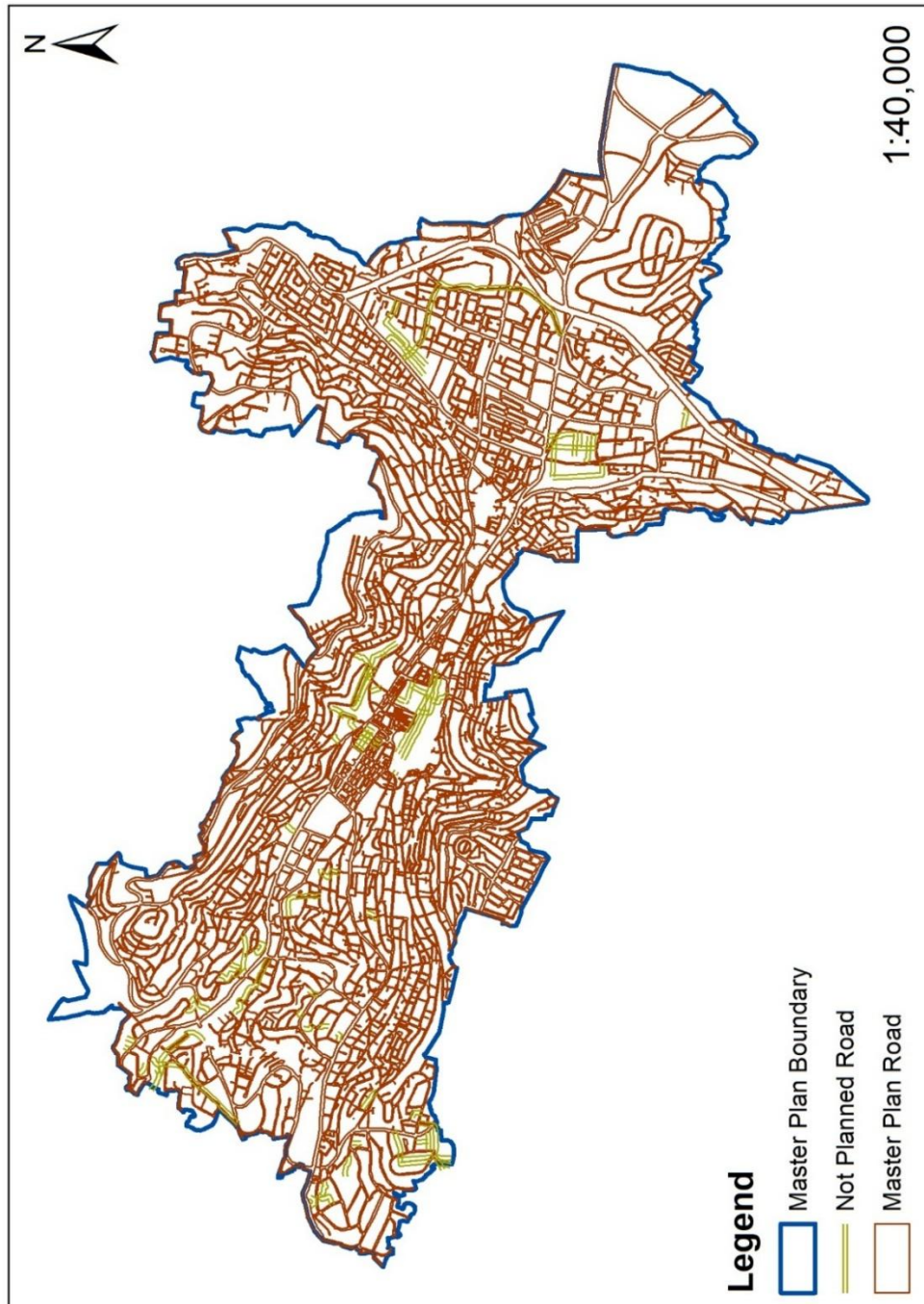
The detailed results will be presented in the subsequent section. These include the urban streets within the master plans and adding the unplanned streets, which are secondary and local streets, and pedestrian paths serving sub-areas in the city's neighborhoods. The percentage area covered by streets in Nablus rose from 10.8% to 21.4%, which is double the area covered by streets that has not been utilized yet, as shown in Figure 6. This will clearly raise the value of the indicator 11.7.1.

As for the rest of the results of the other urban areas, the value of streets in Tulkarm reached about 18.2% of the urban area, as shown in Figure A.10. As for Jenin, the percentage reached 16.8%, as compared to 14.8%, as shown in Figure A.11. In Qalqilya, the percentage remained the same with a slight decrease. This is because the borders of the urban area in Qalqilya have been the same for a long time and there is no future urban expansion. Therefore, the master plan streets, as planned in the master plan (2009) remained the same as shown in Figure A.12, with their widths being used larger than what is planned to accommodate the future traffic.

Based on the analysis, it is concluded that there would be a real change (increase) in the areas of streets in an official manner and within the powers of the approved master plans of cities. Therefore, it is important to utilize the total area of the street as they are planned to ensure the provision of all the components, including sidewalks, parking, islands, and side furniture.

**Figure 6**

*Total Roads (planned and non-planned) in Nablus Urban Area*



### 3.3.3 Estimating the Value of Indicator 11.7.1

The indicator value primarily reflects the quality of the built environment in urban areas and the degree of progress towards achieving sustainability and building resilient urban communities. The nature of the built environment within cities is characterized by high residential density and a growing trend towards urban sprawl at the expense of land and open spaces within the city. This highlights the important and fundamental role of urban public spaces and the need to preserve, expand, and distribute them equitably within the urban area. Based on the previous spatial analysis step, the indicator value is calculated using the following formula:

$$\text{Share of built-up area that is open space in public use (\%)} = \frac{(\text{Total surface of OPS} + \text{Total surface of land allocated to streets})}{\text{Total area of the city}} \dots\dots\dots (2)$$

The results are displayed in Table 2, which shows a clear decrease in UPS and indicator values within the study areas. Nablus scored 12.1%, which is the lowest value for the index, despite the presence of the largest percentage of public spaces for use compared to other urban centers. However, the reason for the low value is due to the small percentage of urban streets, which are considered part of the percentage of public spaces. The highest value was for Qalqilya, at 25.2%. This is due to the increase in the percentage of urban streets, as the percentage of streets was estimated at 23% of the urban area, which is the highest percentage of streets compared to other cities. However, there is a sharp decline in the percentage of existing public spaces due to the limited plots of land designated as public spaces, in addition to the political challenges that affect urban planning and urban expansion processes. It is also noted that the percentage in Tulkarm declined sharply for the same reasons mentioned, while the results for Jenin also showed a decline at the top of the indicator, but with a better result than Tulkarm and Qalqilya in terms of public use areas.

**Table 2***Urban Public Spaces (UPS) Indictors for Existing Situation*

Urban Center	Total city/urban area (Km <sup>2</sup> )	Land allocated to urban public spaces (ha)	Land allocated to streets (km <sup>2</sup> )	Average share of the urban area that is open space for public use (%)
Nablus	29.4	37.5	3.181	12.1%
Tulkarm	13.8	6.3	1,840	13.8%
Jenin	21.5	17.5	3,185	15.6%
Qalqilya	4.3	6.7	0.993	25.2%

In parallel with the indictor values obtained in urban areas, the same equation is used to calculate the indictor value based on the hypothesis on which the study was based. That is, there are opportunities to develop the indictor values and increase public spaces in the urban area through the optimal use of the proposed public and green areas within the city's master plan, and the full planned width of the streets. This would increase the pedestrian paths and green spaces within the street's right of way. The results are shown in Table 3.

**Table 3**

*Urban Public Spaces (UPS) Indicators for Existing and Proposed Situation in Master Plans*

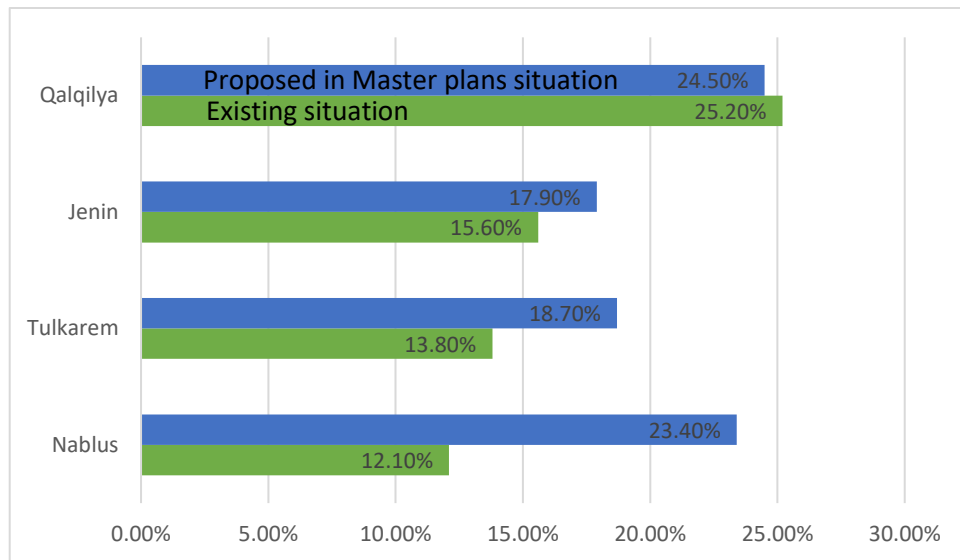
Urban Center	Total city/urban area (Km <sup>2</sup> )	Land allocated to existing and proposed urban public spaces (ha)	Land allocated to planned and non - streets (km <sup>2</sup> )	Average share of the urban area that is open space for public use (%)
Nablus	29.4	57.8	6.295	23.4%
Tulkarm	13.8	6.89	2.505	18.7%
Jenin	21.5	25.54	3.608	17.9%
Qalqilya	4.3	7.38	0.980	24. 5%

### **3.4 Results**

The results of UPS areas and areas allocated to streets are compared among the four urban centers, as shown in Figure 7. The variation in values among urban areas can be attributed to several factors. These include the extent to which urban planning is practiced in each city, particularly efforts to integrate solutions and strategies for increasing public spaces during the planning stages, as seen in Qalqilya and Tulkarm. Other factors include limited implementation of master plans, delays in completing new streets according to approved plans, and insufficient development or rehabilitation of public and green spaces for community use, as is the case in Nablus. In addition, political restrictions on urban expansion and the inability to allocate new areas for public use, as in Qalqilya, contribute to these differences.

**Figure 7**

*Percentage change in value of indicator 11.7.1 between current situation and proposed situation in master plan*



Based on this, the results confirm the validity of the hypothesis underlying the first part of the thesis. This points to the fact that effective interventions in urban planning can play an important role in achieving sustainable development goals for sustainable cities and communities.

## **Chapter Four**

### **Assessment of Urban Public Spaces Accessibility**

Indicator 11.7.1 focuses not only on the quantity of urban public spaces, but also on their accessibility to all users. Accessibility is crucial because it determines the extent to which residents can equitably access and benefit from open and green spaces. This indicator therefore links the provision of public spaces to issues of spatial justice, inclusiveness, and urban sustainability, which is particularly important in Palestinian cities where the distribution of public spaces is often limited and unequal (UN-Habitat, 2018).

This chapter quantifies and evaluates accessibility using ArcGIS software. The data generated from the indicator calculation in the previous chapter was used. The evaluation was based on the accessibility indicator for the current state of public spaces and the current road network.

This assessment was developed in consultation with urban planning and road planning experts to determine appropriate coverage distances for accessing different types of public places within the urban area.

#### **4.1 Assessment Method**

The study areas to be evaluated were divided into spatially defined neighborhoods, allowing for a more accurate assessment of the population size of each neighborhood. The assessment method, illustrated in Figure A.16, first relies on estimating the distances to public places within urban areas, after identifying their different types and proposing coverage distances with the assistance of urban and road planning experts. This will serve as an important basis for studying the accessibility and coverage of open public spaces, particularly those located in Palestinian urban centers. Second, ArcGIS 10.7.1 is used to estimate the coverage areas based on the distances identified in the previous step. A network analyst is then constructed for each urban area based on existing streets and connection points. Third, neighborhoods within urban areas are linked to the coverage results to estimate the number of residents served by UPS and who can access them within optimal standards. Finally, Researcher can create a spatial distribution for neighborhoods that lack any public open spaces and display them for future recommendations.

## 4.2 Experts Opinions

The questionnaire was designed to explore the opinions of experts regarding the distances covered and accessed in the thesis, specifically in Palestinian urban areas. It also addressed other questions related to the optimal proportion of public spaces within Palestinian cities, their fair distribution, and the most important factors influencing the determination of the optimal distances to access urban public spaces in the Palestinian environment, including urban streets and their characteristics as components of urban public spaces. The opinions of experts were expressed through a questionnaire (see Appendix B for details), which was sent via email. The sample included 16 experts in the field of urban and road planning, who work in various jobs such as universities, governmental, and civil organizations. A total of 12 experts participated, representing 75% of the participants. Appropriate access distances for different uses in Palestinian urban areas were mutually agreed upon. These questions are used for comparison with the percentage recommended by the United Nations Human Settlements Program (UN-Habitat) for public spaces within urban areas, which ranged from 15% to 25%. The questionnaire also includes items related to urban roads considered within the indicator as public spaces, and the mechanism for activating and working on them to increase the proportion of public spaces and green spaces within urban areas. This would ensure a comprehensive view point in evaluating the UPS in a manner that suits the Palestinian situation.

Opinions varied regarding the optimal distances to access the UPS, but they were close to the distances suggested by the study, from which a classification of UPS was derived. There was general agreement on the proposed distances for parks and large gardens, as well as public transportation stations. Opinions differed regarding public spaces and local green spaces, which depend on different urban contexts. The most prominent factors identified by experts in determining the optimal distances for public spaces within the city were population density, mentioned by 80% of the experts, the distribution of neighborhoods, the availability of public transportation and safe pedestrian paths, mentioned by more than 70%, and the geographical terrain of Palestinian urban areas, mentioned by more than 60% of the experts.

As for the fair distribution of public spaces in Palestinian urban areas, 90% of experts voted that it is unfair due to land allocation and the concentration of public spaces in the

urban center. Regarding the urban planning process's consideration of access to public spaces in Palestine, 70% of the experts agreed that accessibility is not taken into account, while the remaining 30% expressed that it is only taken this into account theoretically, without any implementation on the ground. This is largely consistent with the hypothesis of this study, which calculates the index value when taking into account the implementation of all urban plans in the urban environment of the city. Regarding the optimal percentage of Palestinian urban public spaces, there was a divergence of opinions, due to several factors. About 25% of experts chose a percentage of public spaces of less than 15%, considering it appropriate for the Palestinian context due to the scarcity of land and the political situation that limits urban expansion

After clarifying the information obtained from the experts in the questionnaire, the data on the proposed access distances to UPS were summarized. This was done after the researcher proposed the distances based on the literature review and his vision for the study of Palestinian urban areas. These distances were presented to the experts in the questionnaire to measure the extent of agreement between the researcher and the experts in reaching more accurate and appropriate distances; see Table 4 for the summary.

**Table 4***Experts Opinion on Accessibility and Coverage Distances for Urban Public Spaces*

UPS Type	Description	Maximum Distance from home (Meters)
Main parks or stadium	A major public park considered the main provider of recreational and sporting facilities	1500- 2000 m
Local parks/ Public squares	A small park that serves the residents of a neighbourhood and nearby neighbourhoods on a secondary basis, and often contains playgrounds and seating areas.	300- 500 m
Green spaces adjacent urban streets	Small green spaces along urban streets serve as a safe recreational space.	400- 500 m
Main public transportation station	Major stations serving people commuting to and from other major cities.	500-1000 m
Local public transportation station	Local stations that serve people commuting to and from nearby communities and other neighbourhoods within the urban area.	300- 500 m
Intersections and Roundabouts	These are spaces that are partially used as places for rest and sitting.	150- 300 m
Pedestrian sidewalks on both sides of urban streets	Public spaces eligible for use by pedestrians and within the street right-of-way	Should be for all Urban Streets Suggested 150- 300 m

On the other hand, 50% of experts chose a percentage between (15-25%), considering streets as public spaces; the remaining 25% of experts chose a percentage of more than 25%, as part of achieving sustainability goals.

And for considering urban streets as part of UPS, 80% of experts expressed their approval, provided that sidewalks are widened for pedestrians, seating areas, and safe bicycle lanes are provided. However, 20% of experts opposed the idea, stating that current streets do not meet the criteria for public spaces.

### **4.3 Classification of the Levels of UPS**

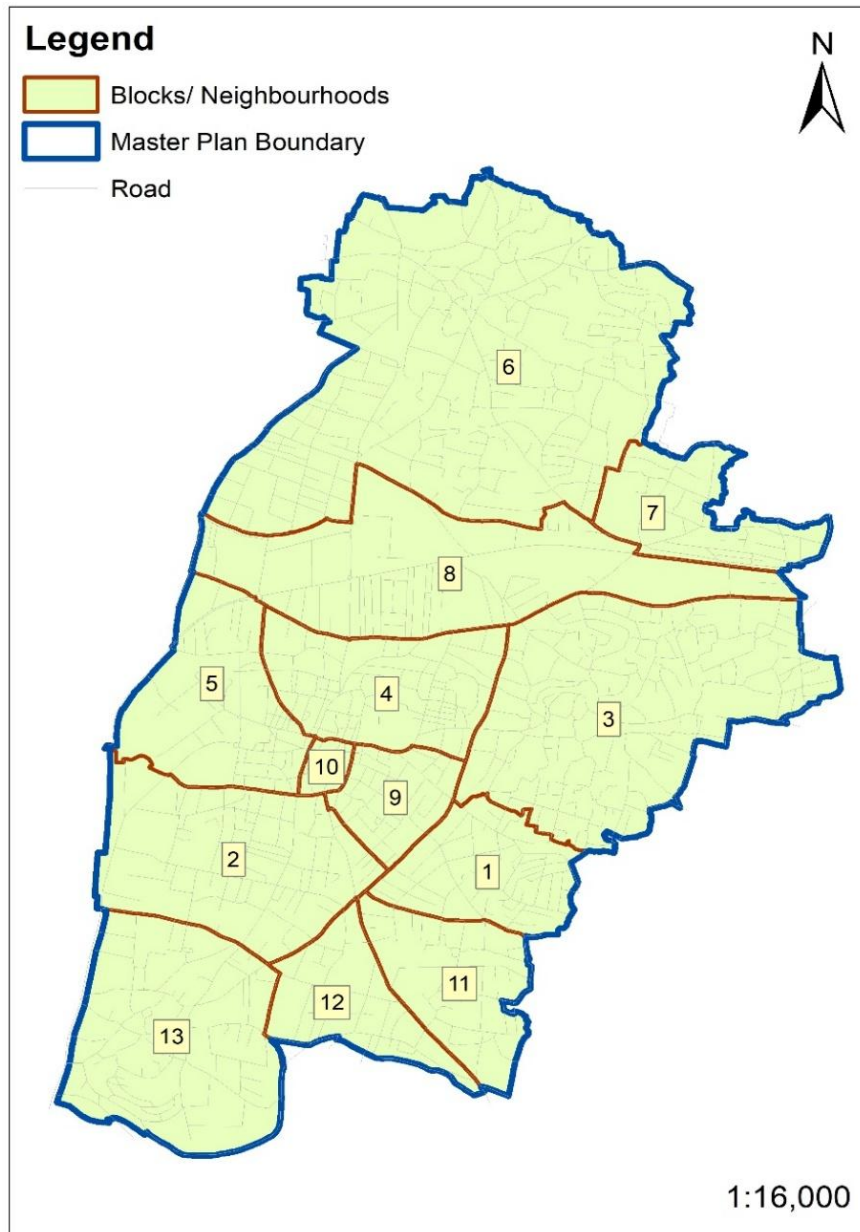
For estimating access to public spaces and the coverage areas, the calculation should be based on criteria specific to the appropriate distances that suit an individual to reach public spaces on foot. Indicator 11.7.1 adopts a distance of 300 meters to stay within the most appropriate access distance to green spaces, as recommended by the World Health Organization (WHO). However, there is a diversity of public spaces within the urban area according to the type of use and the area they serve. Access distances were estimated to suit these types of urban public spaces, with the assistance of urban planning and road planning experts, through an evaluation questionnaire, as shown in the Appendix B.

### **4.4 Boundary of Assessment**

The boundaries of the assessment areas for access to public spaces are defined as the division of neighborhoods within urban areas by municipalities to evaluate the mechanism of accessibility and coverage of urban public spaces (UPS). Tulkarm was taken as a case of four cases in study area. These boundaries are also defined as a single unit with a functional, administrative, or service title. Therefore, it was decided to divide Tulkarm into 13 neighborhoods within the urban area in order to carry out the assessment process, as shown in Figure 8.

**Figure 8**

*Blocks/ Neighborhoods Boundary of Tulkarm Urban Area for Assessment*



#### **4.5 Assessment Process**

The assessment process begins with determining the classification and distribution of UPS within the urban area in order to apply the network analyst assessment method in ArcGIS, which is based on determining the service area for each urban space according to the criteria obtained in Table 4.

#### **4.5.1 Distribution of UPS in Tulkarm Urban Area**

UPS within Tulkarm varied despite their scarcity, as mentioned in Chapter 3. There is no large main park for the entire urban area, except for the municipal stadium in block 8. There is also a significant shortage of public spaces within most of the blocks/neighborhoods such as blocks 1,2,3,7,9,11 and 12. There is also a lack of qualified local public transportation stations within the neighborhoods to reach the city center, as there are only stations within the city center, in addition to the lack of safe pedestrian-friendly streets within the CBD, as shown in Figure 9.

This is clearly considered an unfair distribution of public spaces despite their scarcity, as there are public spaces that must exist, especially in neighborhoods that are not close to the city center.

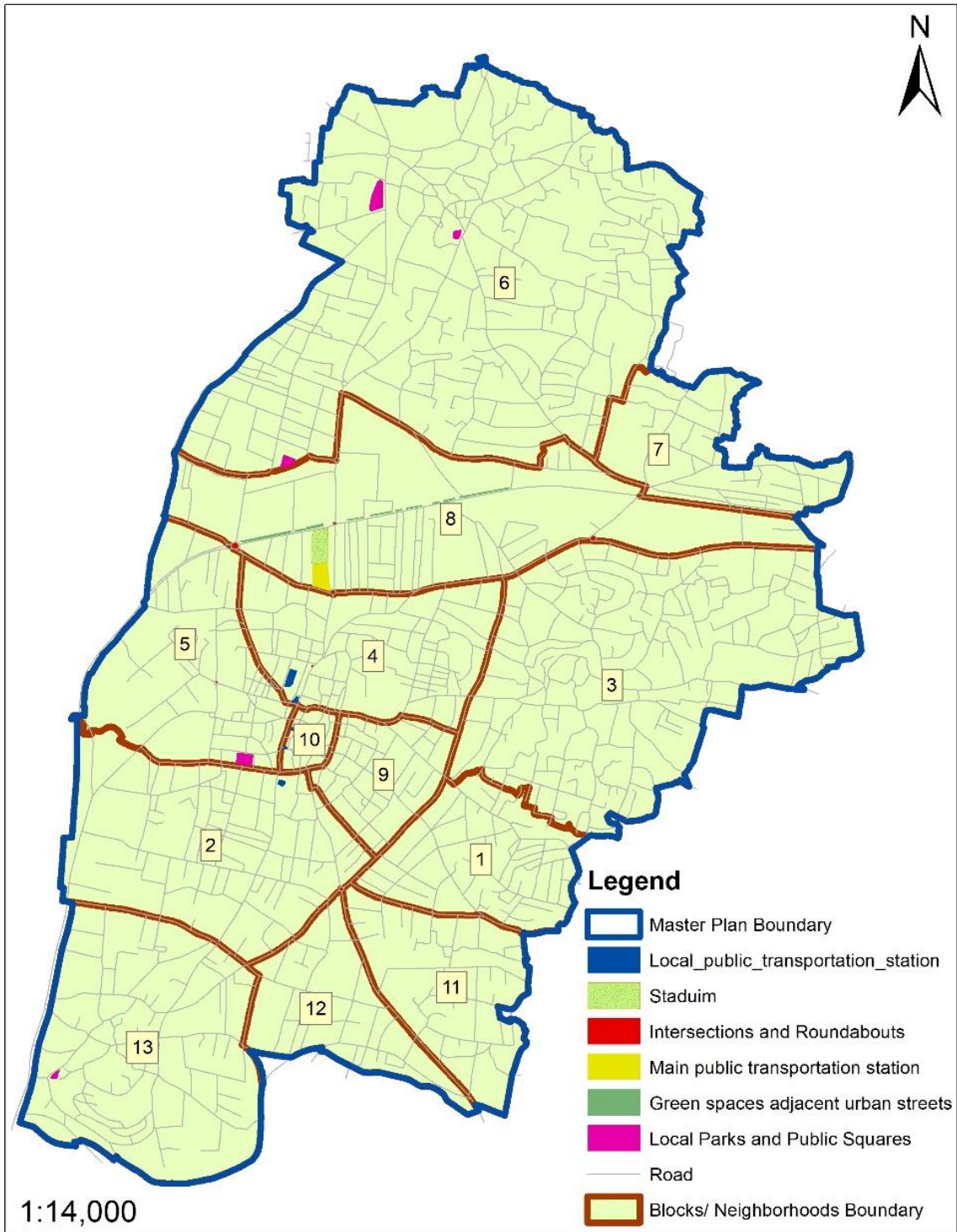
#### **4.5.2 Service Area of UPS in Tulkarm Urban Area**

Accessibility to public spaces is measured using existing urban streets as access corridors as mentioned before. The model was used for more accuracy than buffers model, and it is also used to evaluate the level of urban streets in accessing public spaces.

After applying the service areas calculation model for public spaces and according to the suggested distances, as shown in Figure 10, Researcher notice that there is a clear gap in all types of UPS in the city's neighborhoods, especially the eastern and southern ones, as these are vital neighborhoods with a relatively far distance between them and the city center.

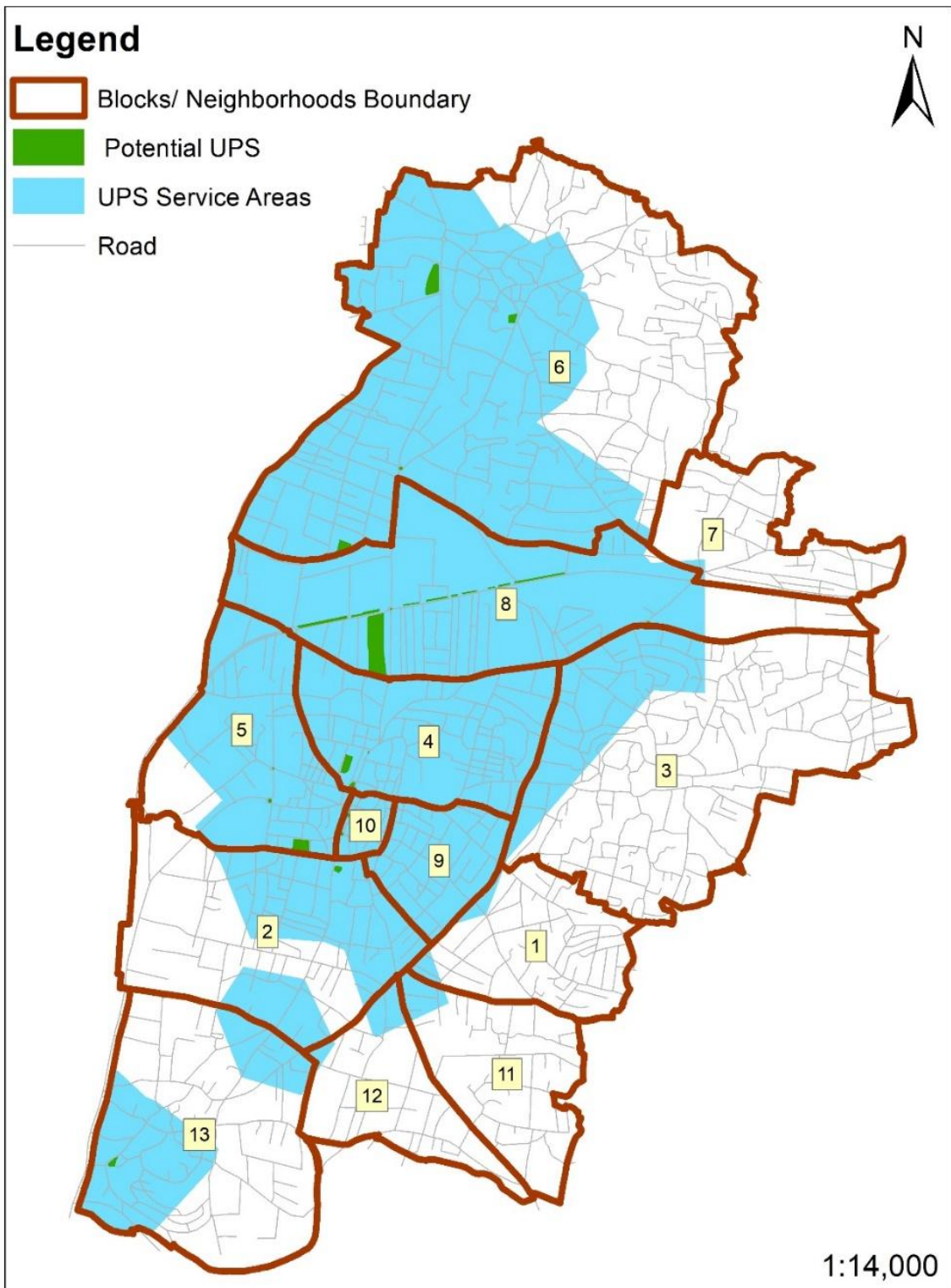
**Figure 9**

*Distribution of UPS in Tulkarm Urban Area*



**Figure 10**

*Service Areas of UPS in Tulkarm Urban Area*



### 4.5.3 Accessibility Index Value

After defining and determining the service areas for public spaces within the urban area, the accessibility index is estimated representing the number of residents living within the service areas and who can access to UPS.

Population numbers are estimated through the population and housing census conducted in 2017, where there is actual data about the number of buildings and households within each neighborhood in the urban area. From which, the population count is derived. This is done in order to estimate the number of residents who can access public spaces. The value of the accessibility index will be calculated using the formula:

$$\text{Accessibility Index (\%)} = \frac{\text{Total population within the service areas}}{\text{Total population of the urban area}}$$
$$(42110 / 80886) = 52\% \dots \dots \dots (3)$$

Therefore, 52% of the population of the Tulkarm urban area has access to public spaces and is concentrated in the city center and the surrounding area, where the population density is high as shown in Figure 10. There are five neighborhoods in which there is no public space of any kind and which do not receive any public space services from other neighborhoods according to appropriate standard distances.

### 4.6 Results

After understanding the mechanism for assessment existing UPS in terms of accessibility and service areas, the researcher has identified proposed criteria and distances that fit the Palestinian urban context, in collaboration with the opinions of local planning experts. This will also help to build a realistic assessment mechanism for UPS in Palestine. Based on that, the assessment was applied to the urban area of Tulkarm. The results showed that almost half of the population of Tulkarm do not have proper access to public spaces and benefit from them. It also indicated, based on the division of neighbourhoods within the city, which neighbourhoods need public spaces and should be worked on comprehensively.

This suggests a fundamental shortcoming in the allocation of public spaces within the urban planning process, as the city's expansion was neither adequately studied nor guided by a sustainable urban plan.

## **Chapter Five**

### **Conclusions and Recommendations**

Based on a comprehensive analysis of indicators of public space use in the four urban areas studied, including measuring indicator 11.7.1 and assessing mechanisms of access to public spaces, the results provide an accurate understanding of the current situation regarding the proportion and coverage of public spaces. Based on these insights, specific conclusions and recommendations are presented to guide planners toward improving the share of urban public spaces in the study area and in Palestinian cities in general, in line with sustainable development goals. These recommendations aim to promote an integrated urban environment and encourage a healthier and more sustainable urban life, including access to and use of public spaces by all members of society.

#### **5.1 Conclusions**

The results of measuring urban public spaces in the study area showed that the percentages were extremely low, far below the standard set in the study index, which recommends a ratio of between 15 and 20% of urban space. The average percentage in the study area was 1%, with the lower percentage in Tulkarm, at 0.5%. The average percentage of urban streets in the study area was 13.3%, while UN-Habitat recommends a percentage ranging between 30 and 35%. This current percentage is also far from the percentage specified in the indicator.

The study used an optimal application of the city's urban planning process to estimate the values of the indicators, in particular with regard to the streets and public spaces identified in the master plan. The results indicate that while streets occupy an average of 19.4%, public spaces remain limited, averaging only 1.5%, highlighting a significant shortage in the allocation of urban space.

The results showed that some urban areas need to work on realizing the opportunities available within urban plans to directly raise the index value, such as the cities of Nablus and Jenin. While the situation in Qalqilya city required proposing new public spaces through the practice of urban planning, it was essential to consider the access mechanisms to the new public spaces and the locations where they are needed in the city, as recommended by this study. The same applies to Tulkarm, which needs to re-engage in

urban planning to create opportunities for increasing public space and street areas and distributing them within the city.

Regarding access to public spaces and their coverage within urban areas, the study developed a model of standards that encompasses the type of public space in the study area, along with suggested access distances. With the assistance of urban planning and road experts, appropriate distances were determined. These standards can serve as a reference for other studies or assessments related to access to urban public spaces in Palestine. The study found that when applying the assessment to the urban area of Tulkarm, there is a severe shortage in the distribution of public spaces, which has resulted in a complete lack of services in five neighborhoods.

The study also observes a clear scarcity in public spaces, particularly local parks that serve the neighborhoods within the urban area; there is no main public park that serves a wide range of up to 1500 meters and a large part of Tulkarm. Regarding the division of neighborhoods in Tulkarm, the study also noticed a significant difference in areas, urban form, and population numbers within the neighborhoods, which have affected the results.

Regarding the methodology on which the study was based, which was consistent with the methodology adopted in calculating the indicator, the study applied parts of the methodology to Palestinian urban areas and developed some sub-indicators and evaluation methods that are appropriate for the Palestinian situation. This was evident in proposing evaluation distances for the accessibility of public spaces in consultation with local experts, as well as applying the urban planning process to find opportunities to raise the value of urban public spaces within Palestinian urban areas.

Therefore, effective urban interventions are required to improve the presence, distribution, and quality of urban public spaces, in a manner that suits all segments of society.

## **5.2 Recommendations**

Recommendations are proposed to improve the presence and distribution of public spaces, including public spaces, parks, green areas, and street spaces within the study area and in Palestinian urban areas in general. These recommendations also include suggestions for measurement methods and future research. Based on the analysis

conducted in this study, these recommendations are intended to address existing concerns and promote a more sustainable environment in the future.

### **5.2.1 Recommendation for Public Spaces and Green Areas**

- In light of the findings of this study, an initial target of 10-15% for urban public spaces could be considered a first step toward improving their share in Palestinian urban areas. This guideline could be integrated into upcoming urban planning processes, which are anticipated to be finalized before 2030.
- The principle of urban revitalization should be applied within urban areas when planning the city, taking into account the need to ensure the equitable and widespread provision of public spaces within the urban area using urban streets as pathways for access.
- Integrate the provision of public spaces and parks into subdivision and licensing procedures in urban areas, it is recommended to allocate 5–7% of the land within detailed plans for this purpose. This approach, already practiced in areas outside the master plan boundaries in the Palestinian territories, would help ensure that neighborhoods and housing projects within urban areas and their master plans are adequately served by public spaces.
- Introducing the principle of mixed-use in land use within densely populated areas of the city, which combines the provision of markets, residential clusters, and public spaces for recreation and cultural and social activities especially in densely populated urban areas and old neighborhoods. This would provide more space for public spaces with more than one identity and use, especially in urban neighborhoods close to the center and old towns.
- Utilizing the proposed public spaces in the approved master plans for cities and rehabilitating them, as it was found during the analysis phase that there is a high percentage of proposed public spaces that have not yet been used within the boundaries of urban areas, which effectively helps increase the proportion of UPS.
- Rehabilitation and utilization of the areas adjacent to wadies and watercourses located within the boundaries of urban areas, as there is a buffer zone for the valleys where construction is prohibited. Therefore, it is important to exploit and develop these areas to become green spaces that contribute to improving the urban environment.

### **5.2.2 Recommendation for Urban Street as Part of UPS**

- To establish a standard for increasing the proportion of streets in Palestinian urban areas during the urban planning process, it is important to consider the UN-Habitat benchmark of 30–35% to be achieved by 2030. Given that the urban areas in the study require updated planning and boundary expansion, a practical first step would be to target 20–25% of the urban area for streets, as suggested by this study’s findings. One of the main factors contributing to the lower-than-expected results was the limited implementation of structural streets in the urban plans adopted for the cities within the study area between 2005 and 2013.
- Classification and ranking of urban streets within the city into arterial, collector, and local streets, as outlined in the Urban Roads and Transportation Planning Guide 2013, in order to analyze the importance of streets within the city and to rely on such a classification in providing public spaces within urban streets such as trees, islands, sidewalks, and side furniture to improve the urban environment within urban areas (MOLG, 2013).
- Redistributing the widths of some streets based on their classification, in such a way that the width of some car lanes is reduced, the area of sidewalks is increased, and green areas, as well as special paths for pedestrians, people with disabilities, and bicycles, are added.
- Identifying streets within urban areas that are designated for pedestrians only and bicycles, with a human-centered character that serves neighborhoods, far from vehicle pollution, and with a sustainable green character.
- Integrating public spaces with urban streets by developing intersections and major roundabouts to serve as urban public squares, especially during seasonal events.

### **5.3 Recommendation for Future Research**

- The city can be divided into neighborhoods and planning zones that are analyzed both individually—to ensure fairness in planning—and collectively, to shape the overall urban form. A more precise application of this approach would have strengthened the study, particularly when delineating the proposed block boundaries for evaluation.
- Planning within the concept of sustainable urban planning for urban areas that focuses on achieving sustainable development goals collectively.

- Conduct studies and analyses of walkability in selected streets in urban areas, so these urban streets are developed to be walkable under all suitable conditions; these would be the same streets that the study consider when calculating the indicator.
- Study public urban spaces within the urban areas to complete the architectural and urban analysis of the needs of these spaces regarding sustainability requirements, which focuses on the human dimension and analyzes the viewpoints of citizens from different segments of society. The use of smart urban planning and urban modeling techniques that assist in analyzing human behavior is also taken into consideration.

## List of Abbreviations

Abbreviation	Meaning
UPS	Urban Public Space
WHO	World Health Organization
UN	United Nations
SDGs	Sustainable Development Goals
MDGs	Millennium Development Goals (MDGs)
GIS	Geographic Information System
UN-Habitat	The United Nations Human Settlements Programme
GHSL	Global Human Settlement Layer
DEGURBA	Degree of urbanization method
ANGSt	Accessible Natural Green Space Standard
NDVI	Normalized Difference Vegetation Index
OPS	Open Public Spaces
LAS	land allocated to streets
UOS	urban open spaces
VGI	Voluntary Geographic Information
HRL	high-density waterproof layer
PCBS	Palestinian Central Bureau of Statistics
UNRWA	United Nations Relief and Works Agency
MOLG	Ministry of Local Governorate

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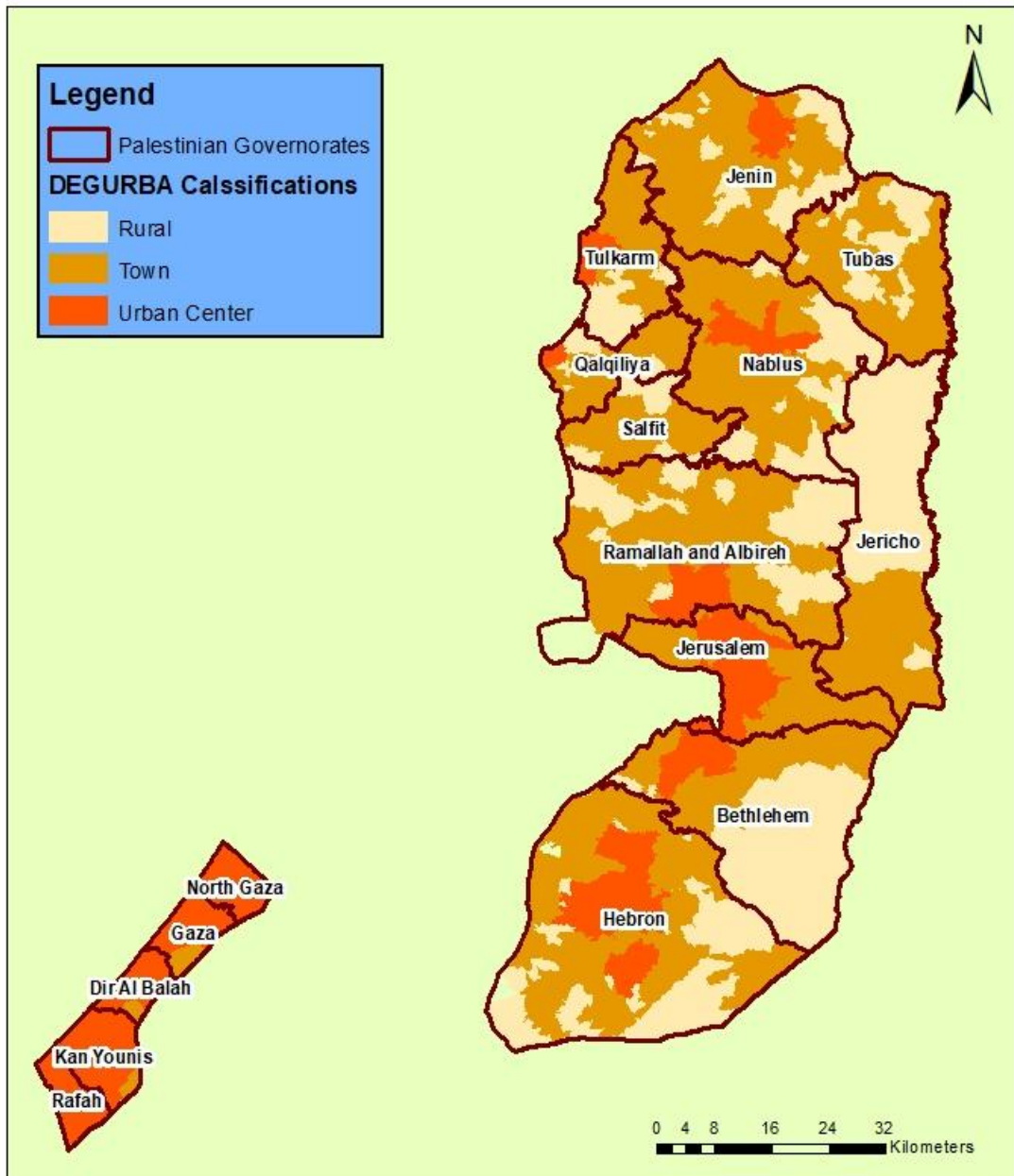
# Appendices

## Appendix A

### Data Collection and Analysis Figures

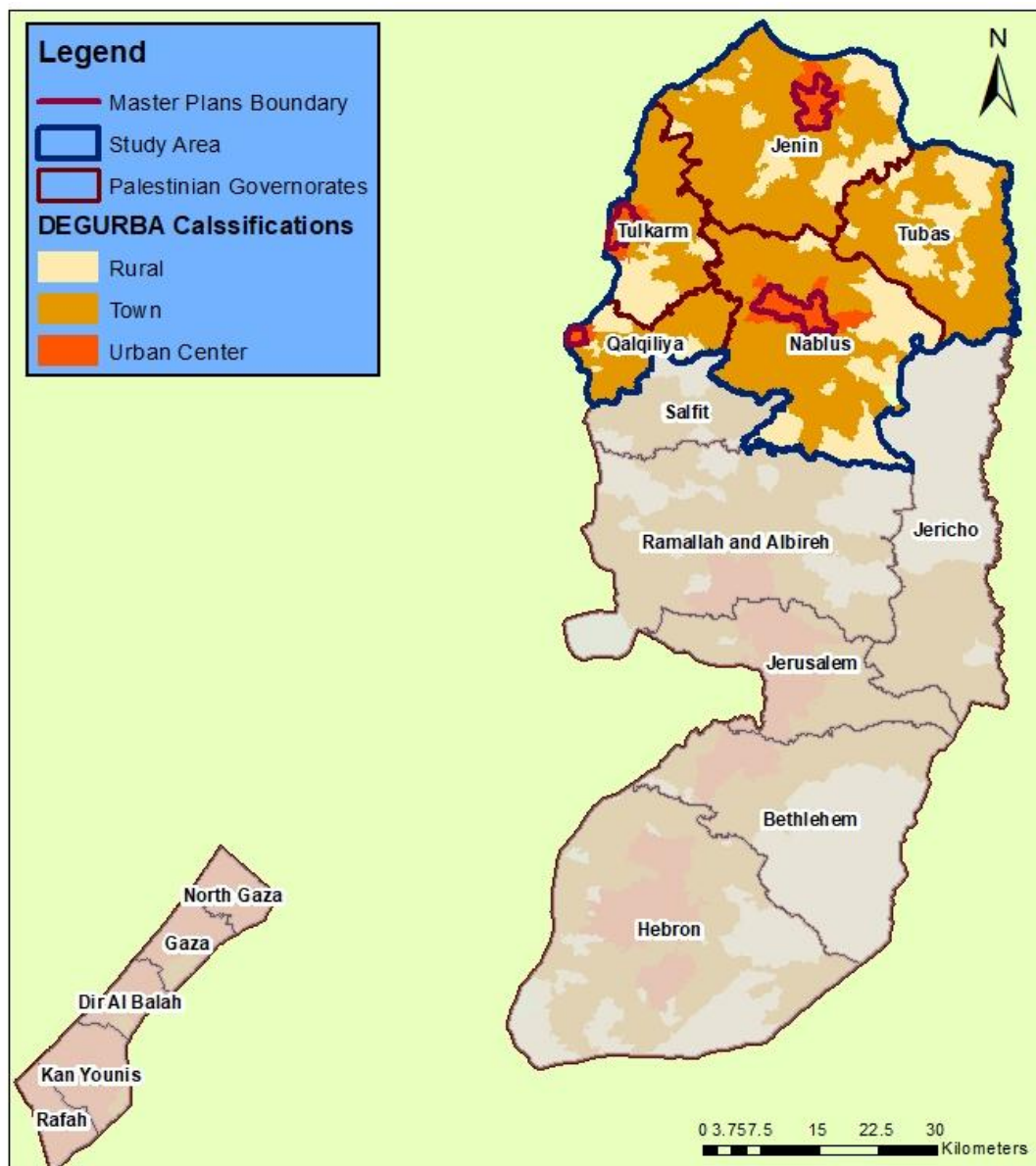
**Figure A.1**

*Degree of urbanization classification map*



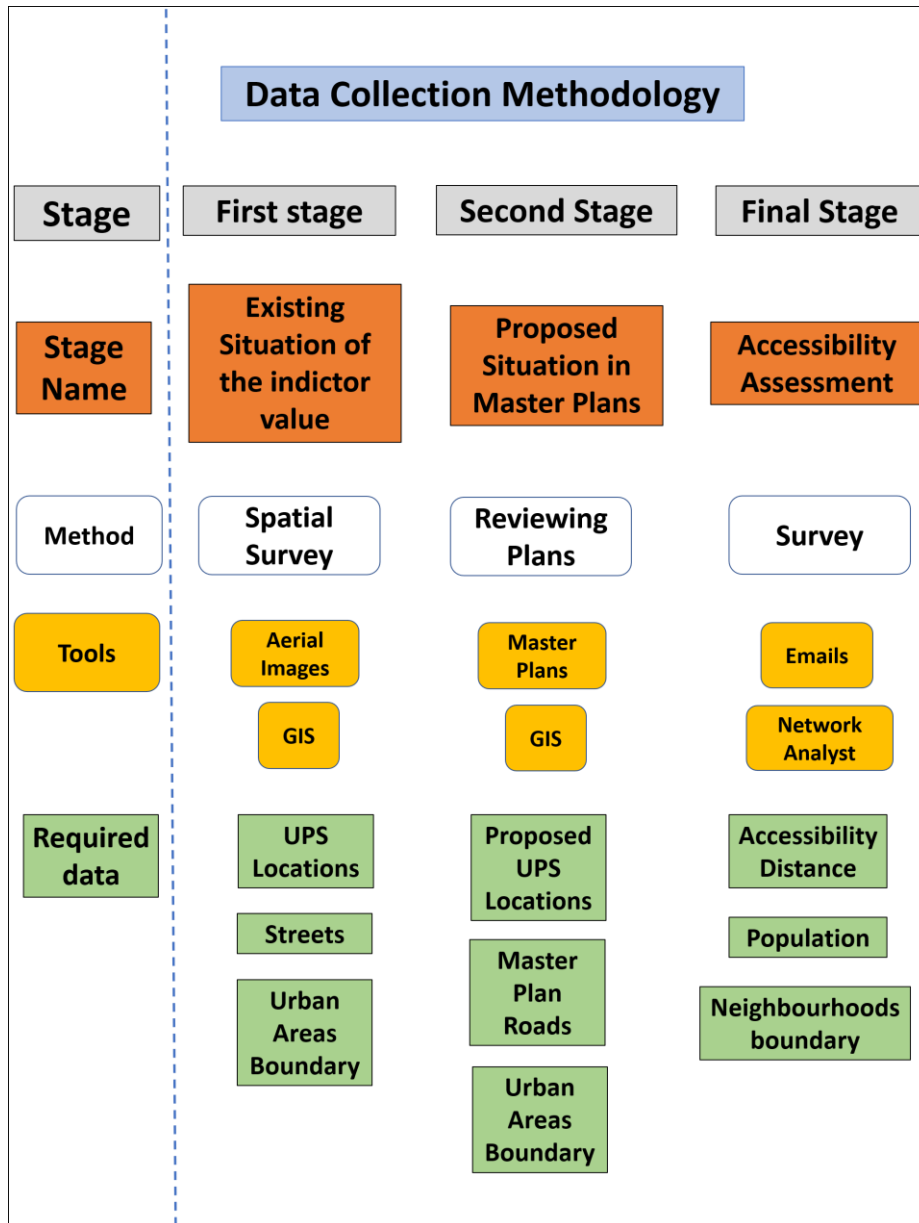
**Figure A.2**

*Study area: North of the West Bank*



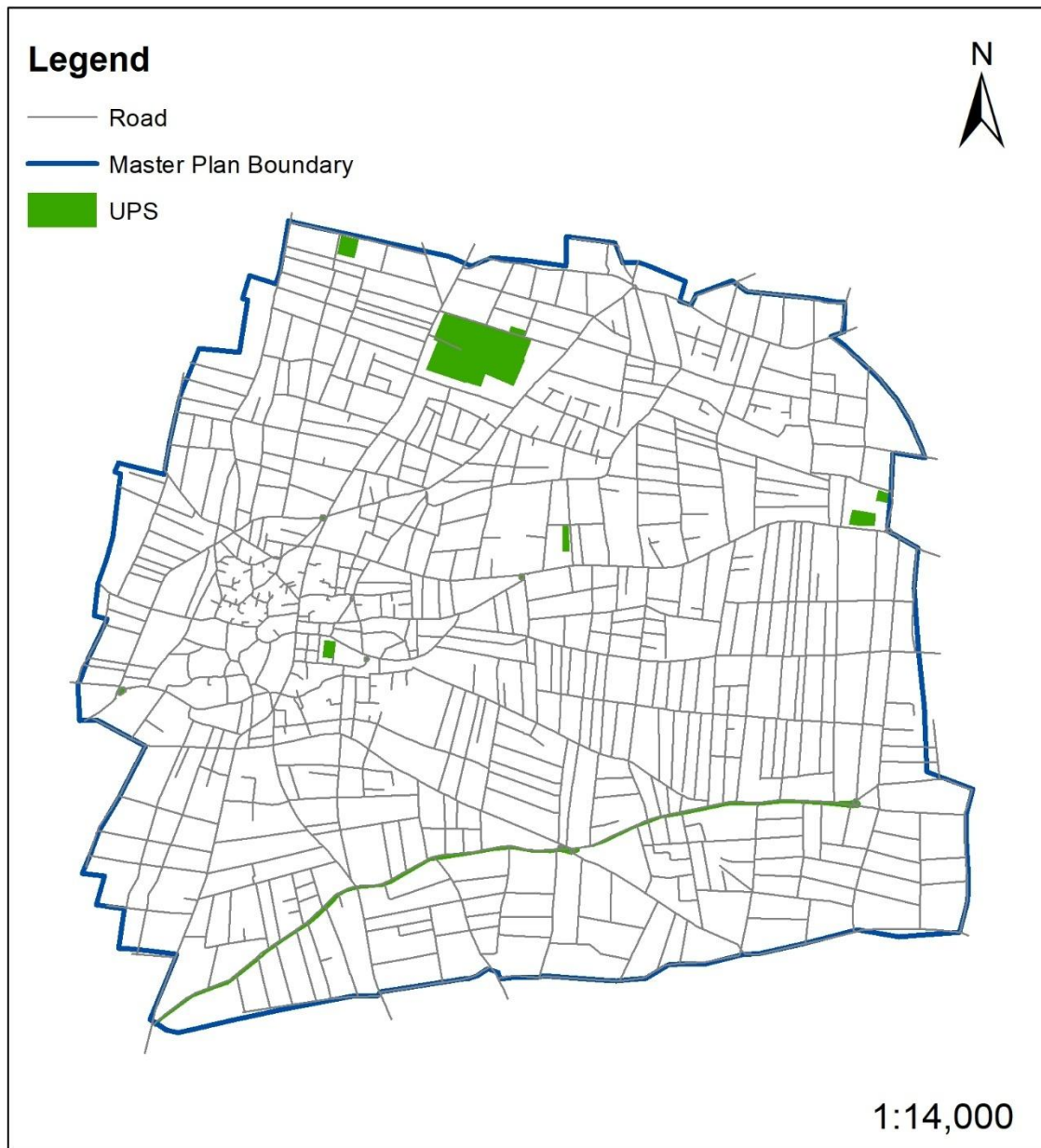
**Figure A.3**

*Methodology of Data Collection*



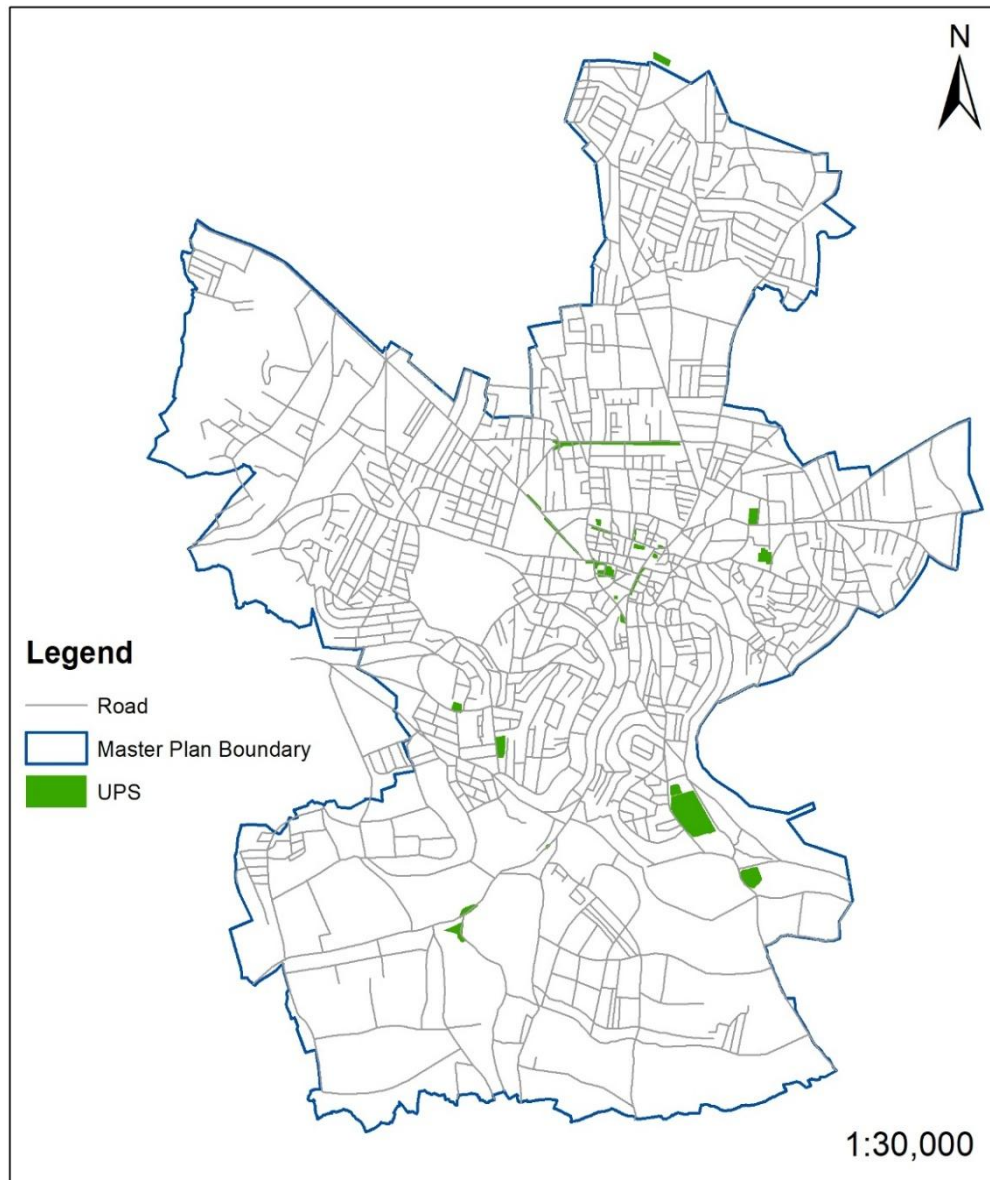
**Figure A.4**

*UPS distribution map in Qalqilya Urban Area.*



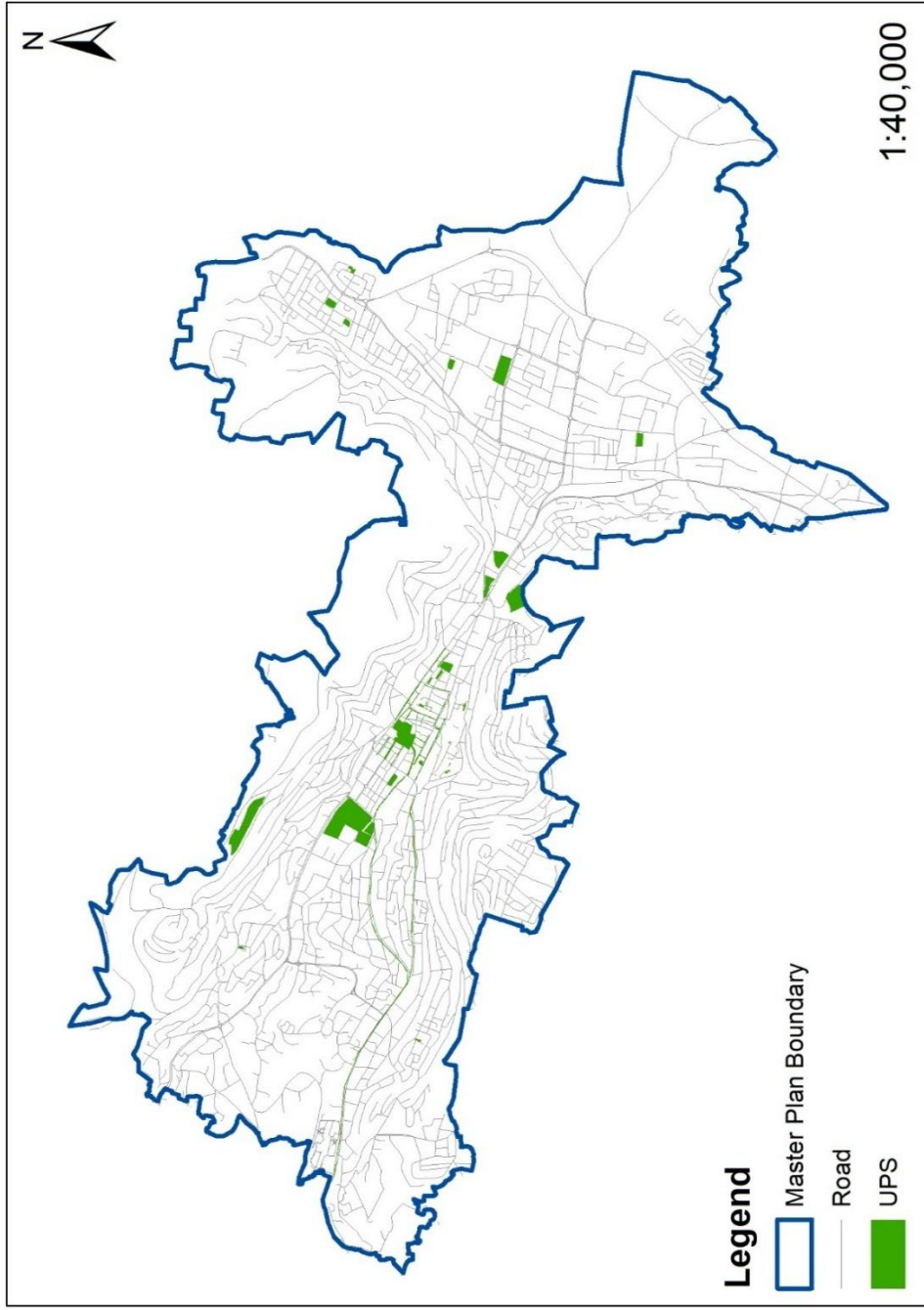
**Figure A.5**

*UPS distribution map in Jenin Urban Area.*



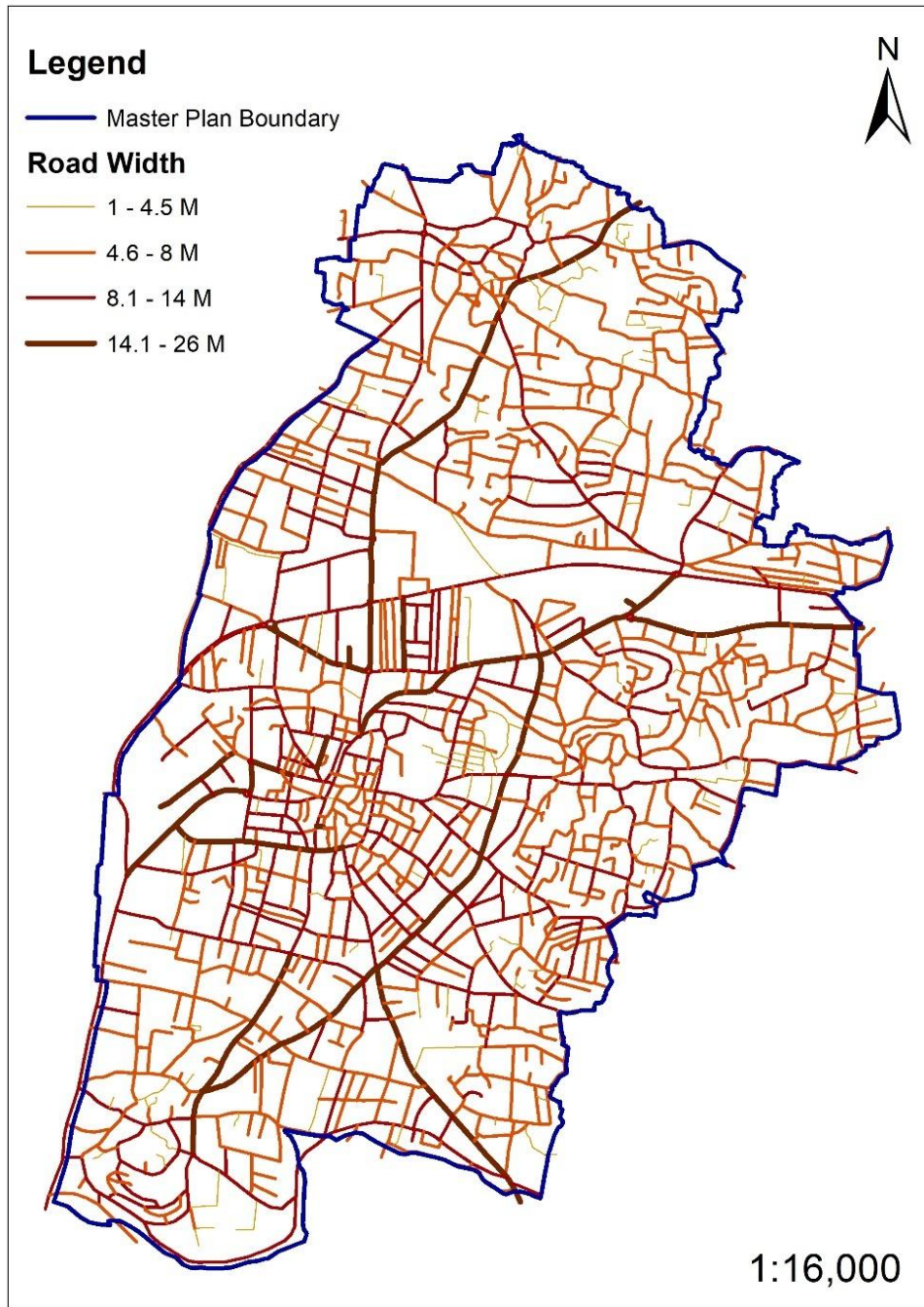
**Figure A.6**

*UPS distribution map in Nablus Urban Area*



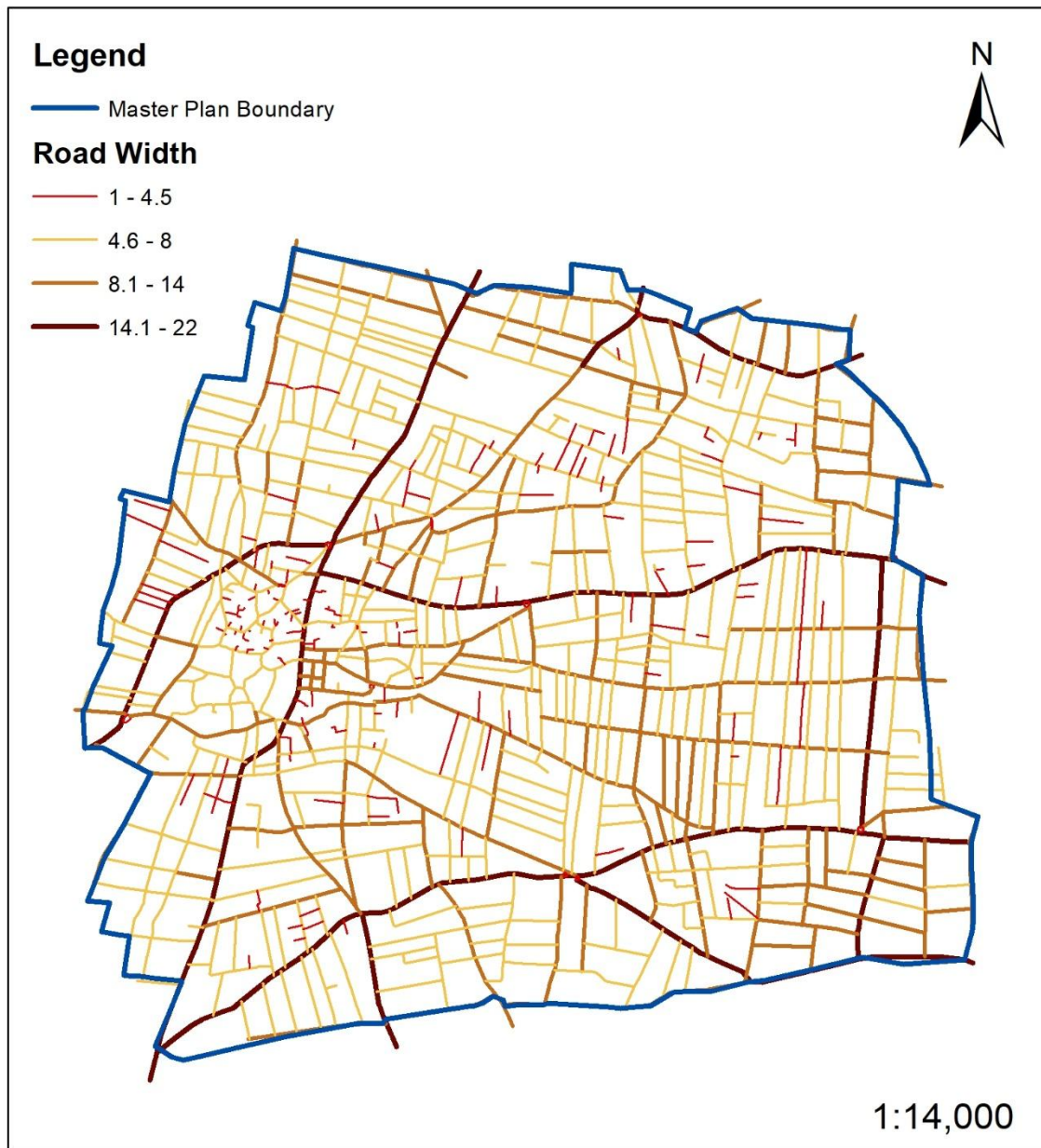
**Figure A.7**

*Existing Road Network in Tulkarm Urban Area.*



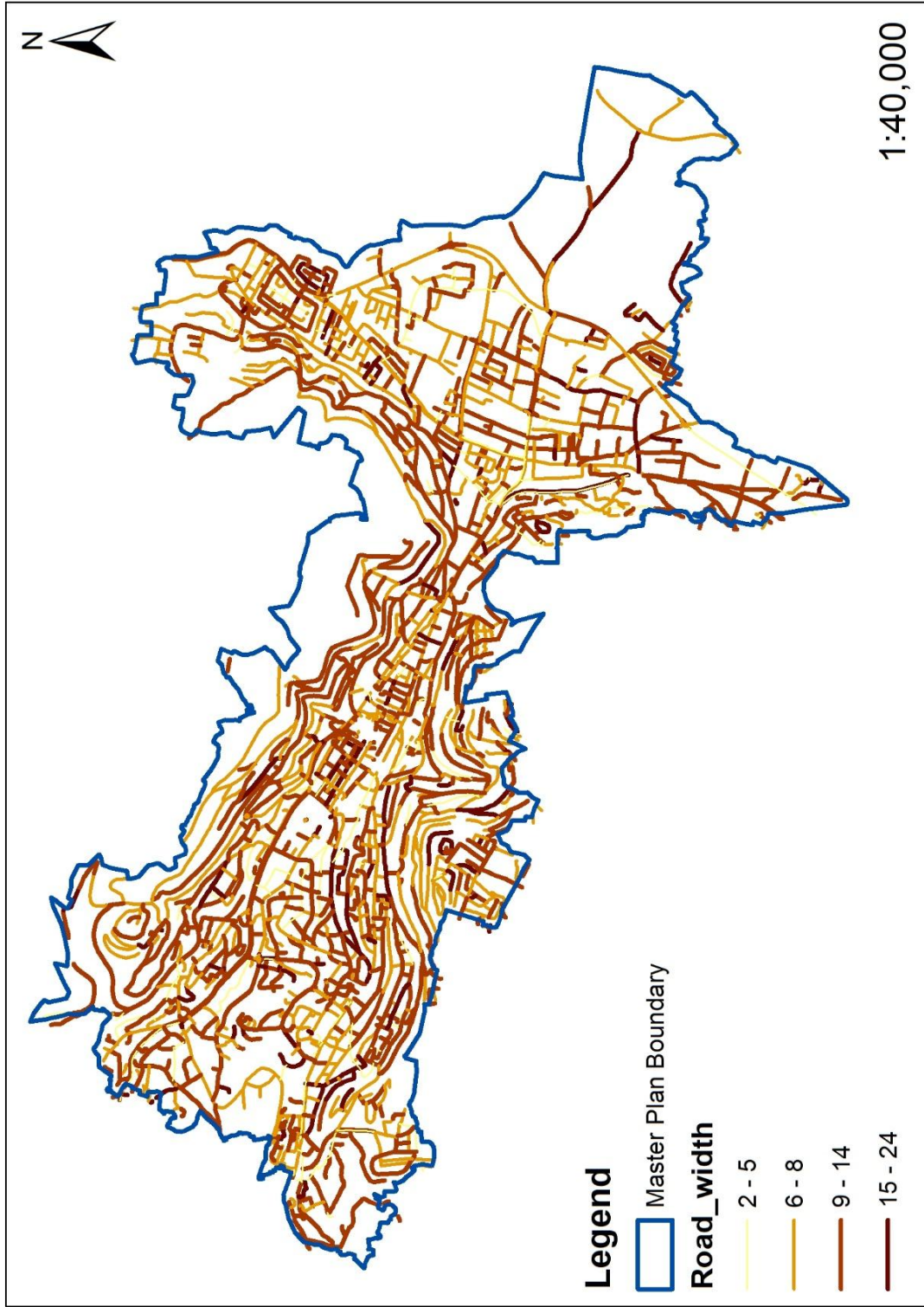
**Figure A.8**

*Existing Road Network in Qalqilya Urban Area.*



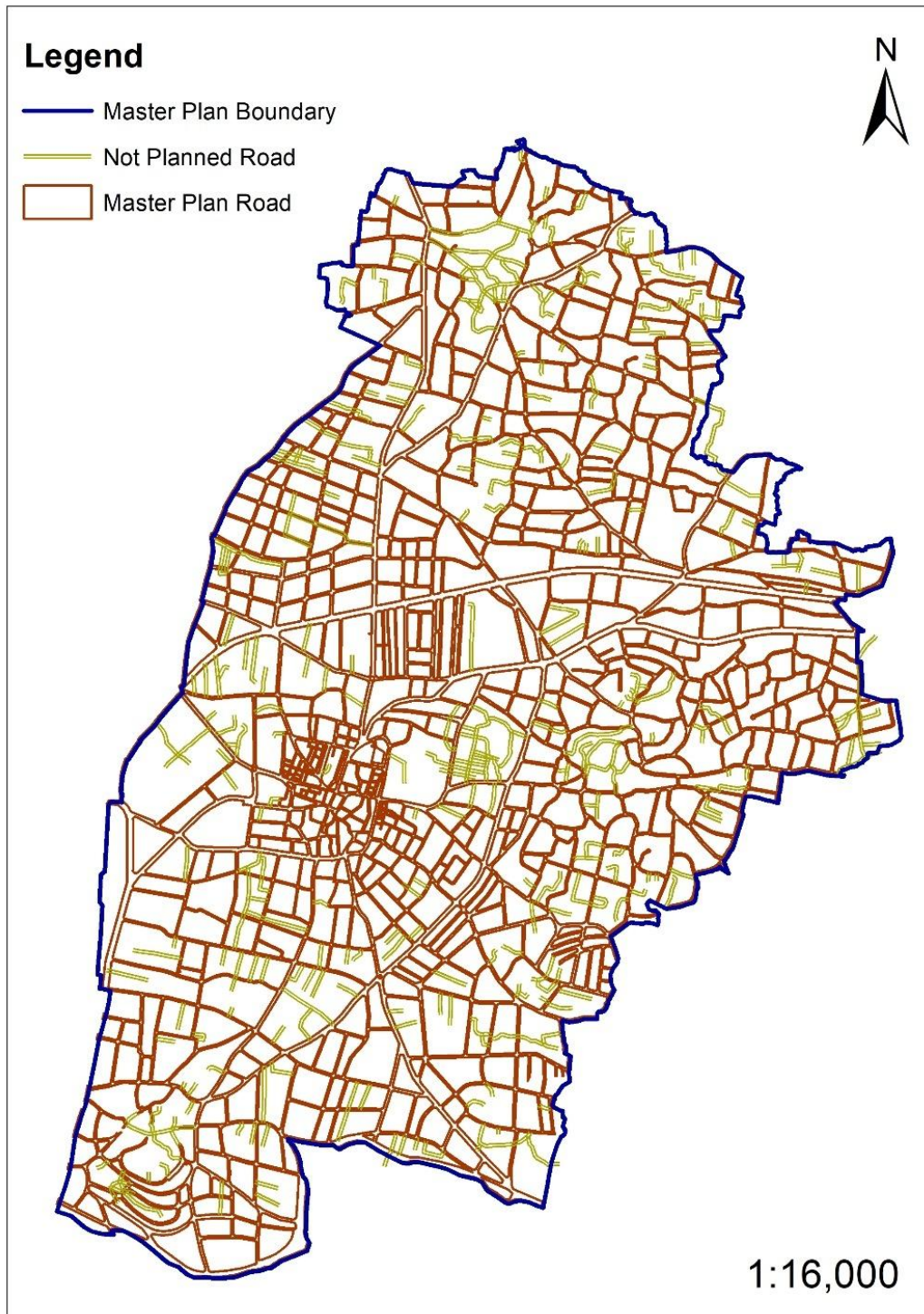
**Figure A.9**

*Existing Road Network in Nablus Urban Area.*



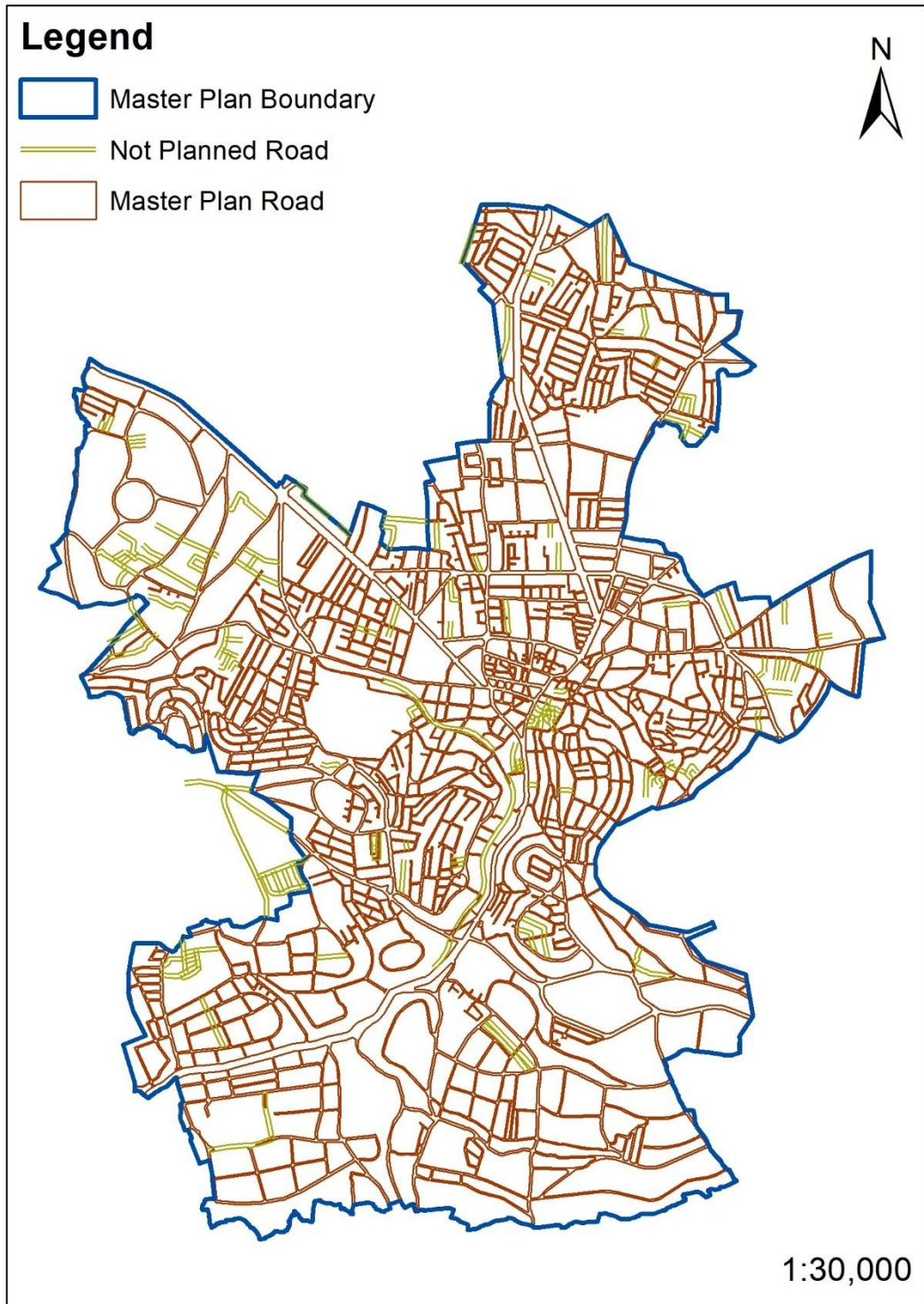
**Figure A.10**

*Existing Not Planned and Master Plan Road in Tulkarm Urban Area.*



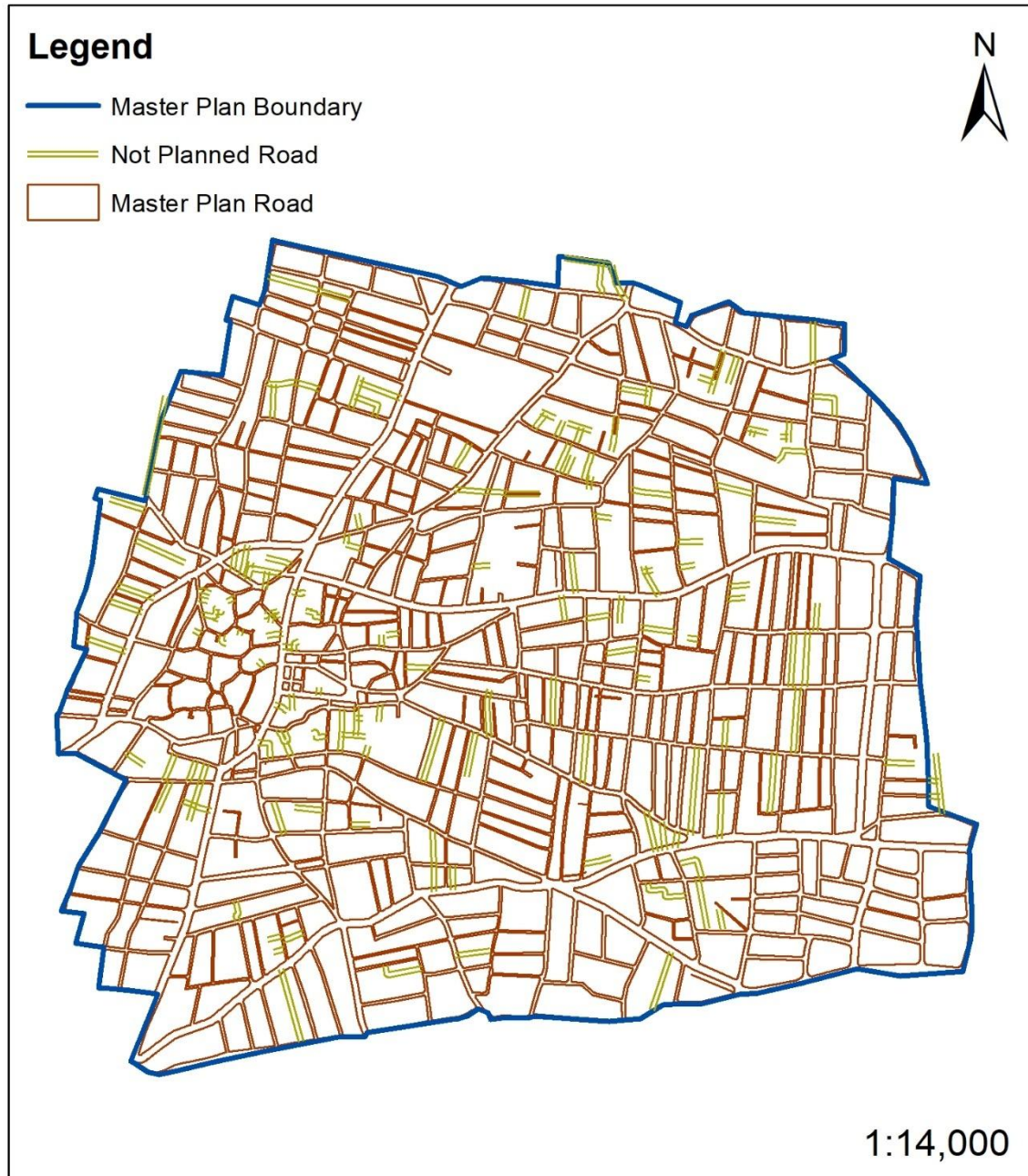
**Figure A.11**

*Existing Not Planned and Master Plan Road in Jenin Urban Area.*



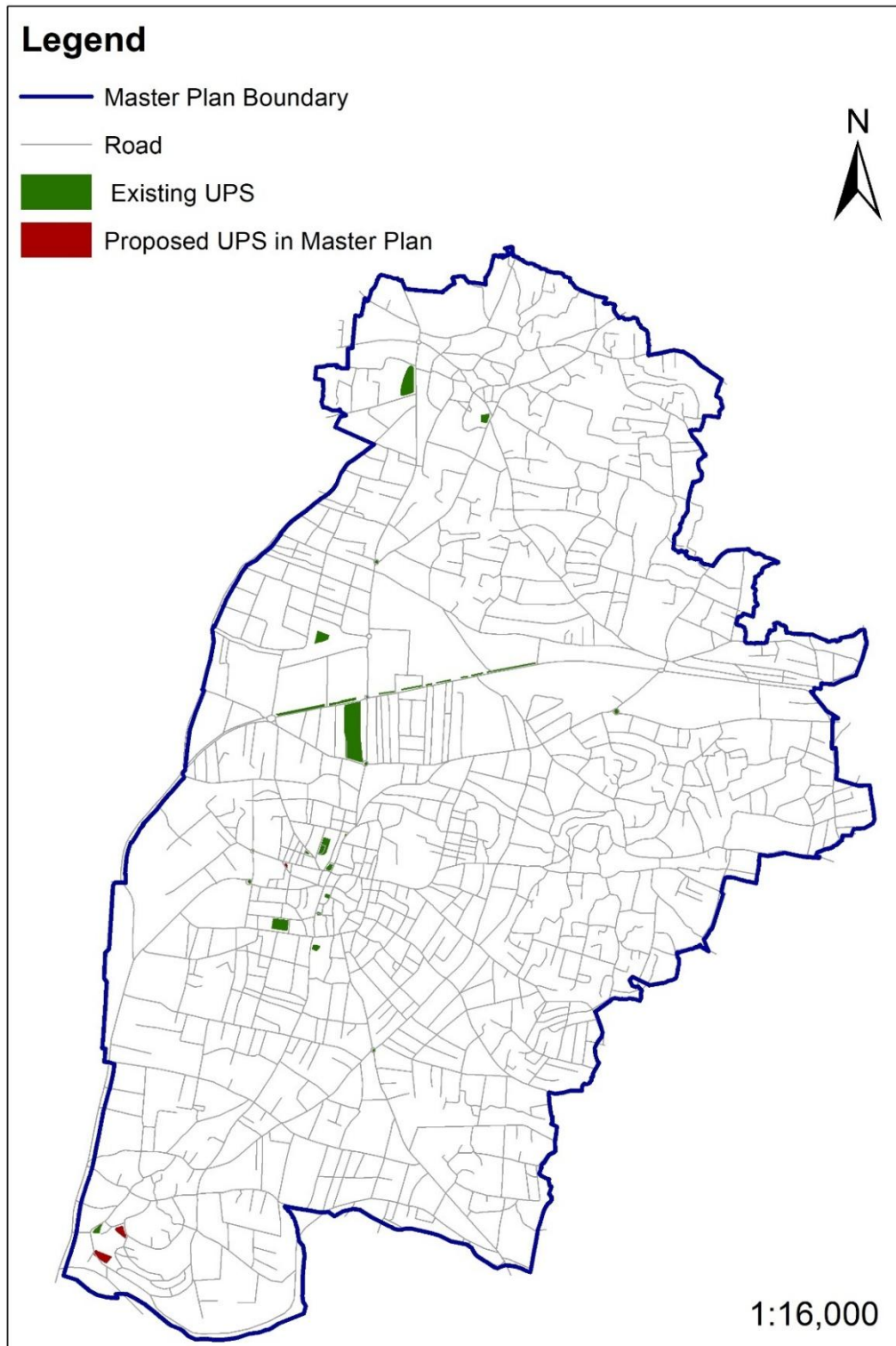
**Figure A.12**

*Existing Not Planned and Master Plan Road in Qalqilya Urban Area.*



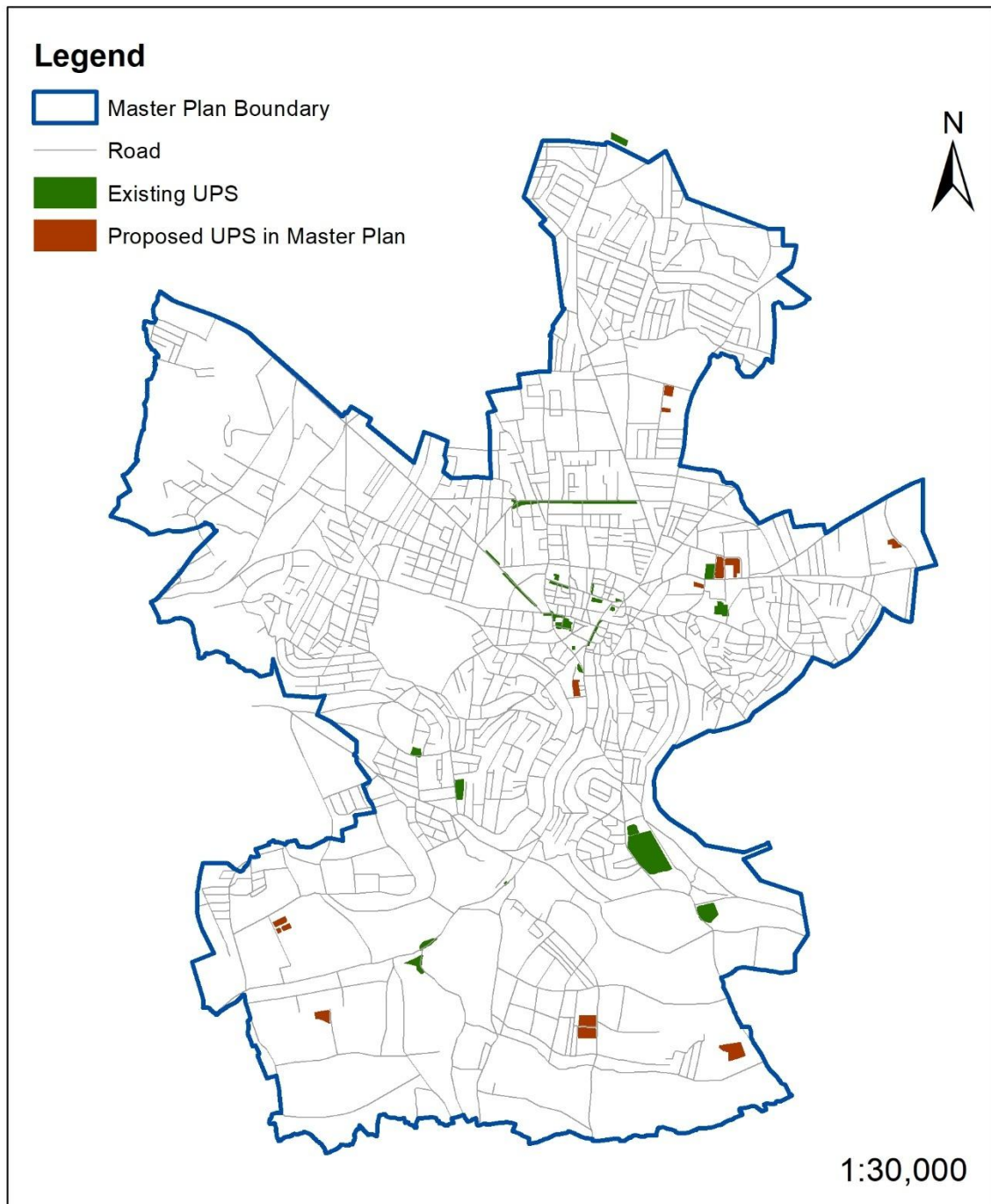
**Figure A.13**

*Existing UPS and Proposed UPS in Master Plan in Tulkarm Urban Area.*



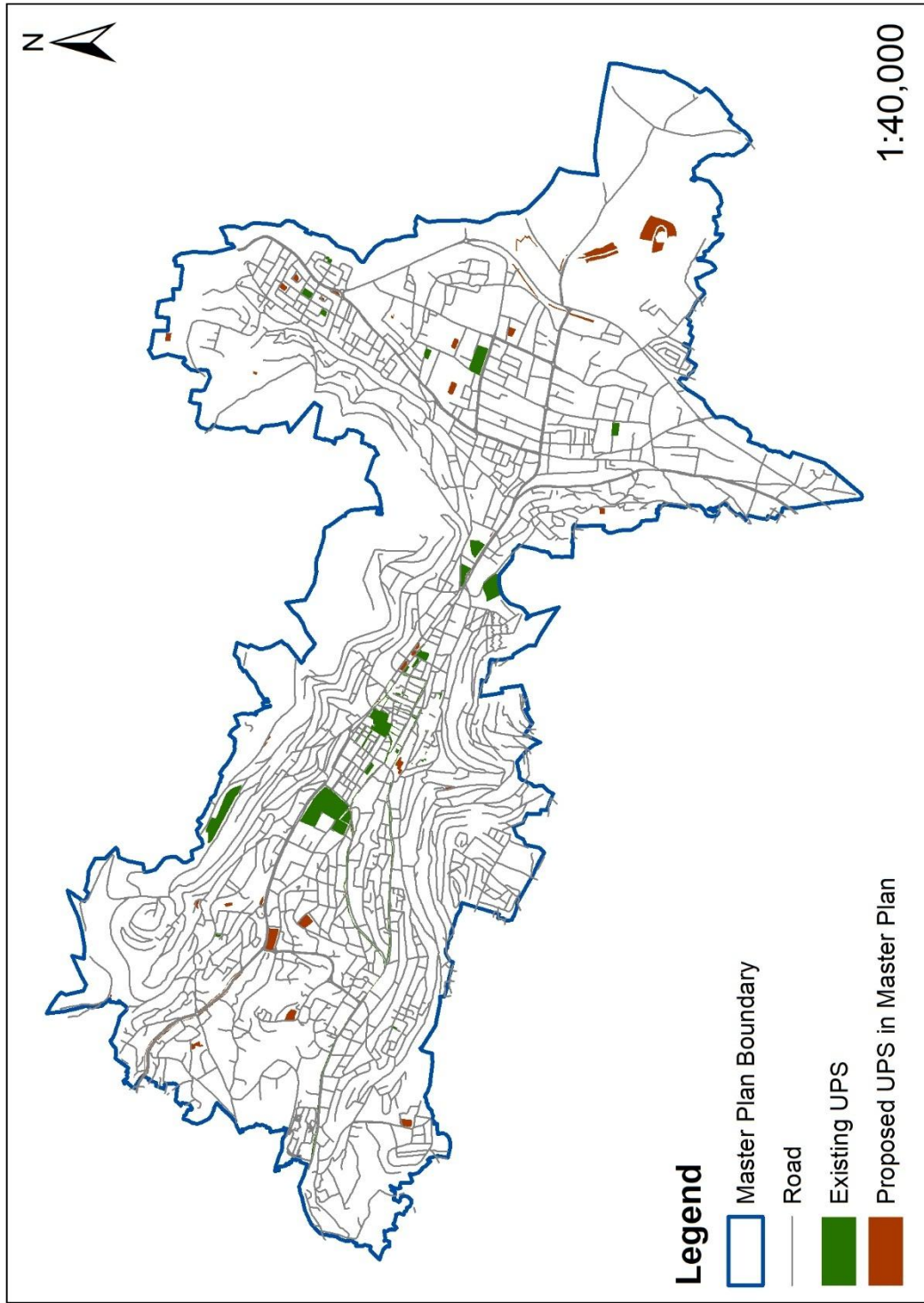
**Figure A.14**

*Existing UPS and Proposed UPS in Master Plan in Jenin Urban Area.*



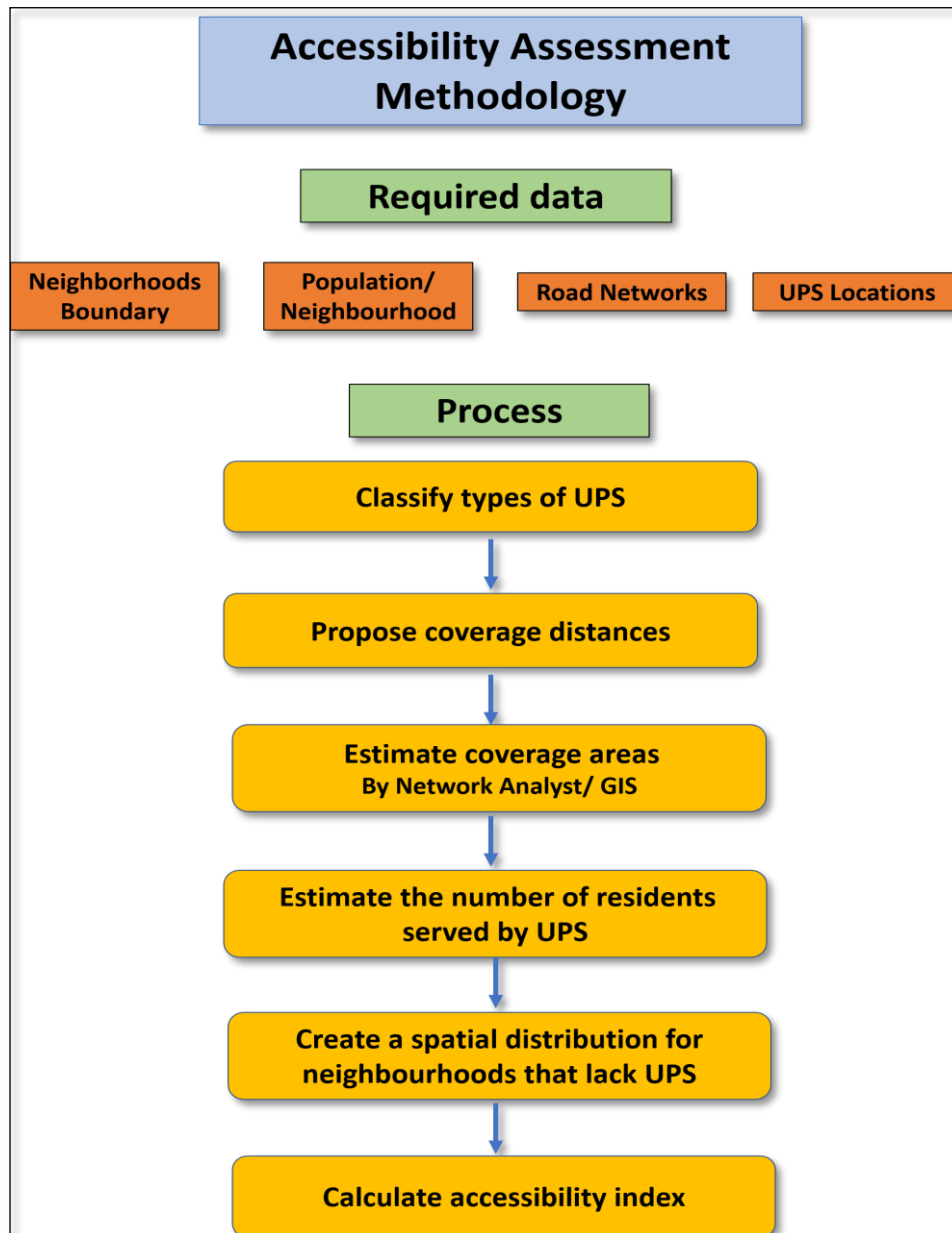
**Figure A.15**

*Existing UPS and Proposed UPS in Master Plan in Nablus Urban Area.*



**Figure A.16**

*Methodology of Assessment of Urban Public Spaces Accessibility*



## Appendix B

### Expert Evaluation Questionnaire



جامعة النجاح الوطنية  
كلية الدراسات العليا

استبيان مقابلات الخبراء في مجال التخطيط العمراني وتخطيط الطرق الحضرية

عنوان الرسالة:

تقييم الفراغات العامة الحضرية ( مؤشر التنمية المستدامة 11.7.1 ) في  
المدن الفلسطينية

اعداد الطالب : ساند عبد الكريم كامل صالح

بإشراف : أ.د. خالد الساحلي

2025

## الإطار العام:

هذا الاستبيان/ المقابلة جزء من رسالة ماجستير تهدف الى تقييم الفراغات العامة الحضرية داخل المدن الفلسطينية وحسب ما ورد في المؤشر 11.7.1 من مؤشرات التنمية المستدامة والخاص بمعدل نصيب الفرد من الفراغات العامة المفتوحة القابلة للوصول في المدن الحضرية، حيث ان هذا الاستبيان موجها بشكل علمي للخبراء في التخطيط العمراني وتخطيط الطرق الحضرية لتقييم مسافات التغطية والوصول الى الفراغات العامة المفتوحة داخل المدن الحضرية – مدن شمال الضفة الغربية كحالة دراسية.

### ❖ معلومات عامة ( اختياري):

- 1- الاسم : .....
- 2- التخصص/مجال العمل :  تخطيط عمراني  تخطيط الطرق الحضرية  هندسة معمارية  تخصص اخر
- 3- عدد سنوات الخبرة :  أقل من 5 سنوات  5 – 10 سنوات  أكثر من 10 سنوات
- 4- جهة العمل : .....

### ❖ القسم الاول: تقييم مسافات الوصول والتغطية للفراغات العامة الحضرية

بعد عمل مسوحات ميدانية للفراغات العامة داخل المناطق الحضرية وبالإضافة الى فحص المخططات الهيكلية والفراغات العامة القائمة والمقترحة، تم حصر الانواع الرئيسية من هذه الفراغات واقتراح مسافات للتغطية وامكانية الوصول كما يلي:

ملاحظات	اقتراح مسافة بديلة اذا وجدت	مناسبة؟ يرجى وضع اشارة صح داخل المربع	المسافة المقترحة (متر)	نوع الفراغ العام
		<input type="checkbox"/>	1500- 2000م	المنتزهات او الحدائق الكبرى
		<input type="checkbox"/>	150- 300 م	المنتزهات/ الساحات العامة المحلية
		<input type="checkbox"/>	500- 700 م	المساحات الخضراء المحاذية للشوارع الحضرية

		<input type="checkbox"/>	م(500-1000)	محطات النقل العام الرئيسية
		<input type="checkbox"/>	م(300-500)	محطات النقل العام المحلية
		<input type="checkbox"/>	م(150-300)	التقاطعات والدورات
		<input type="checkbox"/>	م(150-300)	ارصفة المشاه على جانبي الشوارع الحضرية

❖ القسم الثاني: الاسئلة المفتوحة عن الفراغات العامة داخل البيئة الحضرية

1. ما العوامل الرئيسية التي تؤثر برأيك في تحديد المسافات المثلى للوصول الى الفراغات العامة داخل المدينة؟

.....

.....

.....

2. ما مدى عدالة توزيع الفراغات العامة في مدينتك او المدن الفلسطينية برأيك؟

عادلة  مقبولة  غير عادلة

يرجى التوضيح .....

3. هل ترى ان عملية التخطيط العمراني والمخططات الهيكلية في فلسطين تراعي معايير الوصول للفراغات العامة ولماذا؟

.....

4. ما هي النسبة الامثل من مساحة المدينة التي ترى انه يجب تخصيصها كفراغات عامة قابلة للوصول؟

أقل من 15%  15-25%  أكثر من 25%

يرجى التوضيح ان امكن .....

5. إلى أي مدى توافق على أن الشوارع الحضرية يجب اعتبارها فراغات عامة؟

أوافق بشدة  أوافق  محايد  لا أوافق

يرجى التوضيح إن أمكن .....

6. ما هي الخصائص التي يجب أن تتوفر في الشوارع لتكون فراغات عامة نشطة؟

أرصفة واسعة  مظلات  مناطق جلوس  مسارات دراجات  أخرى: .....

7. هل تؤيد أن يتم تخصيص شوارع للمشاة فقط داخل الأحياء والمراكز الحضرية؟ ولماذا؟

نعم  لا  إلى حد ما

.....

8. ما هي التوصيات والمقترحات التي تساعد برأيك في تفعيل دور الشوارع كفراغات عامة داخل المدينة؟

.....

شكراً لمشاركتك



جامعة النجاح الوطنية  
كلية الدراسات العليا

تقييم الاماكن العامة المفتوحة في المناطق الفلسطينية لدراسة  
مؤشر التنمية المستدامة 11.7.1

إعداد  
سائد عبد الكريم كامل صالح

إشراف  
أ.د. خالد الساحلي

قدمت هذه الرسالة استكمالاً لمتطلبات الحصول علي درجة الماجستير في هندسة الطرق والمواصلات، من كلية الدراسات العليا، في جامعة النجاح الوطنية، نابلس - فلسطين.

# تقييم الفراغات العامة الحضرية ( مؤشر التنمية المستدامة 11.7.1) في المدن الفلسطينية

إعداد

سائد عبد الكريم كامل صالح

إشراف

أ.د. خالد الساحلي

## الملخص

أدى التوسع الحضري السريع، خاصة في المدن الفلسطينية، إلى نقص حاد في المساحات العامة المفتوحة، مما يؤثر سلباً على تحقيق الهدف الحادي عشر للتنمية المستدامة الذي يسعى إلى بناء مدن شاملة وآمنة ومرنة ومستدامة. ويُعد المؤشر 11.7.1 أداة رئيسية لقياس متوسط نصيب الفرد من المساحات الحضرية المخصصة للفراغات العامة والشوارع، مما يتيح تقييم التقدم نحو تحقيق هذا الهدف.

تقوم هذه الدراسة بتقييم الوضع الراهن للمساحات العامة الحضرية (UPS) في أربع مدن رئيسية في شمال الضفة الغربية: نابلس، جنين، طولكرم، وقلقيلية، في ظل التوسع الحضري المتسارع والنقص الحاد في المساحات المفتوحة. وقد اعتمدت المنهجية على تحليل نظم المعلومات الجغرافية (GIS) لتحديد المناطق الحضرية باستخدام منهجية درجة التحضر (DEGURBA) المعتمدة من الأمم المتحدة، ورسم خرائط المساحات العامة وشبكات الشوارع، إلى جانب استبيان آراء الخبراء لتقييم إمكانية الوصول.

كشفت النتائج عن عجز كبير، حيث بلغت المساحات العامة في المتوسط 1% فقط من المساحة الحضرية، فيما بلغت مساحة الشوارع 13.3%، وهما أدنى بكثير من المعايير الدولية (15-20% للمساحات العامة و30-35% للشوارع). تراوحت قيمة المؤشر 11.7.1 بين 12.1% في نابلس و25.2% في قلقيلية. وأظهر تحليل إمكانية الوصول في طولكرم أن 52% فقط من السكان لديهم وصول مناسب إلى المساحات العامة، مع تفاوتات كبيرة بين الأحياء.

تخلص الدراسة إلى ضرورة تدخلات تخطيطية فعالة، مثل تنفيذ المقترحات الواردة في المخططات الهيكلية، وإحياء المساحات غير المستغلة، وتعزيز البنية التحتية للمشاة لتحسين توفر وإتاحة المساحات العامة. كما تقدم الدراسة إطاراً منهجياً لتطبيق المؤشر في السياقات محدودة البيانات، مما يوفر دليلاً عملياً لتخطيط حضري مستدام.

**الكلمات المفتاحية:** المساحات العامة الحضرية، الهدف التنموي 11.7.1، إمكانية الوصول، نظم المعلومات الجغرافية، المدن الفلسطينية، التخطيط الحضري، التنمية المستدامة.