



Faculty of Engineering

**Promoting Sustainable Urban Growth Strategies to Curb Sprawl
in the Urban Area of Bethlehem Governorate**

ترويج إستراتيجيات النمو الحضري المستدام لكبح الإنتشار العشوائي
في المنطقة الحضرية لمحافظة بيت لحم

Submitted by:
Ahmad El-Atrash
(1075494)

Supervisor:
Dr. Shadi Ghadban

This Thesis was submitted in partial fulfillment of the requirements for the Master's Degree in Urban Planning and Landscape Architecture from the Faculty of Engineering at Birzeit University, Palestine.

October, 2009

**Promoting Sustainable Urban Growth Strategies to Curb Sprawl
in the Urban Area of Bethlehem Governorate**

Submitted by:
Ahmad El-Atrash
(1075494)

This thesis was developed under the supervision of Dr. Shadi Ghadban, and has been approved by all members of the Examination Committee.

Dr. Shadi Ghadban
(Chairman of the Committee)

.....

Dr. Luban Shaheen
(Member)

.....

Dr. Yazid Anani
(Member)

.....

Date of Defense:
December 22, 2009

The author is solely responsible for the accuracy of the statements and interpretations contained in the publication. Such interpretations do not necessarily reflect the views of the Birzeit University or the UNPF.

Dedication

To my parents, sisters and brothers, who are the best supporters ever

To my friends and colleagues at ARIJ & UPLA, who have encouraged me in so many ways....

To you all I dedicate this humble work....

Acknowledgments

I would like to acknowledge the colleagues at the Applied Research Institute-Jerusalem (ARIJ) for their help and technical support throughout the development of this thesis. I gratefully acknowledge Dr. Jad Isaac, Director General of ARIJ for his help in the first place to join the Urban Planning and Landscape Architecture Master Programme at Birzeit University.

I am indebted to Dr. Shadi Ghadban, my research mentor who provided an insightful and very careful orientation. I am deeply thankful for all the constructive comments and sage advice, which have been provided in a courtesy and friendly manner.

I truly believe that I was tremendously fortunate to have both Dr. Luban Shaheen and Dr. Yazid Anani as members of my thesis committee. Both of them have enriched and inspired this thesis by profound scholarly and pedagogic experiences. However, a special thank you is to Dr. Shaheen for her continuous encouragement and guidance.

Lastly, I am thankful for the United Nations Population Fund (UNPF) for their financial support through the Institute of Community and Public Health (ICPH) at Birzeit University, without which this publication has never been accomplished.

Table of Contents

Dedication	III
Acknowledgments.....	IV
Table of Contents.....	V
List of Figures.....	VII
List of Tables.....	VIII
Acronyms and Abbreviations.....	IX
Abstract.....	X
Abstract (In Arabic).....	XI
Chapter 1: Prologue	
1.1 Definition of the Target Area.....	2
1.2 Research Theme and Context.....	5
1.3 Research Goals and Outputs.....	9
1.4 Research Organization.....	10
Chapter 2: Contextual Background	
2.1 Urban Geo-political Intervention.....	14
2.1.1 Sub-Regional Context.....	14
2.1.2 Urbicide and Infrastructure Warfare in Bethlehem Area.....	17
2.1.3 Flexible Frontier.....	19
2.2 Socio-economic and Environmental Interventions.....	25
2.2.1 Spatial Re-Distribution and Geo-Demography.....	25
2.2.2 Mobility of People and Goods.....	27
2.2.3 Agricultural Base at Risk.....	29
2.4 Planning System.....	31
2.5 Summary.....	32
Chapter 3: Methodological Frameworks	
3.1 Research Questions.....	34
3.1.1 Main Question.....	34
3.1.2 Secondary Questions.....	34
3.2 Research Strategy and Framework.....	35
3.2.1 Case Study Approach.....	37
3.2.2 Research Propositions.....	39
3.2.3 Q-squared Methods.....	40
3.3 Data Collection and Analysis.....	41
Chapter 4: Theoretical Frameworks	
4.1 Notions of Sustainable Development in Urban Planning Literature.....	44
4.2 Principles of Smart Growth.....	49
4.2.1 Mixed Land-Uses.....	51
4.2.2 Compact Design.....	52
4.2.3 Provide A Variety of Transportation Choices.....	53

4.3 Urban Sprawl: A Destructive Vying for Space.....	56
4.4 Compact City Model.....	61
4.5 Community Participation.....	70
4.6 Summary.....	75
Chapter 5: Urbanization Trends and Sprawl in Bethlehem Area	
5.1 Urbanization in Bethlehem Area.....	76
5.2 Morphology of Urban Human Settlements in Bethlehem Area.....	80
5.3 Patterns of Urban Human Settlements in Bethlehem Area.....	82
5.4 Urban Sprawl in Bethlehem Area.....	89
5.4.1 Measuring Urban Sprawl in Bethlehem Area.....	90
5.4.2 Urban Sprawl Modeling in Bethlehem Area.....	93
5.5 Summary.....	94
Chapter 6: Strategizing A Sustainable Urban Growth Scenario for Bethlehem Area	
6.1 Sustainability within the Palestinian Context.....	95
6.2 Growth Projection Scenarios.....	97
6.2.1 Population Projection.....	97
6.2.2 Built-up Area Projection.....	102
6.2.3 Net Urban Density Projection.....	103
6.3 Land for Future Urban Growth.....	104
6.3.1 Needed and Available Land Area for Urban Growth.....	104
6.3.2 Suitable Land Area for Urban Growth.....	107
6.4 Bethlehem City-region: The Regional City Model.....	121
6.5 Summary.....	128
Chapter 7: Framework for Promoting A Sustainable Urban Growth Strategy	
7.1 Enable the Environment.....	129
7.2 Key Recommendations.....	132
7.3 Epilogue.....	136
Sources and Bibliography.....	139
Appendices.....	148

List of Figures

Figure (1.1): Location of Bethlehem Governorate within Mandate Palestine	3
Figure (1.2): Geo-political Status of Bethlehem Area	4
Figure (2.1): United Nations Partition Plan (1947)	15
Figure (2.2): Lands Confiscated from Bethlehem, Beit Jala and Beit Sahour	17
Figure (2.3): Israeli Deep Bulldozing of Al-Mqata' Premises in Bethlehem (2002)	19
Figure (2.4): The Segregation Plan in the West Bank Territory	23
Figure (2.5): Geo-political Map of Bethlehem Governorate	24
Figure (2.6): Palestinian Population Gross Density before and after the Segregation Wall	26
Figure (2.7): Concretization of Jabel Abu Ghneim	30
Figure (3.1): Advancement of Research Context	40
Figure (4.1): General Framework of the Theoretical Analysis	44
Figure (4.2): Triple Bottom-line of Sustainability (Interactive Zone)	46
Figure (4.3): Bus Routes for Beit Sahour and Al 'Ubeidiya	55
Figure (4.4): Models of Settlement Forms	69
Figure (5.1): Palestinian Governorates According to Locality Type (Urban vs. Rural vs. Camp)	77
Figure (5.2): Comparative Outlook for Gross Population Densities (Person/Sq km) in the Main Palestinian Cities (2009)	80
Figure (5.3): De-Attaching Bethlehem from the Milieu of Jerusalem City (1917-2007)	82
Figure (5.4): Comparative Graphical Presentation of Designated Urban Human Settlements in Bethlehem Area (2009)	86
Figure (5.5): Main Road Network in Bethlehem Area (2009)	88
Figure (5.6): Aerial Photo of the Target Area (2007)	90
Figure (5.7): Rates of Growth in Population and Built-up in Bethlehem Area (1997-2007)	92
Figure (5.8): Built-up Dispersion in Bethlehem Area (1997-2007)	94
Figure (6.1): Population Projection in Bethlehem Area, According to Medium and High Growth Scenarios (1997-2020)	99
Figure (6.2): Population Projection in the Cities of (a) Bethlehem, (b) Beit Jala and (c) Beit Sahour, According to Medium and High Growth Scenarios (1997-2020)	101
Figure (6.3): Net Built-up Area Projection in Bethlehem Area, According to Medium and High Growth Scenarios (1997-2020)	102
Figure (6.4): Net Urban Density in Bethlehem Area, According to Medium and High Growth Scenarios (1997-2020)	104
Figure (6.5): Land-use / Land-cover for Bethlehem Area (2007)	113
Figure (6.6): Topography Map for Bethlehem Area	114
Figure (6.7): Geological Map for Bethlehem Area	115
Figure (6.8): Built-up Proximity to the Central Business Districts in Bethlehem Area	116
Figure (6.9): Suitability Analysis for Future Urban Development in Bethlehem Area	120
Figure (6.10): Built-up Configuration in Bethlehem City-region	122
Figure (6.11): Spatial Structure for Public Service Centers in Bethlehem City-region	124
Figure (6.12): Proposed Structural Model for Sustainable Bethlehem City-region	126

List of Tables

Table (2.1): Area Classification According to Sharm Al Sheik Agreement (2000) in Bethlehem Governorate	21
Table (4.1): Comparing the Principles of New Urban Approaches	47
Table (4.2): Localizing Principles of Smart Growth According to their Theme-related Tendencies	50
Table (4.3): Sprawl and Compact City Models Opposite Characteristics	63
Table (4.4): Matrix of Sustainable Urban Form	66
Table (5.1): Gross Population Density of Bethlehem Area (1967-2007)	78
Table (5.2): Gross Population Density in the Main Palestinian Cities (2009)	79
Table (5.3): Comparative Outlook for Urban Human Settlements in Bethlehem Area (2009)	85
Table (5.4): Shanon's Entropy for Bethlehem Area	92
Table (6.1): Land-use / Land-cover Analysis for the Bethlehem Area (2007)	106
Table (6.2): Calculations of Available Land for Future Urban Growth in Bethlehem Area	107
Table (6.3): Scorecard Sheet for the Developed Spatial GIS-based Model	118
Table (6.4): Area Calculations based on the Spatial GIS-based Model	119

Acronyms and Abbreviations

ARIJ	Applied Research Institute-Jerusalem
CBD	Central Business District
CBO	Community Based Organizations
CCHP	Bethlehem Cultural Center for Heritage Preservation
GIS	Geographic Information Systems
ICCPR	International Covenant on Civil and Political Rights
IHL	International Humanitarian Law
IOF	Israeli Occupation Forces
LGU	Local Government Units
MOLG	Ministry of Local Government
MOP	Ministry of Planning
MOPAD	Ministry of Planning and Administrative Development
MOPIC	Ministry of Planning and International Cooperation
MSL	Mean Sea Level
NGO	Non-Governmental Organizations
OPT	Occupied Palestinian Territory
PCBS	Palestinian Central Bureau of Statistics
PLC	Palestinian Legislative Council
PLO	Palestinian Liberation Organization
PNA	Palestinian National Authority
PRB	Population Reference Bureau
RBA	Ratio of total Built-up area to locality block Area
RFA	Ratio of buildings total Floors area to locality block Area
TND	Traditional Neighborhood Design
TOD	Transit Oriented Development
UN	United Nations
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs
UNRWA	United Nations Relief and Works Agency for Palestine Refugees in the Near East
WCED	World Commission on Environment and Development

Abstract

Sustainable urban growth is the new pervasive orthodoxy extolled among urban planners in their quest for a utopian community all over the world. It is touted as a strategic framework for helping today's communities achieve a better, more equitable and more harmonious urban built environment. Generally speaking, notions of sustainability in urban planning literature defines a broad agenda of policies to use land more efficiently, curb urban sprawl and to promote better planning through the virtue of compact design, and walkable community, with multiple public transportation choices. Unfortunately, it is not so far a highly visible or tangible concept in the local urban planning debates across the Palestinian territory. Therefore, this thesis is an excretion of efforts to investigate the feasibility and possible potentials of promoting the concept of sustainable urban growth, within the Palestinian context, in lieu with the current volatile geo-political environment that create layers of complexities and challenges to the development of present Palestinian cities.

The thesis follows a case study approach, where the urban area of Bethlehem Governorate is micro-examined, as a tool to provide a practical framework for further future investigations on other Palestinian cities. The thesis strategically ends with a conceptual identification of the suitable areas for future urban growth using a designated spatial Geographic Information System, along with a decentralized and flexible structural model for Bethlehem Governorate that would ensure a harmonized urban-rural growth. Furthermore, the thesis holistically presents a set of general policies and key recommendations for the efficient adoption of sustainable urban growth agenda, based on a consultation process with local experts in the field of interest and within the scope of intervention that pay a premium to the physical discipline of urban planning.

Keywords: Sustainable Urban Growth, Urban Sprawl, Urban Suitability Analysis, Bethlehem Area.

مستخلص

يعتبر مفهوم النمو الحضري المستدام من أكثر المفاهيم رواجاً في مسيرة البحث عن المجتمعات المثالية حول العالم. لقد إنتشر المبدأ كمرجعية إستراتيجية لمساعدة المجتمعات العمرانية لتحقيق بيئة مبنية أكثر عدالة وتجانس. بشكل عام، إن مبدأ النمو الحضري المستدام يعرف أجندة واسعة من السياسات الخاصة بإستخدامات الأراضي بطريقة أكثر فاعلية بغية التخفيف من وطأة ظاهرة الإنتشار الحضري العشوائي من خلال الدعوة إلى مجتمعات أكثر إكتظاظاً والتي تحتوي على خيارات عدة من المواصلات العامة والقدرة على التنقل مشياً على الأقدام. ولكن للأسف، إن مبدأ النمو الحضري المستدام لم يلق حتى الآن نصيبه من النقاش بين المخططين العمرانيين في الأراضي الفلسطينية. لهذا، فإن هذه الرسالة لهي محاولة جادة لمناقشة هذا المبدأ ودراسة مدى قابلية تطبيقه ضمن السياق الفلسطيني، وفي ظل الظروف الجيوسياسية التي تزيد الأمور تعقيداً وتحدياً في مسيرة سعي الفلسطينيين لتحقيق التنمية المستدامة في المدن الفلسطينية.

إن الرسالة تتبع أسلوب الحالة الدراسية، حيث أن المنطقة العمرانية لمحافظة بيت لحم قد شكلت البيئة المناسبة للتحليل الدقيق على المستوى المحلي، وكأداة لتقديم مرجعية عملية لدراسات بحثية على المدن الفلسطينية الأخرى في المستقبل القريب. إن الرسالة تنتهي بتحديد المناطق الأكثر ملائمة للتطور العمراني بإستخدام نموذج رياضي خاص تم تطويره بإستخدام نظم المعلومات الجغرافية، علاوةً على تعريف نظام بنيوي على مستوى محافظة بيت لحم يتسم باللامركزية والمرونة بغية تحقيق نمو حضري - ريفي متزن. هذا وتقدم الرسالة جملةً من التوصيات الرئيسية والسياسات العامة لتعزيز مبدأ النمو الحضري المستدام، وذلك بالإستشارة مع خبراء معنيين في موضوع البحث ومجال التدخل الذي يركز على الجانب الفيزيائي للتخطيط العمراني.

الكلمات المفتاحية: النمو الحضري المستدام، الإنتشار العشوائي، تحليل الملائمة العمرانية، منطقة بيت لحم.

Chapter 1: Prologue

Palestine is a small but engulfed country with immanent problems that evolved throughout the modern history, as a serious challenge to the sustainable development of today's society. Inevitably, un-harmonized urbanization within the Palestinian context is one of the most prevailing challenges that would undermine the development of the Palestinian statehood in the foreseeable future, unless addressed in advance.

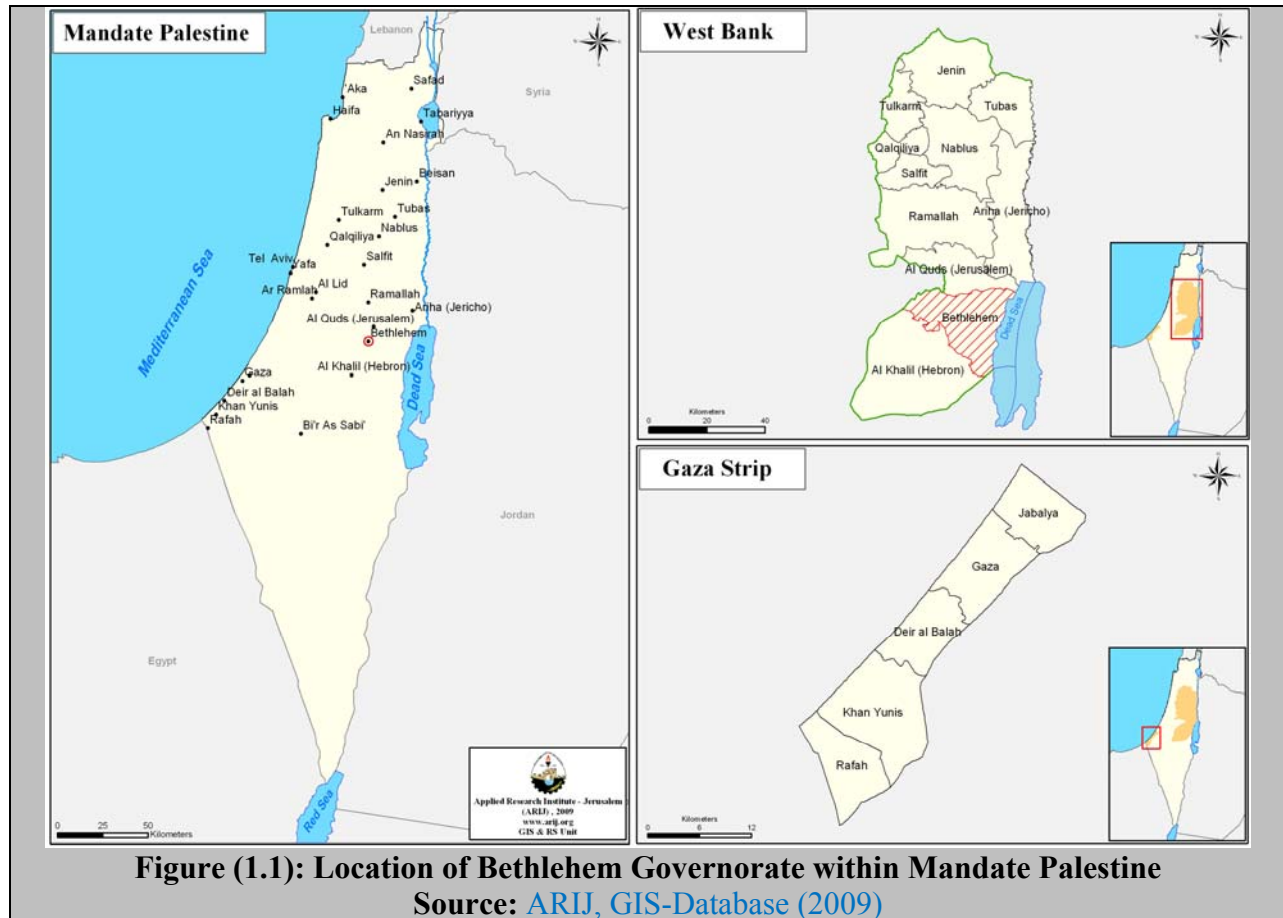
One tangible cause of the status-quo urbanization in Palestine is the evident and complex interaction with the geo-political intervention, as well as with the incompetent capacity of municipal and state decision making apparatus that further shape the nature and characteristics of urban spaces. However, this truism rarely finds an expression in Palestinian academic and professional research.

As a young profession within the Palestinian context, urban planning has always had to contend with the problems facing Palestinian cities by responding and in a few cases effectively and efficiently reacting to those problems. The problems facing the present-day Palestinian cities are either exacerbated by natural or man-made conditions. However, as Palestinian cities became part of complex geo-political conditions increasingly after signing the Oslo II Interim Agreement in 1995, there has been a pressing demand for new-flexible strategies to deal with “wicked problems” (Conklin, 2006) that cut across physical boundaries and administrative jurisdictions, such as urban sprawl manifested in such a volatile and uncertain political regime. Globally, sustainable urban growth strategies emerged as one of the foremost “elusive solutions” (Barton, 2008) to help confronting the intertwined problems that undermine the sustainable development of present cities. This thesis is an excretion of efforts to pragmatically explore the feasibility of promoting sustainable urban growth strategies in such a Palestinian context.

The impetus of research methodology is a case study approach, whereby the urban area of Bethlehem Governorate is used to investigate the possibility of promoting sustainable urban growth strategies, as an elusive solution to the many urban challenges that faces the Palestinian cities, including the phenomenon of sprawl.

1.1 Definition of the Target Area

Bethlehem Governorate is one of the largest West-Bank eleven governorates. It occupies 607.8 km² of mass land and is bordered with Jerusalem Governorate in the North and Hebron Governorate from the South. The Western borders of Bethlehem Governorate are the 1949-Armistice Line (AKA: Green Line) that was demarcated by designated United Nation (UN) resolutions. The Governorate is distinguished by its topographic variability where the altitude ranges from the mountainous hills of Beit Jala that stand at 930 meters above Mean Sea Level (MSL) to as low as 412 meters below MSL along the shores of the Dead Sea that represent the Eastern border of the Governorate (Figure 1.1).



Historically, the three twin cities of Bethlehem, Beit Jala and Beit Sahour developed to constitute the urban hub and the service center of the Bethlehem Governorate. These three cities has a monolithically relationship that share a rich oeuvre of natural resources, and a common socio-cultural context. Therefore, the three cities of Bethlehem, Beit Jala and Beit Sahour (hereinafter, the Target Area or interchangeably the Bethlehem Area) will be the micro-focus of this thesis (Figure 1.2). However, based on the factual reality that the target area indispensably needs the space and resources of the adjacent cities, towns and camps to develop in a sustainable manner, Bethlehem Governorate (hereinafter, the City-Region) will be introduced in the different courses of analysis, as the macro-focus of this thesis.

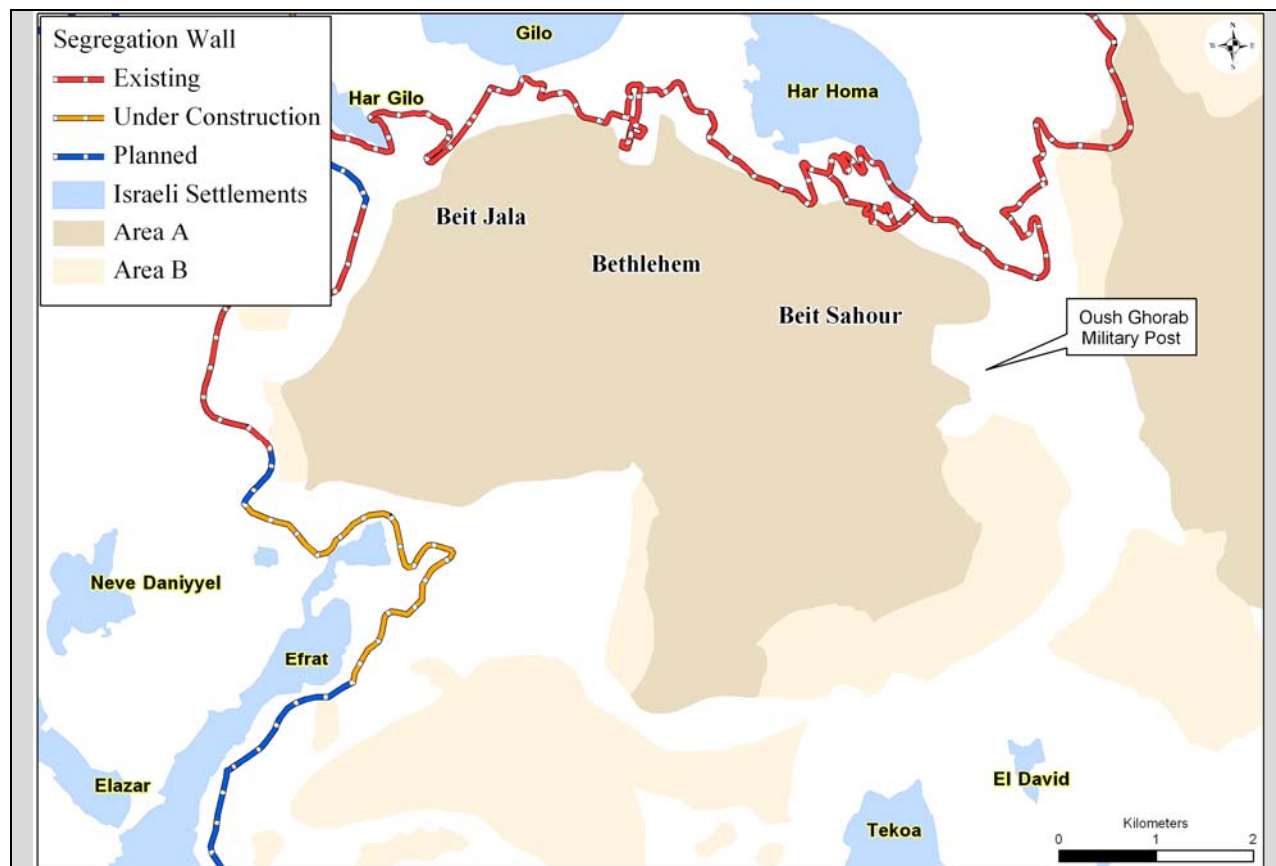


Figure (1.2): Geo-political Status of Bethlehem Area

Note Bene (N.B.): Areas (A) and (B) falls under the planning jurisdiction of the Palestinian National Authority and represent only 13.4% of the Governorate's lands ([ARIJ GIS-Database, 2009](#)), which is inhabited by 96% of Bethlehem's total population (i.e. 176,235 residents) ([PCBS, 2007](#)). The rest are within area (C) and nature reserves that fall under full Israeli control.

Nevertheless, the target area and the city-region as two dependent hierarchical levels; ultimately interact with the West Bank milieu, and consequently to the entire Occupied Palestinian Territory (OPT; Gaza Strip and the West Bank, including East Jerusalem). Anyway, the latter level of intervention at the OPT is beyond the scope and capacity of this thesis. In the same token, though the target area is neighbored by the three refugee camps of Ad Duheisha, Ayda, and Beit Jibrin (Al-Aza), they remain outside the jurisdiction area of the three municipalities under study; therefore they will be neglected in the framework of analysis. In paradox, though the three refugee camps avail assistance and support from the United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA), they still benefits

from the provided services and functions of the target area, especially from Bethlehem and Beit Jala municipalities. However, the justification for not including the three refugee camps within the scope of this thesis is related to the thorny political debate within the Palestinian context, whether to develop the refugee camps and absorb them within the Palestinian urban fabric of today's cities or leave them as they are, subject to the right of return or to the rites of return.

It is worthy to mention that the target area celebrates the existence of three historic cores that need a special conservation management plan to preserve their architectural elements and urban fabric, which is ultimately beyond the scope of this thesis too.

1.2 Research Theme and Context

Virtues of planning for sustainable urban growth have been extolled in the memory of Palestinian planners, practitioners and policy makers. But, a vivid gap between planning as a theory and practice, unfortunately, remains tangible. This may be interpreted due to many cause-and-effect factors including, life under the prolonged Israeli military occupation that is considered an inevitable problematic malaise for both who theorize and practice planning, on one side, and on whom planning consequences could affect their daily life, from another side. More germane, the chaotic and weak Palestinian planning system that suffers, as other governmental systems from inordinate years of neglect and marginalization adds more complications and restrictions at both the national and local levels.

The Palestinian National Authority (PNA) has planning jurisdiction only over 42% of the West-Bank area ([ARIJ GIS-Database, 2009](#)), which is totally besieged and perpetuated by the manifested Israeli practices, in terms of land razing and confiscation, illegal Israeli settlements and outposts, construction of Israeli by-pass roads, to name a few; such a case results in the lack of sovereign control by the Palestinian people over their lands and natural resources.

Furthermore, the PNA manages an inefficient and non-transparent current system of land administration in the West-Bank area of jurisdiction. Still valid different layers of laws, legislative frame and plans from different times (Ottoman, British Mandate, or Jordan) and lack of appropriate planning basics that make decisions related to land and properties more difficult. These are considered among the paramount reasons that hinder and undermine the process of sustainable development in the West Bank. This includes the development of a proactive and flexible concept of sustainable Palestinian cities.

Another interesting point of view is embodied in the Palestinian authentic conceptualization of cities. Palestinians don't conceptualize them as abstract layers of masonry-concrete structures and a base for real state broking, rather as layers of overlaying spatial entities that protect, provide, regulate and enable the right for just, prospers, sustainable urban development that solidify the Palestinian quest for an affluent and credible statehood.

Notwithstanding, the political dimension, relating as it does to resources, accountability and strategic choices, is a pivotal aspect of city development, along with the triple bottom lines of sustainable development: social, economic and environment. In this context, the politics of urban mutations within the Palestinian cities is directly related to the phantasmagorical attitudes of the Israeli separation doctrine that affects the spatial grounds of the Palestinian cities.

Nevertheless, the societal development in the OPT is being urbanized, with almost three-quarters of the OPT inhabitants live in urban areas (69% in the West Bank and 81% in the Gaza Strip) (PCBS, 2007). This is a close indication to the globe population growth, as the Secretary General of the UN; Mr. Ban Ki-moon dictates that we are living in an "urban century", where more than half of the world's population now living in urban areas (UNHABITAT, 2008). Taking Bethlehem, Beit Jala and Beit Sahour cities as the focus of research, the dwellers of these

three cities constitutes 28% of Bethlehem Governorate dwellers and more than 40% of the urban dwellers of the Governorate that represent 70% of the Governorate's total dwellers (PCBS, 2007).

The target area is facing many vexing problems that create a *de facto* situation, which is considered antithetical to the process of sustainable development. On one hand, the target area is surrounded by various types of Israeli territorial and security measures. On the northern and western parts the target area is surrounded by the Segregation Wall that holds its expansion and connection with its twin city of Jerusalem. From the southern and eastern parts, the target area is held off by the new Israeli bypass road and formerly by Oush Grab military post (Figure 1.2). On the other hand, lack of sound planning capacities at the Palestinian side has exacerbated the side effects of the Israeli aggressive measures, creating a sprawled neighborhood and cities. Other resulting environmental problems such as congestion, pollution, urban decay at the old cores, as well as the rising numbers of urban poor will feature prominently as formidable challenges to the emerging Palestinian statehood in the coming years, unless dealt with now.

The fact that the target area cannot expand means that it is “eating into” its open spaces. Horizontally limited by the Segregation Wall and Israeli bypass roads and vertically by a “preservation policy” (Hilal *et. al.* (2007); and CCHP (2005)) that seeks to keep the city's traditional nature, the target area is developing into what Lisa Taraki (2008) calls an “enclave micropolis”.

Khasawneh (2001) notes that the first two decades of the British Mandate (1920-30's) in Palestine were characterized by rapid urban growth and the first urban sprawl, as important residential areas formed away from historic urban centers, outside the old-walled cities. Brueckner (2000) defines urban sprawl as the *excessive* spatial growth of cities, the key word in

this definition being excessive. Although cities must grow spatially to accommodate an expanding population, the claim is that too much spatial growth occurs. Characteristics of sprawl can include unlimited outward extension of development, low-density residential developments, leapfrog development, dominance of transportation by private vehicles, lack of centralized planning or control of land uses, widespread strip commercial development and the segregation of types of land use in different zones among others (Carruthers and Ulfarson, 2002).

To this end, there is a crucial need for vision and place making to mold the related set of convictions to inform the course of action towards sustainable development in the Palestinian cities, by studying the concept of sustainable urban growth that confront the phenomenon of urban sprawl and its adverse impacts on the natural environment and landscape.

Sustainable urban growth strategies are not merely academic propositions, but proven methodologies in urban planning and design (Behan *et. al.*, 2008). From its inception as a concept; the unique approach to zoning, planning and urban design has brought to fruition the benefits of such strategies in the management of urban change (Punter, 2003).

The understanding of sustainable urban growth processes originates by thinking inductively, rather than by proceeding explicitly from grand philosophical or ideological principles. Jane Jacobs (1961) in her influential book entitled “The Death and Life of Great American Cities”, has precisely defined the conditions for urban diversity through **mixed use** and **dense urban grid structures**, where people could live, work, walk and meet forming thriving economies and cultures. These conditions have been interpreted by some as prescriptions for new, more enlightened forms of interventionist urban planning; those in what are known as the New Urbanism and Smart Growth movements (Callahan, 2003).

1.3 Research Goals and Outputs

The proposed research will contribute to knowledge of a virgin and uncultivated field, at least in terms of contemporary epoch of professional Palestinian urban planning experience, by providing a theoretically informed account of the urban form mutations occurring in Bethlehem Governorate, as the focus of research, highlighting what [Eyal Weizman's \(2004\)](#) calls “Geometry of the Occupation”, in which urbanity provided not the theatre of war but it's weapons and ammunition. The *overarching goals* of this research thesis thus could be readily outlined as:

To **assess** the present-day situation (potentials and weaknesses) and the future impact (threats and opportunities) of the business-as-usual approach of urbanization in Bethlehem Governorate on the limited Palestinian natural resources and consequently **develop** a strategic scenario based on these findings oriented by sustainable urban growth strategies.

This could include the exploration of viable scenarios of de-colonizing and subversion of the illegal Israeli architecture in and around the target area, as a preamble to the creation of a unified and comprehensive land-use frame, in addition to the development of suitability maps for urban development for the designated-representative pilot urban areas in Bethlehem Governorate and its rural hinterland.

The research thesis, thus promises to add to the weak-practical Palestinian literature of how urban planning could provide an account of resistance practices that take shape within and around urban renewal projects. In doing so, the Palestinian cities in general could be informed to the adaption (not subjection) to the Israeli colonial project, by the investment to the utmost in the modest resources in hand, while envisioning a full independent Palestinian statehood. However, this is only could be approached by a set of propositions, namely: to end the Israeli military

occupation; to control the high urban growth rates that comes over valuable agricultural and cultural landscapes; and to strengthen the planning system that lack sovereignty and the efficient town planning tools that would promote sustainable urban growth strategies in the Palestinian cities.

1.4 Research Organization

The research thesis is organized into seven chapters, as follows:

Chapter 1: Prologue

This chapter is presented in the form of preparatory background to introduce the following parts of the thesis. The “*Prologue*” chapter clearly identifies the scope and level of intervention of this research, and systematically elaborates on the research theme and context, along with the research goals and slated outputs.

Chapter 2: Contextual Background

This chapter provides a background context on the state of the target area and present the many challenges that curtail the development of a sustainable city in the OPT in general, and in the target area, in specific. The chapter is mainly three folds. The *first* covers the urban geopolitical status of the target area and examine the prolonged Israeli colonial project and its adverse impacts on the target area. The *second* part examines the business-as-usual status in the target area, in terms of socio-economic and environmental interventions that constitute the triple bottom lines of sustainability of the target area. The *third* part briefly discuss the prevailing planning system and the inherited legacy of life under military occupation in Palestine and its problematic effects on the right to secure land and property ownership.

Chapter 3: Methodological Frameworks

This chapter provides an overview of the case study approach, as well as the appropriateness of choosing such an approach for this thesis, and a review of the implementation of the research. The field observations that has been undertaken, and the selection of data (primary and secondary) that have been analyzed, compounded by the limitations of this method are all discussed, as a part of the proposed methodological framework.

Chapter 4: Theoretical Frameworks

This chapter interprets the relevant discourses on the form and structure of the envisaged sustainable city that would accommodate and empower the Palestinian growth, and discuss how the concept of sustainability has evolved and developed throughout the contemporary epoch of urban planning discipline, with a special emphasis on the importance of community participation and strategies of compactness, as efficient tools to promote sustainable urban growth to mitigate the adverse impacts of urban sprawl. The chapter is entirely based on analyzing the related archive research in the form of scientific books, refereed journals, relevant reports and plans to the Palestinian context.

Chapter 5: Urbanization Trends and Sprawl in Bethlehem

This chapter analyzes the urbanization trends in the target area in comparison to other main Palestinian cities of the West Bank territory. Furthermore, the chapter dedicates a considerable size to the study of the urban human settlements morphology of the target area in concert with their associated patterns. Successive to that, the chapter traces and quantifies the urban sprawl phenomenon in the target area by the simulation of a designated empirical formula using the state-of-the-art-technology of Geographic Information Systems (GIS), in order to show the projected effects of the business-as-usual course of urbanization.

Chapter 6: Strategizing A Sustainable Urban Growth Scenario for Bethlehem Area

This chapter simulates two distinct scenarios for future spatial development in the target area. The first is a detailed projection of the status-quo and the second is an allocation of the needed land based on a computerized modeling of the most suitable areas for urban development in the target area, based on a set of pre-defined parameters, which have been assessed and weighed through a consultative process with experts in the field of interest. Finally, this chapter presents an ever flexible and decentralized conceptual structural re-organization for the city-region of Bethlehem, as an efficient tool for a harmonious urban-rural growth.

Chapter 7: Framework for Promoting A Sustainable Urban Growth Strategy

This closing scene chapter presents a set of general policy framework for promoting sustainable urban growth strategies in the Palestinian context by identifying the preconditions to initiate such a course of change. Such a general policy framework should enable the environment for practicing the pertinent strategies of sustainable urban growth.

Chapter 2: Contextual Background

This chapter will provide a background context on the state of the target area and present the many “wicked” challenges that curtail the development of a sustainable city in the OPT in general, and in the target area, in specific. The chapter is mainly three folds. The *first* will cover the urban geo-political status of the target area and pay attention to the development of the “urbicide” theory, and mold it into the Palestinian case, where the notion of “security” invokes the urbanization of warfare in the target area. This will inevitably enrich the theoretical base of this thesis (Chapter Four) and suit the scope of work into a responsive rather a reactive strategy. This part will further examine the prolonged Israeli colonial project and its adverse impacts on the target area, where two competing schemes have characterized the development in Bethlehem area, one for the occupier (i.e. Israelis) and the other for the occupied (i.e. Palestinians). This will include the examination of the “flexible frontier” policy that cruxes the Israeli colonial project, thus uncovering a new angle to thoroughly understand the “Geometry of Israeli Occupation” and its long lasting physical oeuvre. The *second* part examines the business-as-usual status in the target area, in terms of socio-economic and environmental interventions that constitute the triple bottom lines of sustainable development. Along with part one “i.e. urban geo-political intervention”, this part will close the picture on the many interventions that undermine the viability and sustainability of the target area. The *third* part scanty discuss the prevailing planning system and the associated legacy of the prolonged five centuries of military occupation in Palestine and its problematic impacts on the right to secure land and property ownership.

2.1 Urban Geo-political Intervention

During the last 42 years of Israeli military occupation of the OPT, the Palestinian cities, including Bethlehem area have been the target of the Israeli Occupation Forces (IOF) (Hanafi, 2004). Eyal Weizman's (2004) articulates that the Palestinian urbanity provided not only the theater of Israeli war, but also its very weapons and ammunition.

The following lines will scantily, but substantially analyze the geo-political status, and depicts the chronological transformations of boundaries in the target area to introduce the course of analysis that outlines the many Israeli imposed formidable constraints on the sustainable urban development of the target area.

2.1.1 Sub-Regional Context

During the British Mandate, and according to the administrative sub-districts, Bethlehem was part of Jerusalem District. On November 1947, the UN General Assembly Resolution No. 181 endorsed the partition of Mandate Palestine into two states; an Arab-Palestinian state and a Jewish one (Figure 2.1). According to this plan, the Jewish population, which owned only 6% of the land, was allocated 55.6% of Mandate Palestine even though they constituted only 30% of the population, while the Arabs were designated 43.7% of Mandate Palestine at the time they owned 94% of the land and formed 70% of the population (ARIJ, 2007: 3).

Under this partition plan, Bethlehem and Jerusalem were to be within the *Corpus Seperatum* area; that is, a separate body to be run by an international administration. The boundaries of this *Corpus Seperatum* reached beyond Bethlehem in the south to Shu'fat in the north, and had an area of 186 km² (i.e. approximately 0.7% of Mandate Palestine). The Arabs at that time rejected the plan as it ignored the rights of the majority of the indigenous Arab Palestinian inhabitants. However, because of 1948 war, Israel conquest ran on 78% of Mandate Palestine, and destroyed

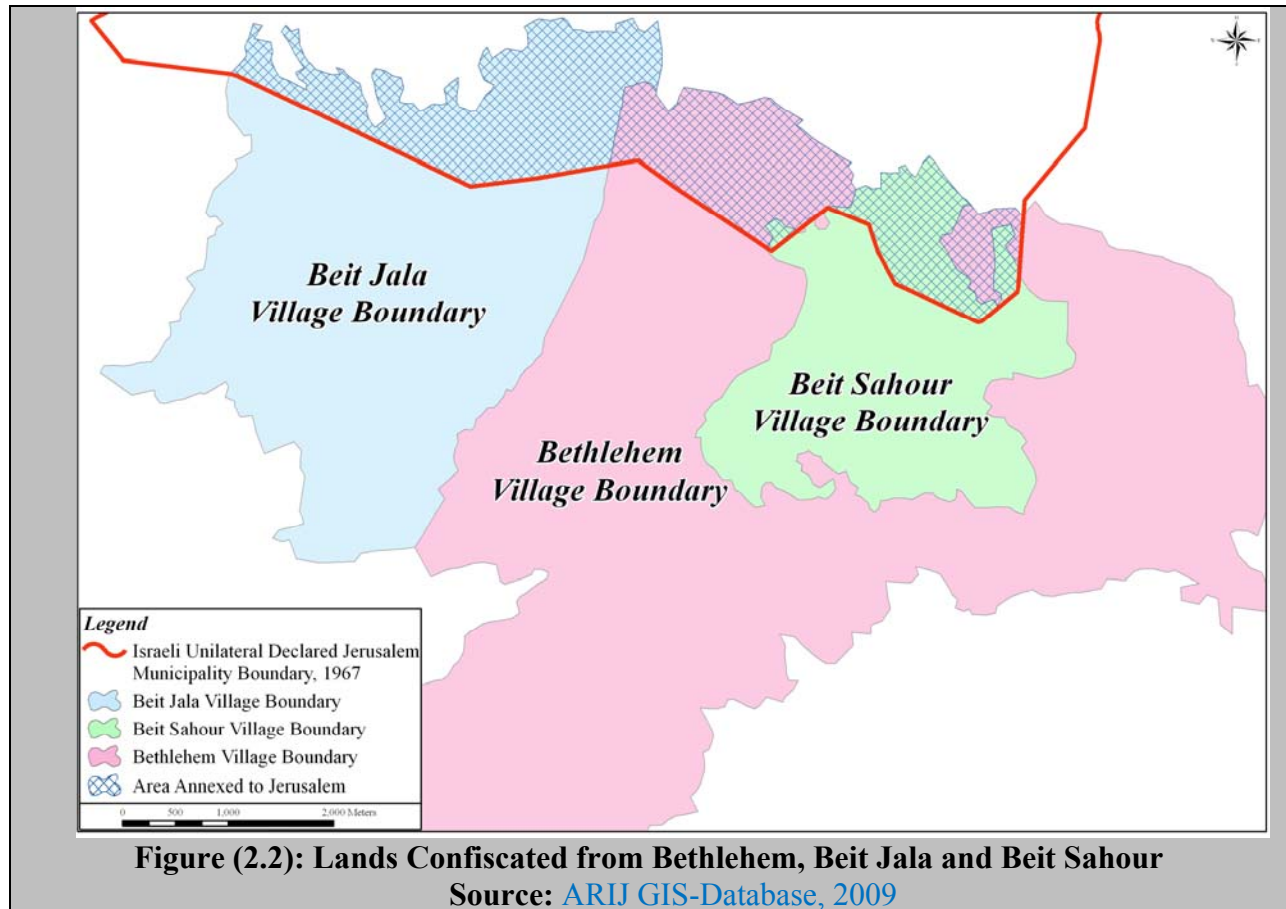
419 Palestinian villages in the process and created at the time the exodus of more than 900,000 Palestinian refugees (Isaac *et. al.*, 2008). Bethlehem then became part of the West Bank and came under the Jordanian Administration until 1967.



Figure (2.1): United Nations Partition Plan (1947)
 Source: [ARIJ GIS-Database, 2009](#)

On the 5th of June 1967, Israel launched a war that extended the Israeli occupation over the rest of Mandate Palestine, the Syrian Golan Heights, and the Egyptian Sinai Peninsula. Soon after the occupation, the Israeli government officially annexed East Jerusalem, redrew the administrative boundaries of the Palestinian governorates, and illegally expanded the Jerusalem municipal boundaries from 6.5 km² to 71 km²; increasing it by a factor of 10.8 times of its original size to include lands from surrounding towns and villages. As a result, the Governorate of Bethlehem lost 18,048 dunums of its land out of which 6,844 dunums belonged to the village boundary of Bethlehem and its two satellite cities Beit Jala and Beit Sahour. It is worth mentioning that during the British Mandate, the middle and northern parts of Palestine were divided into villages (the term village was also used for cities), the division was based on land ownerships where village boundaries were delineated (Coon, 1992).

Consequently, a total of 2,487 dunums of Bethlehem's land was confiscated due to the expansion of Jerusalem municipal boundary (8% of the city's total land); while Beit Jala lost 3,147 dunums (22% of the city's total area); and Beit Sahour lost a total of 1,210 dunums (17% of the city's total area) (Figure 2.2).



2.1.2 Urbicide and Infrastructure Warfare in Bethlehem Area

Drawing on Palestinian/Israeli researcher's work on Palestinian cities (e.g. Hanafi, 2004; Abdel Jawad, 1997; Isaac and Abdul-Latif, 2007; Weizman, 2007; Yiftachel, 2006), one could propose a new concept argument on the Israeli colonialism against occupied urban Bethlehem. Pertinent concepts of ethnocracy (Yiftachel, 2006); de-palestinization (Isaac and Abdul-Latif, 2007); socio-cide (targeting the social fabric) (Abdel Jawad, 1997); and spacio-cide (systematic destruction of public spaces) (Hanafi, 2004); underlines and exposes the hegemonic effects of Israeli colonialism on ethnographic, demographic, social, and spatial grounds of Palestinian cities across the OPT, respectively. All of all, the "urbicide" (as opposed to geno-cide) encompasses these concepts plus other related concepts, namely economo-cide (hindering the flow of people and goods), politi-cide (destroying PNA institutions), environ-cide (degrading the

natural and built environment) and culture-cide (annihilate embodiments of national aspirations). In our case the “urbicide” is defined as the deliberate killing or denial of the city’s people and built environment, the meaning of which is the destruction of heterogeneity in and through the destruction of buildings (Coward, 2009: 53).

The “urbicide” concept was first coined by the Architect Bogdan Bogdanovich that was used to describe the destruction of cities in the Balkans, during the wars in the former Yugoslavia, but what makes the “urbicide” in occupied Palestinian cities in the OPT in general, and the target area in specific, a different and unique one that it was constructed by “bulldozers” (Graham, 2004: 200). Ariel Sharon, who has long been nicknamed the “Bulldozer”, revealed his personal philosophy behind urbicide by bulldozer in an interview in the Ha’aretz newspaper on January 26, 2001. In answer to a question about how he would respond to the persistent Palestinian shooting into the new Jewish settlements that had recently been implanted in the Palestinian neighborhood of Beit Jala at Gilo that overlooks the whole target area, he replied: *“I would eliminate the first row of houses in Beit Jala, and then ask the journalists, if the shooting persisted?”*

In April 2002, the IOF invaded the Palestinian main cities of the West Bank, including Bethlehem area. The invasion was also known as the “Defensive Shield Operation”, with ultimate aim of destroying the “Palestinian terrorist infrastructure!” This military operation is only a new scene in the long lasting play of the strategy “preemptive attack” that was coined in 1959 by Yigal Allon. Graham (2004: 139) argues that the “Defensive Shield Operation” was in fact, emblematic of a much broader campaign of deliberate “urbicide”. Extensive evidence (Figure 2.3) on such state-led infrastructural destruction by military means has led some scholars to identify Israeli policy as “de-development” (Roy, 1987), “forced de-modernization” (Graham,

2002), or “politics of creative destruction” (Salamanca, 2007) against the Palestinian urban society.



Photo Courtesy of ARIJ

Figure (2.3): Israeli Deep Bulldozing of Al-Moqata' Premises in Bethlehem (2002)

This section has elaborated on the politics of urban mutations in the Palestinian context from a theoretical standpoint, but the following section will provide factual information on the induced urban mutations by the manifested Israeli separation doctrine. The thorough understanding of such separation doctrine is only possible through this logical consequence between theoretical and factual analysis. Either part alone (theoretical or factual) could fully analyze this doctrine.

2.1.3 Flexible Frontier

The spatial legacy of the Israeli colonial project is manifested in the redefinition of engineering metrics. The points, lines, surfaces and volumes have been re-conceptualized to define a colonial engineering that mainly coerces facts on the ground, undermining the quest for peace and reconciliation. The phantasmagorical attitude of the Israeli planning authorities has been characterized with an ever-flexible interior frontier, where “demography shaped

geography”. The Palestinian communities were besieged and put in a limbo. This is epitomized by the recent construction of the Segregation Wall in and around the OPT, where the imposed geo-political space resembles a territorial patchwork of enclaves that lay outside the surrounding jurisdiction (Taraki, 2008).

Jeff Halper (2001) calls the contemporary consequence of this colonial doctrine in the West Bank “the matrix of control”. This matrix is activated by immobilizing the indigenous Palestinians, by gaining control of key points of a matrix so that every time a Palestinian moves s/he encounters an obstacle of some kind. This replaces the necessity for Israeli forces to be directly present within Palestinian cities. The fixing of the Palestinian population as relatively stationary, and its separation into isolated, “immobile islands” (Weizman, 2004: 182), makes it much easier to manage and control.

Throughout the past 42 years of occupation Israel has confiscated Palestinian lands to construct Israeli settlements, which are deemed to be illegal under international laws and UN Security Council resolutions. A total of 20 illegal Israeli settlements with an estimated settler population of 80,000 were constructed in Bethlehem Governorate and occupy an area of 19,151 dunums (19.51 km²). Additionally, 18 Israeli settlements’ outposts have also been erected from 1996 until 2005 (ARIJ GIS-Database, 2009).

According to the Oslo II Interim Agreement that was signed in September 1995 between the Palestinian Liberation Organization (PLO) and the Israeli Government, the Palestinian areas in the West Bank were divided into three categories: A, B and C. The aim was at facilitating a phased withdrawal by the IOF from these areas until the accomplishment of a final status agreement. In this interim arrangement, area A is area under full Palestinian control, area B is area under Palestinian civil administration and Israeli security control, and area C is under full

Israeli control (Table 2.1). Farsakh (2005) noted that the territorial fragmentation of the OPT under the Oslo accords, has contributed to the creation of disconnected Palestinian population reserves that have the characteristics of Bantustans rather than of cantons, in order to dismember the space of the remaining Palestinian population as Ghazi-Walid Falah (2005) has noted.

Table (2.1): Area Classification According to Sharm Al Sheik Agreement (2000) in Bethlehem Governorate			
Area	Population¹ (2007)	Area² (km²)	% of the Total Governorate's Area
Area (A)	109,368	47.6	7.8
Area (B)	59,300	33.8	5.5
Area (C)	4,648	424	69.7
Nature Reserves	2,919	102.4	17
Total	176,235	607.8	100
Source: Edited by the author from: ¹ PCBS, 2007 and ² ARIJ GIS-Database, 2009			

Based on the geographic analysis of Bethlehem Governorate, only 13.4% of the Governorate's lands are within areas A and B and are inhabited by 96% of Bethlehem's total population (176,235 residents). The rest are within area C and nature reserves, which were transferred to the PNA in 2000, following Sharm El Sheikh Agreement. Half of the built-up fabric is located in area A, where the other half is evenly distributed between area B and C (ARIJ GIS-Database, 2009). This shows the high pressure on Bethlehem's urban environment and the *de facto* delimitation of urban growth.

Within this volume, and after the eruption of the second *Intifada* in 2000, Israel intensified its "internal closure" policy (restriction of movement within the West Bank, even between nearby communities) in addition to the already present "external closure" (restriction of movement from the West Bank to Israel, Gaza Strip, or the Arab neighbors). This has been done by many

designated physical obstructions, including the Israeli by-pass roads and the Segregation Wall. The remaining of this section will present more factual information on this separation doctrine.

The existing Israeli bypass roads stretch nearly 80 km in length in and around Bethlehem Governorate, while an additional 30 km of bypass roads are planned within the Governorate. The Israeli bypass roads are ultimately used to link the illegal Israeli settlements to one another and with Israel, where Palestinians are often prohibited from using these roads although they are constructed over confiscated Palestinian lands. Over all, the Israeli designated bypass road system occupies 16.5 km² (i.e. 2.8%) of Bethlehem Governorate's total land area ([ARIJ GIS-Database, 2009](#)).

In June 2002, the Israeli Government embarked on its Separation Plan that expropriates about 40% of the total West Bank area that calculates 5,661 km². Almost one-third of the expropriated area is located between the Segregation Wall and the Green Line that was delineated in the aftermath of the 1948 war. This area is called the “Western Segregation Zone”. The other two-thirds of the confiscated area are the *de- facto* created “Eastern Segregation Zone” on the eastern side of the West Bank, which was created without walls or fences, but through its control of access points along the Jordan Valley and the shores of the Dead Sea ([Figure 2.4](#)).

In Bethlehem Governorate, 73,000 dunums (73 km²) of land will be segregated behind the Wall. This represents the second highest area of confiscated lands in the Palestinian governorates, after Jerusalem Governorate. The Segregation Wall confines the western rural villages of the Governorate incarcerating more than 20,000 residents. These residents will be segregated from their lands, livelihood and vital social services such as hospitals, schools and universities that are only found in the city centers (i.e. target area) east of the Wall.

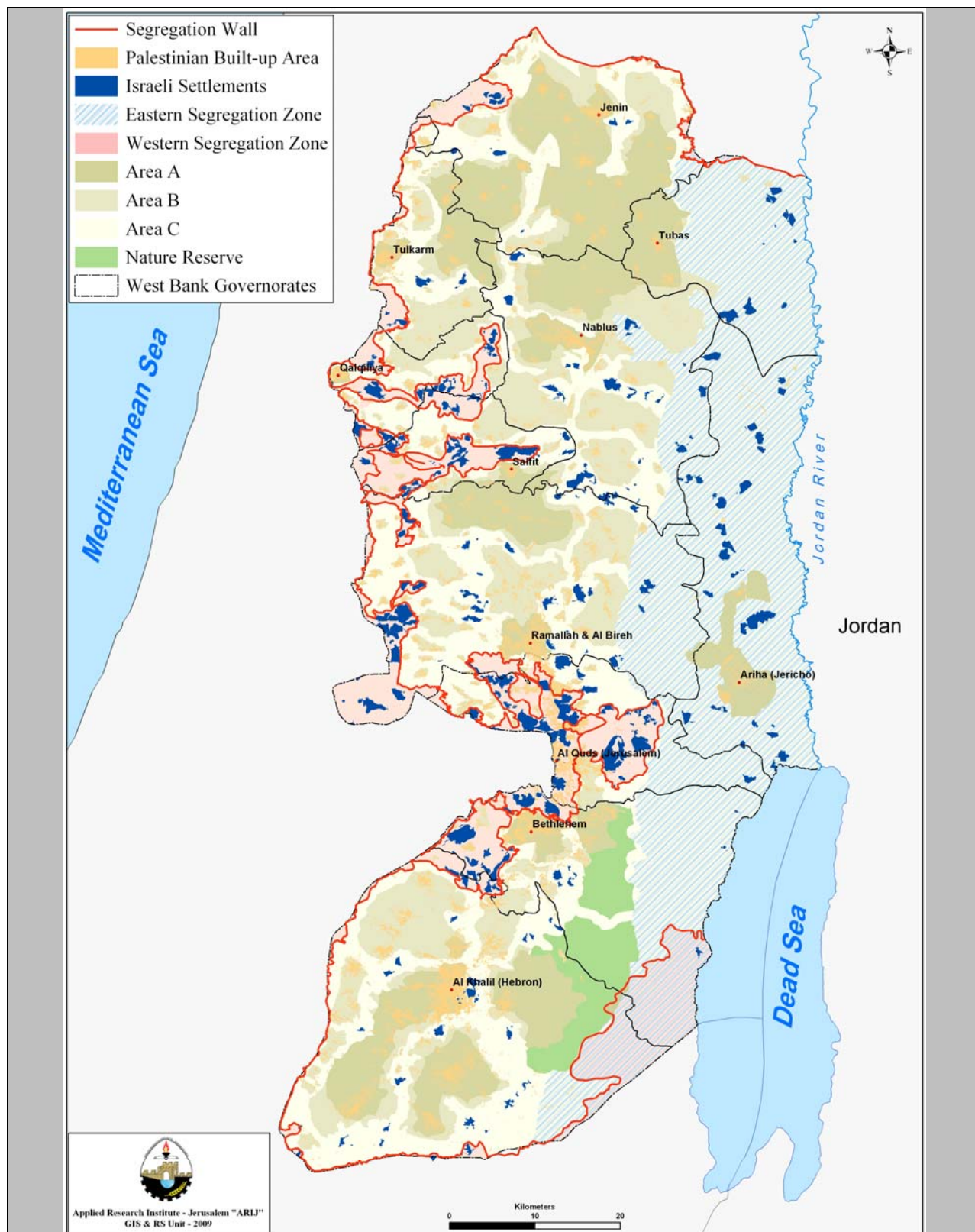
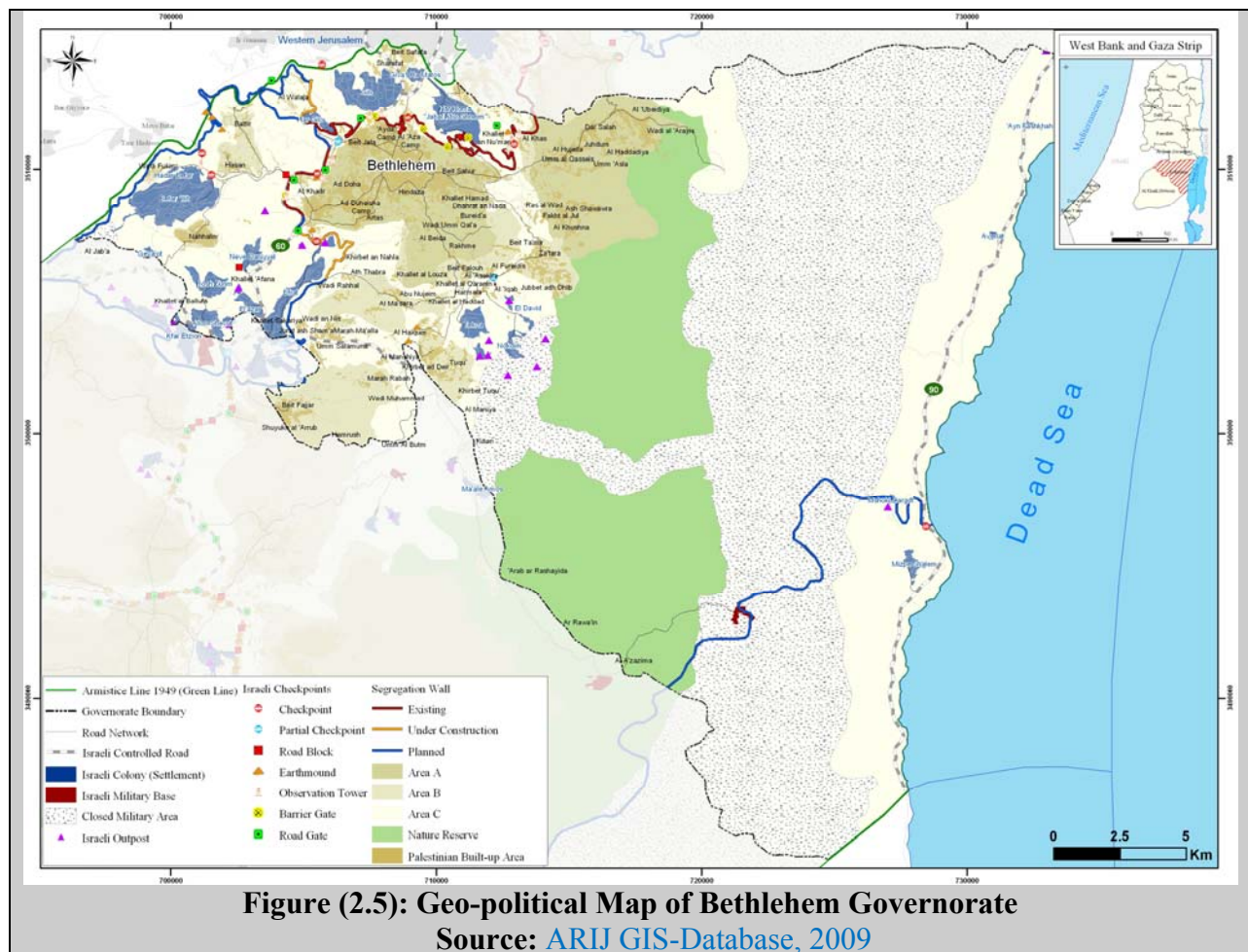


Figure (2.4): The Segregation Plan in the West Bank Territory
 Source: [ARIJ GIS-Database, 2009](#)

The eastern part of Bethlehem Governorate lies within the West Bank's eastern Segregation Zone. This area extends from Bethlehem's eastern slopes to the western shores of the Dead Sea. This sparsely populated eastern section covers a total area of 299 km² (49% of the Governorate's total area) (*Ibid*, 2009). The reason for this small population is that the vast majority of the land was declared a closed military area or nature reserve area by the Israeli Government in 1967 and has remained so since. Accordingly, the Israeli Army prohibited any kind of development in that area and because of this it has become inaccessible to Palestinian farmers (*Figure 2.5*).



2.2 Socio-economic and Environmental Interventions

As have been expressed so far, the geo-political considerations have contributed to the creation of a *de facto* situation on the ground, where the “construction of meaning” and “meaning of construction” has been articulated interchangeably to portray the ugly face of military occupation in Bethlehem area in specific, and the OPT in general. In the same vein, the socio-economic and environmental repercussions of such a geo-political environment are problematic to the sustainability of Palestinian cities. In her study of “The Urbanization Impact on the Palestinian Landscape”, [Shaheen \(2007\)](#) assures that the high urbanization rates within the Palestinians amplify the side effects of occupation measures and increase the complexity in terms of mal-distribution of natural resources and employment opportunities. The following headlines elaborate on this matter further.

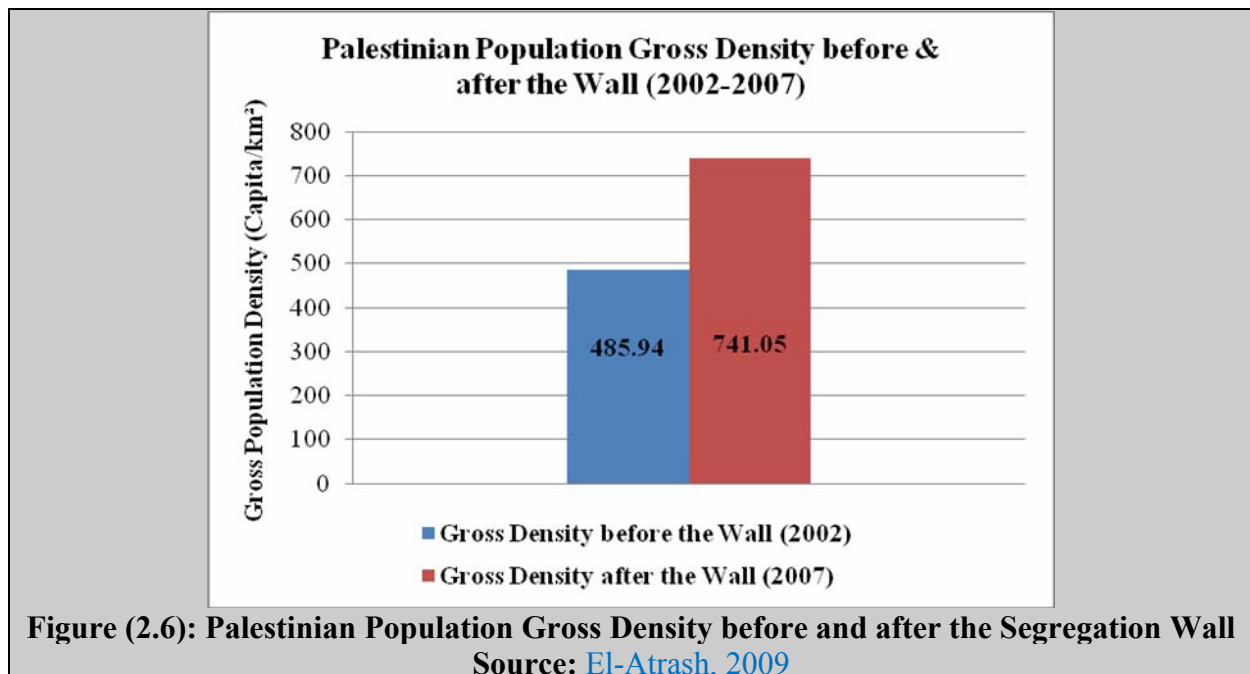
2.2.1 Spatial Re-Distribution and Geo-Demography

The target area is the home of 49,391 inhabitants; 25,266 (51%) inhabit Bethlehem, 11,758 (24%) inhabit Beit Jala, and 12,367 (25%) inhabit Beit Sahour cities, respectively ([PCBS, 2007](#)). According to the Palestinian Central Bureau of Statistics (PCBS) census track for the year 2007, the inhabitants of the target area constitute 40% of the urban inhabitants of Bethlehem Governorate that calculates 123,639 ([Ibid, 2007](#)). This represent a plummet rate of 60%, in comparison to the PCBS census track for the year 1997, where the target area exclusively resembled the urban inhabitants of Bethlehem Governorate at that time. This is interpreted to the statistical definition that encompassed new communities in Bethlehem; climbing the number from 3 communities (i.e. the target area) in 1997 to 12 communities in 2007 ([Ibid, 2007](#)). The statistical definition of urban areas is “*any locality whose population amounts to 10,000 persons or more. This applies to all governorates/districts centers regardless of their size. Besides, it*

refers to all localities whose populations vary from 4,000 to 9,999 persons provided they have, at least, four of the following elements: public electricity network, public water network, post office, health center with a full – time physician and a school offering a general secondary education certificate” (Ibid, 2007).

Thus, it is vivid enough to note that Bethlehem Governorate, as in the case of other Palestinian Governorates across the OPT is being deliberately urbanized, mainly due to high Palestinian growth rates and the Israeli *de facto* enabled environment.

To look at the bigger picture, the gross population density of the West Bank has increased by approximately 50% during the last 5 years (Figure 2.6) (El-Atrash, 2009), and this is interpreted due to the high rate of population growth and the limited access to open lands for future development, compounded by the land confiscation policies that the Israeli government has implemented in the West Bank territory, thus propelling the salient rural-urban migration. This relatively high gross population density will probably exacerbates the results of urban sprawl and the misuse of valuable agricultural land.



2.2.2 Mobility of People and Goods

The Israeli adopted policy of physical domination through building the Segregation Wall, along with the other imposed physical obstructions is manifested through a series of military terminals with the purpose of controlling the commercial flow of the Palestinian goods, merchants and workers from the OPT to Israel and also between the OPT area. This Israeli terminals' policy has served, according to human rights organizations, as a collective punishment strategy and as a source of impediments to Palestinians' movement along the snaky path of the Wall. Even Danny Tirza the architect of the Wall noted that the continuously deflected and reoriented path of the Wall, during its construction, as "*a political seismograph gone mad*" (Weizman, 2007: 162).

The Palestinians argue the legitimacy of the Israeli military terminal policy by the virtue of international law, including the International Humanitarian Law (IHL) that obligates Occupying Powers (i.e. Israel) to protect freedom of movement for the population of any Occupied Territory (i.e. Palestine), as well as their (population under occupation) political, economic, cultural and social rights. "*Everyone lawfully within the Territory of a State shall, within that Territory, have the right to liberty of movement and freedom to choose his residence*". (Article 12.1, International Covenant on Civil and Political Rights (ICCPR) (OHCHR, 1966).

To this end, the perpetual and improper subdivision of the landscape has resulted in insufficient usage of natural resources, particularly for the urban poor of the OPT, who constitute more than two thirds of the total population. In 2001, 60% of the urban poor were living in low standard conditions, in comparison to only 2% of the urban poor of Israel (UN-HABITAT, 2001).

A thorough understanding of the locations of the erected military terminals (Figure 2.6) inside Bethlehem Governorate reveals that these terminals are located in sensitive areas to block the usual routes that were used by the Palestinians until recently, creating a group of besieged Palestinian communities. These terminals are opened for Palestinians to access other adjacent Palestinian communities only at specific times and under ambiguous, harsh and inhuman Israeli procedures. Movement of people and flow of goods between towns and cities, farmlands and towns and between the OPT and the world outside have been reduced to a trickle.

Evidently, it became increasingly difficult for Palestinian public to commute easily across the Wall to access places of worship, families, education, institutions and employment. The United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA), located in the OPT, estimated that 15-20% of Palestinians' daily work time is lost on account of internal closures, thus jeopardizing the social fabric "lifescape" of Palestinian communities. This could be flagrantly seen, as the majority of the expropriated lands due to the construction of the Wall are of a rural nature, where its residents depends extensively on the public services provided by the nearby urban centers, which were detached from the realm of its territorial contiguity.

Karl Marx described the vulnerability of individuals in a modernizing urban world as *alienation*, a concept further elaborated by 20th century urban sociologists in studies of social networks (UNHABITAT, 2008 a: 167). The value of such networks and social relationships became known as social "capital" elevating the study of social networks from the social into the economic sphere (Bazoglu, 1992). The central idea behind social capital is that "*networks of social contacts may represent a form of capital resource ... with important potential returns on investment*" (PRI, 2005).

2.2.3 Agricultural Base at Risk

Land-use / Land-cover interpretation of the isolated Palestinian lands in Bethlehem Governorate due to the building of the Segregation Wall shows that almost one-third of the area is of agricultural nature, plus other 4% of forests scenery (ARIJ GIS-Database, 2009). Anani (2007) called the former as “Agrarian Landscape”, which is characterized by a vivid change in its physique, due mainly to what he called rurbanization; the mix in the property (e.g. social and physical) of urban and rural areas to a degree that is regarded as interacting and inseparable.

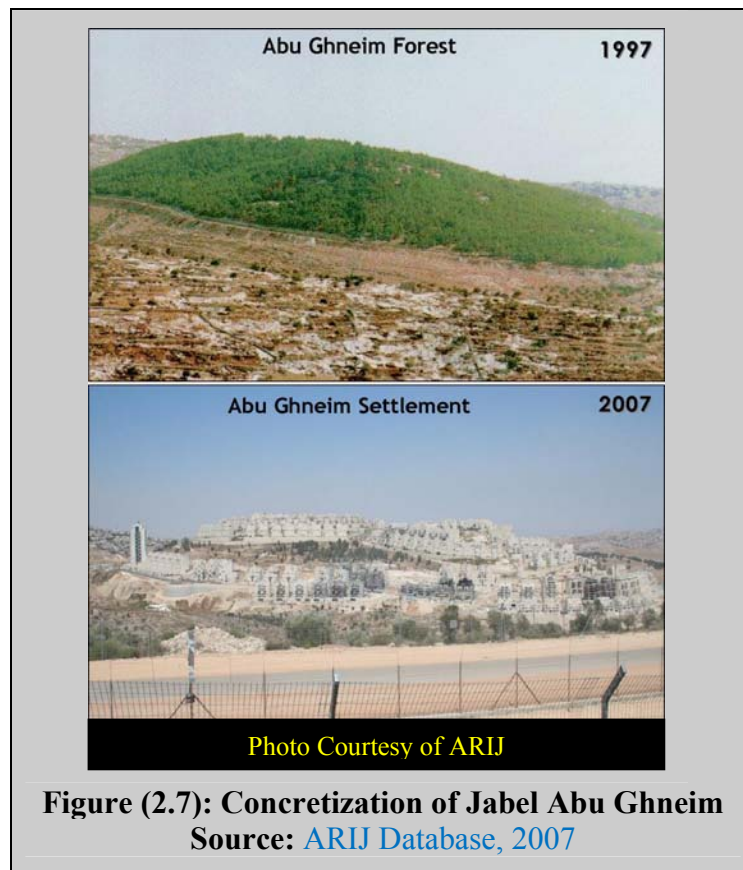
To elaborate more, the perpetual and increasing migration from Palestinian rural areas to the urban ones, due to the Israeli oppressive practices, including the Wall, has its adverse effects on both sides. However, the borders between these urban areas and its rural hinterlands can be best described by the term used by Raja Shehadah (2006), “A Vanishing Landscape” due to the growth rates of urban sprawled areas and the uncontrolled expansion of villages in the direction of urban centers. Consequently, the organic relationship between Palestinian manpower and agrarian landscape became more fragile and jeopardizing the agricultural production-consumption cycle of agri-economics (Anani, 2007).

However, Weber (1991) argues that those who are disconnected from their production-consumption relationship with the landscape tend to protest and resist. On the Palestinian arena, nucleus of civil protest and resistance, as in Ba’lian and Na’lin in the Ramallah Governorate, as well as Umm Salamuna in Bethlehem Governorate, east of the target area, provide an aspiration and motivation for other Palestinians that something could be done to stop the crime of the Wall against Palestinian lands and people.

The Israeli planning authorities has purportedly manipulated the land-use system in the OPT (Abdulhadi, 1990). The designated “green natural” zones were systemically annihilated and

concretized with exclusive Jewish settlements. This was described as “agoraphobia; the fear of space” (Salmon, 2002), which refers that the crux of the Israeli colonial politics relays not only on the division of territory, but its abolition.

More germane, the Israeli Jerusalem Municipality as-though legal maneuver of designating Palestinian lands into “green natural” zones only help them to gain time to strategically abolish the landscape by its concretization with illegal exclusive Jewish settlements, such as Har Homa Settlement that was built on Jabel Abu Ghneim north of the target area (Figure 2.7).



2.3 Planning System

The most unfortunate legacy of the last five centuries (1516-to present) of occupation in Palestine is that the development of any kind of state structure in the country has been tabooed. This explains the Palestinian people's weakened capacity for planning the development of land and resources in a sustainable manner.

The inefficient existing laws, regulations and decrees that wrap the legal planning system in present Palestine (i.e. OPT), including the target area include the Ottoman Turks (1516-1917); British Mandate laws (1917-1948); Jordanian laws in the West Bank Governorates (1948-1967); Israeli military orders since 1967; and Decrees issued by the PNA since its inception in 1994.

During the period of Ottoman rule in Palestine, a Land Register Law known as the "Tabu" was introduced in 1858 to establish rights of land ownership. Accordingly, the Land Settlement Ordinance to the year 1928 that was introduced during the British Mandate also tried to solidify rights of land ownership (Halabi, 1997). However, both approaches failed to document the situation of land ownership in, what is now the OPT, as the Arab family-based communal farmers who formed the majority of the landowners resisted those systems for several reasons, including: Both systems neglected the tradition of collective ownership adopted by the farmers at those times; and the Turkish Land Register Law forced high taxes on the registered cultivated lands that were classified as the land of the emirate (El-Atrash, 2007).

Nevertheless, Israel - as a consequence of 1948 war - took control of 78% of Mandate Palestine (ARIJ, 2007). Up until the 1967 war, the West Bank came under the Jordanian administration. Since land ownership has always been the key issue in the Palestinian-Israeli conflict, Israel neither recognized nor authorized the traditional communal based system of

ownership that had existed for many generations on the land that covered almost the entire Palestinian rural area including Bethlehem Governorate.

Knocking effects on the last-present occupation era (i.e. Israeli Occupation), Hanafi (2009) indicates that one of the many repertoires of the Israeli “state of exception” occurs when issued law carries along with it the rule of suspension of this law without specifying a context. Using such a power technique, Israel has been able to constrain the Palestinian residential construction, predominantly using military orders. Military order No. 418, “Order for the Planning of Towns, Villages and Buildings (Judea and Samaria)”, outlines the requirements for obtaining building permits in the West Bank territory. Article 7, called “Special Powers,” grants the High Planning Council the power to: *“amend, cancel or suspend for a specified period the validity of any plan or permit; to assume the powers allocated to any of the committees mentioned in article 2 and 5; to grant any permit which any of the committees mentioned in article 2 and 5 are empowered to grant [...]; to dispense with the need for any permit which the Law may require”* (Coon 1992: 280).

In other words, the Israeli authorities created a *de jure* situation, where it could manipulate the law by annulling its own regulations, in such a way that the construction permit becomes a tool for *de facto* control and surveillance.

2.4 Summary

The target area is facing many vexing problems that create a *de facto* situation, which is considered antithetical to the process of sustainable development. On one hand, the target area is surrounded by various types of Israeli territorial and security measures: on the northern and western parts the target area is surrounded by the Segregation Wall that holds its expansion and connection with its twin city of Jerusalem, from the southern parts, the target area is held off by

the new Israeli bypass road and formerly by Oush Grab military post. On the other hand, lack of sound planning capacities at the Palestinian side has exacerbated the side effects of the Israeli aggressive measures, creating a sprawled neighborhood and cities. Other resulting environmental problems, as well as the rising numbers of urban poor will feature prominently as formidable challenges to the target area within the emerging Palestinian statehood in the coming years, unless dealt with now.

Chapter 3: Methodological Frameworks

The impetus of research methodology is a case study approach, whereby the urban area of Bethlehem Governorate is used to investigate prospectus and challenges of applying sustainable urban growth strategies, as an elusive solution to the many urban challenges that faces the Palestinian cities, including the phenomenon of sprawl. This chapter provides an overview of the case study approach, as well as the appropriateness of choosing this approach for this thesis, and a review of the implementation of the research. The field observations that will be undertaken, and the selection of data (primary and secondary) to be analyzed, compounded by the limitations of this method are all discussed, as a part of the proposed methodological framework.

3.1 Research Questions

Based on the statements of problems, elaborated in [Chapter 2](#), the key questions that will invoke the course of research are divided into *main* and *secondary* questions. These questions could be scantily summarized as follows:

3.1.1 Main Question:

- **How** can the urban dwellers of Bethlehem grow and develop, in order to curb urban sprawl and ensure sustainability? (*Solution-oriented question*)

3.1.2 Secondary Questions:

- **What** discourses surround the politics of urban form mutations in Bethlehem area? (*Analytical question*)
- **How** can urban sprawl be measured? (*Process-oriented question*)
- **What** tools could be used to design and project a sustainable urban form in Bethlehem area and its hinterlands? (*Process-oriented question*)

- **What** might be the set of recommendations and general policy framework towards a sustainable urban growth strategy? (Auxiliary solution-oriented question)

3.2 Research Strategy and Framework

A first step in designing the research strategy was to set-up the mind to which research method to adopt in the investigation of the research questions. Should the research methodology follow an inductive or a deductive reasoning approach? According to [Jones \(2004\)](#) both are used in research to establish hypotheses. Deductive reasoning arrives at a specific conclusion based on generalizations. Inductive reasoning takes events and makes generalizations.

The reason behind adopting an inductive (AKA: exploratory analysis) rather deductive (AKA: confirmatory analysis) approach to analyze the collected data for this research thesis is embedded in the key characteristics of the approach in terms: the flexibility to examine data without preconceptions; the promotion of deeper understanding of processes; and the learning from the own descriptive statistical data ([Tukey, 1977](#)). These characteristics allows for this particular social enquiry research to achieve its goals, as Palestine in particular and other Third World countries in general, rely increasingly upon social science methods to gather high-quality data, which are of “major importance”, because they are used both for development planning and day-to-day administration that influence the life chances of people ([Bulmer and Warwick, 1993](#)).

However, according to [Adam Jones \(2004\)](#) adopting an exploratory data analysis approach has some disadvantages. Among these disadvantages are that exploratory approach usually does not provide definitive answers; and requires judgment and artistry. In our case, it is argued that these disadvantages, especially the latter are of minor significance, as the research hierarchy will follow a “scientific approach” that juxtaposes all the solicited views without influencing them.

Robson (2002) asserted that a “scientific approach” should be carried out “*systematically, skeptically, and ethically*”. The intention behind working in this way is to seek the truth, lead to better-quality and more useful research. To elaborate more, “*systemically*” means giving serious thought to what you are doing, and how and why you are doing it; in particular being explicit about the nature of the observations that are made, circumstances in which the observations are made and the role the researcher takes in making the observations. In the same vein, “*skeptically*” means subjecting the researcher ideas to possible disconfirmation and also subjecting the researcher observations and conclusions to scrutiny (by oneself then by others). Lastly, “*ethically*” means that the researcher follows a code of conduct and ethics to safeguard the interests and concerns of those taking part in, or possibly affected by the research. Nevertheless, the researcher knowledge and experience in the subject matter will ultimately influence the research scope and not the context.

Beside the **exploratory** nature of the proposed research strategy, which seeks to examine a more sustainable form of development for the Palestinian cities, it is paralleled by the **descriptive** analysis and **causal** illustration of the research context. The descriptive research involves the gathering of information about existing conditions; while the causal research is concerned with determination of which variable might be causing a particular behavior. Consequently, the use of multiple methods (or *triangulation* in our case) enables the research environment; allowing for an opportunity for an in-depth understanding of the phenomenon under question. Denzin (1978) used the term triangulation to argue for the combination of methodologies in the study of the same phenomenon. The concept of triangulation is based on the assumptions that any bias inherent in particular data sources, investigator or method would be neutralized when used in conjunction with other data sources, investigators or methods.

3.2.1 Case Study Approach

Among the various possible social science research strategies, such as survey, histories or analysis of archival information, a research strategy that utilizes the use of a case study as an analytical approach seems to be the most suitable tool for this study. Gerring (2002) defines a case study as “*an in-depth study of an individual unit where that unit is approached as an example of some larger phenomenon*”. According to Yin (2003), case studies are the preferred strategy when “how” or “why” questions are being posed (Section 3.1), when the “*investigator has little control over events, and when the focus is on a contemporary phenomenon within some real-life context*”. Furthermore, the case study method allows investigators to retain the holistic and meaningful characteristics of real-life events, such as neighborhood change (Ibid, 2003).

Babbie (1992) argues that the case study approach has the potential of establishing a research design that embraces the combination of multiple methods, approaches and techniques of data collection and analysis; this is perfect since the study follow a triangulation research method: exploratory, descriptive and causal, keeping in mind that the various methods are not mutually exclusive (Yin, 2003). Gerring (2002) rightly prize case studies as a form of exploratory research that focus on a subject that is not well-understood or a research whose primary focus is hypothesis-generation rather than hypothesis-confirmation.

The target area of Bethlehem, Beit Jala and Beit Sahour cities is used as the model that will allow for in-depth research and scrutiny at the micro-level. The study at the micro-level will gives more insight to the cause-and-effect relationship that woven the process of antithetical sustainable development of the Palestinian cities in terms of urban sprawl phenomenon, along with the associated adverse impacts on the local urban environment. Having said this, the target area doesn't provide a unique or exceptional case within the context of the Palestinian cities,

rather a representative model that would facilitate the replication and adaptation of the research methodology on different Palestinian cities or other developing cities with different regional context.

Notwithstanding, the rationale for adopting a case study approach to investigate the question of “*How can the urban dwellers of Bethlehem grow and develop, in order to curb urban sprawl and ensure sustainability, within the Palestinian context?*” the author is merely simulating the adopted approach by great urban planners and designers who booked influential work in the subject matter.

[Alexander Cuthbert \(2006\)](#) in his book “The Form of Cities - Political Economy and Urban Design” lists forty classic texts in urban design, most of which adopt the case study approach. To name a few, [Kevin Lynch \(1960\)](#) in his study “The Image of the City” in which he proposed an original and vital method for the evaluation of city form, could support his study by micro-examining the American cities of *Los Angeles, Boston, and Jersey* to formulate a new criterion “image-ability” and shows its potential value as a guide for the building and rebuilding of cities. Not away from, the arguably most influential book written on urban planning in the 20th century, “The Death and Life of Great American Cities” by the urbanist and activist [Jane Jacobs \(1961\)](#), frequently cites *New York City's Greenwich Village* as an example of a vibrant urban community in her way of critiquing the proposed modernist urban planning schemes at that time. In the same vein, [Christopher Alexander \(1987\)](#) presents “A New Theory of Urban Design”, which attempts to recapture the process by which cities develop organically. Alexander with a number of his graduate students could set-out his new theory by simulating the urban redesign of a high-density part of *San Francisco City*. Last but not least, [Kim Dovey \(1999\)](#) in his book “Framing Places: Mediating Power in the Built Environment”, investigates how the built forms of architecture and

urban design act as mediators of social practices of power through a series of narratives on specific places and types of environment, such as *Berlin* in Germany, *Beijing* in China and *Canberra* in Australia.

3.2.2 Research Propositions

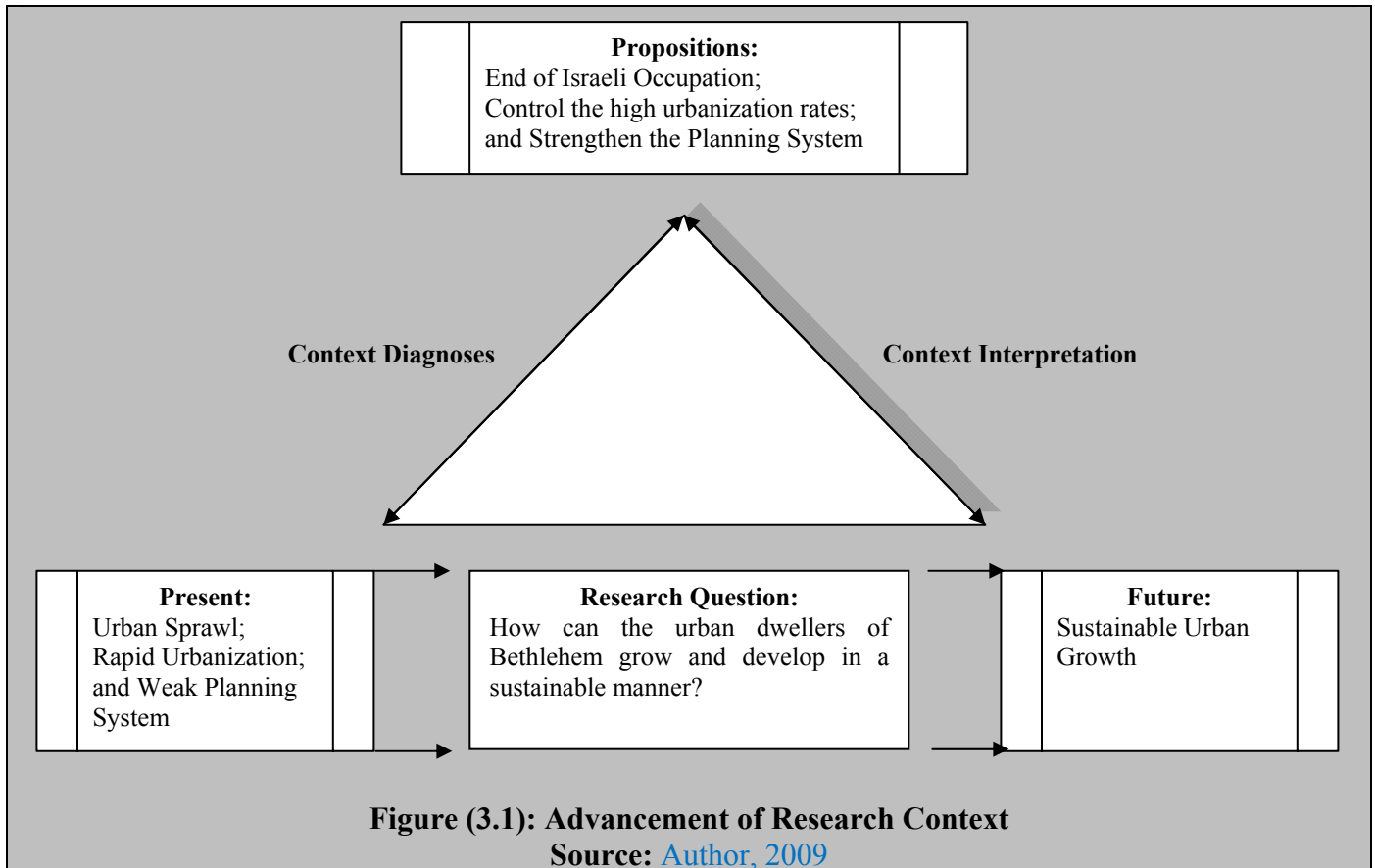
To advance the research context (Figure 3.1) into a strong, clear and transparent research design that facilitates the development of practical explicit descriptions within the research context, some research propositions have been identified. According to Gerring (2002), the viability of a case study is always proposition-centric or proposition dependent. It depends on what the researcher wish to argue. Propositions help identifying the relevant information about studied causes and represent the reference point against which the collected data is collated and the results generalized. Each proposition directs attention to something that should be examined within the scope of study, and the more a study contains specific propositions, the more it will stay within feasible limits (Yin, 2003).

The key propositions that invoke the research study are summarized as follows:

- To end the Israeli Military Occupation that adopt a *de facto* confiscation policy against the Palestinian resources; thus undermining the sustainability of the Palestinian cities.
- To control the high urban growth rates that comes over valuable agricultural and cultural landscapes.
- To strengthen the planning system that lack sovereignty over resources and territorial contiguity, along the efficient town planning tools that would promote the development of a sustainable urban form in the Palestinian cities.

The abovementioned propositions are deeply rooted and embedded into the triple-bottom lines of sustainability, in terms of social, economic and environmental development on the

ground. However, the unique case of the Palestinian cities that live under military occupation makes the political development at the heart of the envisaged sustainability of the Palestinian cities form and structure.



3.2.3 Q-squared Methods

The research thesis uses both quantitative and qualitative (Q-squared) methods. Thompson (2004) expresses it, "...research using one eye rather than two" typifies much conventional social science. But, in recent times, more and more researchers are attempting to use "both eyes".

Greene *et al.* (1989) advanced many purposes for combining Q-squared methods in a single study, to name a few: *complimentary*, in that overlapping and different facets of a phenomenon may emerge; *developmentally*, wherein the first method is used sequentially to help inform the

second method; *initiation*, wherein contradictions and fresh perspectives emerge; and *expansion*, wherein the mixed methods add scope and breadth to a study.

However, [Hulme \(2007\)](#) indicates many potential ways in which a combination of the Q-squared approaches might capture the strengths of both methods for country case studies for development, mainly: data quality, deeper understanding and more effective policies. All of which will be thoroughly interconnected in the research undertaking.

Knocking on the qualitative research underway, the author uses a conceptual analysis technique in the development of the theoretical framework ([Chapter 4](#)). The main reason for using this technique is demonstrated in the theoretical framework that aims at describing the discourse of “urban forms” and “sustainability” rather than theorize it. [Strauss and Corbin \(1990\)](#) point out two main points related to the difference between “theory” and “descriptions”: First, theory uses concepts. Similar data are grouped and given conceptual labels. This means placing interpretations on the data. Second, the concepts are related by means of statements of relationships. In description, data may be organized according to themes. These themes may be conceptualizations of data, but are more likely to be a precise or summaries of words taken directly from the data.

3.3 Data Collection and Analysis

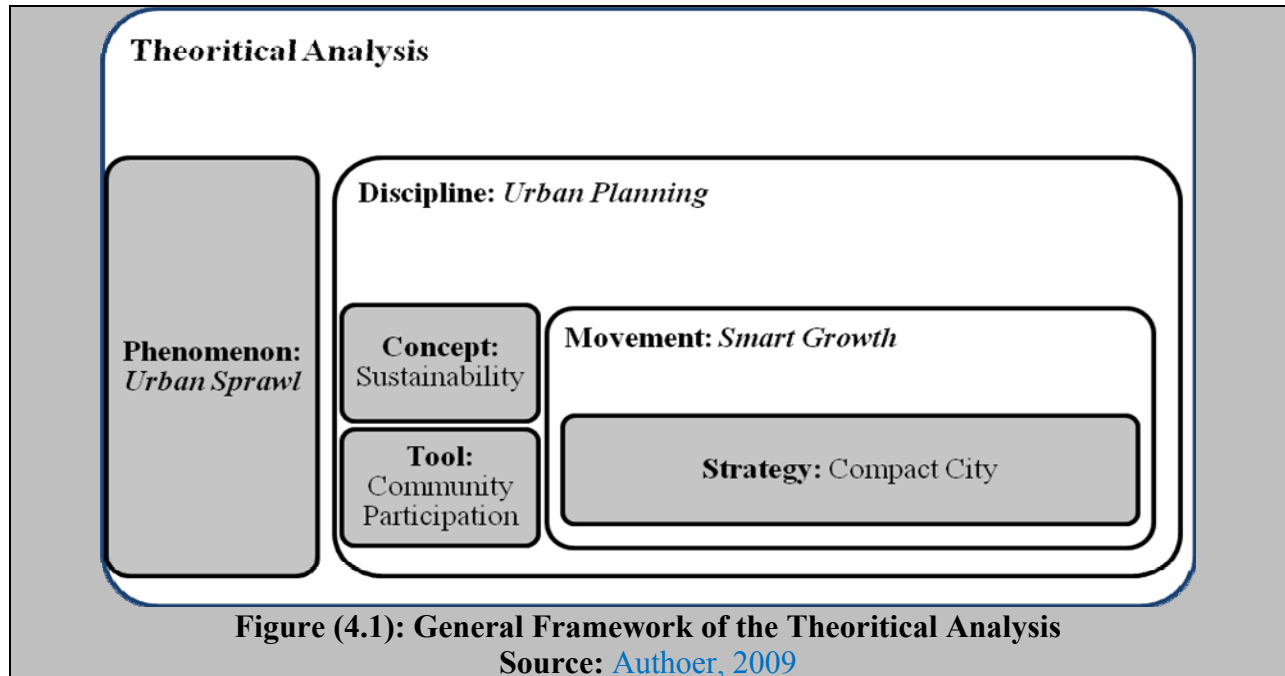
The research study musters evidences at several levels of analysis, retaining a stronger case than one which rests at a single level of analysis (*ceteris paribus*: or other-things-equal, which means that all other variables except those under immediate consideration are intentionally held constant for a particular analysis at specific particular place and time) ([Gerring, 2002](#)). Using as many data sources as possible is crucial to a strong case study ([Yin, 2003](#)); therefore, two data sources have been identified, namely: *primary* and *secondary* data sources.

The primary data are extracted, mainly from the direct observations made by the author from the target area environment, and from the semi-structured interviews conducted with local and national stakeholders to build a spatial GIS-based model to identify the suitable locations for future urban growth in Bethlehem area. Concurrently, the secondary data are built through deliberations on the available data sources in the forms of archived research, municipal published documents, mapping interpretations using the state-of-the-art technology of GIS. The GIS has only two types of data, namely: *spatial* and *attribute* data. The former is related to the digitized and drawn geographical data, while the later is related to the descriptive tabular data, which is entered in the database tables in order to be used in querying and spatial reasoning. The GIS is owned, operated and updated at the bequest of the Applied Research Institute-Jerusalem (ARIJ), where the author is currently employed. The meta-data on ARIJ's GIS-database reads the coverage of the target area in terms of road networks, land parcels, main features, administrative boundaries, land-use and land-cover classifications, contour lines, houses, water network, waste water network, electric network, among others. However, the attribute data in terms of statistical figures and socio-economic and environmental conditions has been gathered by the author from other multi-secondary data sources, including the PCBS.

To this end, the primary data used in this sense are conceptual and provide a base for vision and foresight operationlization to orient the course of future urban growth in a sustainable manner. Nevertheless, the used secondary data sources could be perceived as auxiliary means to diagnose and forecast the course of urban growth is statistical and spatial terms.

Chapter 4: Theoretical Frameworks

This chapter will interpret the relevant discourses on the form and structure of the envisaged sustainable city that would accommodate and empower the Palestinian urban growth, and discuss how the concept of sustainability has evolved and developed throughout the contemporary epoch of urban planning discipline, with a special emphasis on the importance of community participation, as an efficient tool to promote sustainable urban growth to mitigate the adverse impacts of urban sprawl, especially in such a geo-political context as in the OPT. The organic relations within the general framework of this theoretical analysis (Figure 4.1) explain the generic dialectical approach that constitutes the foundation for promoting sustainable urban growth strategies. This is theoretically approached by a pre-supposition that emphasis on a principle of inference that the “Smart Growth” movement, as one of the foremost new urban approaches, and as an executable sustainable urban growth agenda, which is founded on the premise of a compact city model, would provide a fertile environment to mitigate urban sprawl within the Palestinian context. This will be discussed and analyzed within the following lines, where lights will be shaded on the “Smart Growth” movement, more specifically on its principles and founding strategies that holistically encompass the sustainable urban growth strategies, however the “Smart Growth” movement itself, in terms of thorough historical pedigree will be eschewed. In other words, the appropriation of the “Smart Growth” movement within this volume is merely a terminological manipulation, which is equivalent to the envisaged sustainable urban growth scenario;



This part of the research should be dealt with, as “a mean to an end and not as many people have been taught to think an end in itself” (Yin, 2003). The presented theoretical analysis herein allowed the author to determining the questions that are most significant for the topic under study. However, gaining some precision in formulation these questions requires much preparation (*Ibid*, 2003). One way is to review the literature on the topic (Cooper, 1984). Novices may think that the purpose of a literature review is to determine the answers about what is known on a topic; in contrast, experienced investigators review previous research to develop sharper and more insightful questions about the topic (Yin, 2003).

4.1 Notions of Sustainable Development in Urban Planning Literature

Sustainable development is a multi-disciplinary and hermeneutic *-theory of the interpretation of texts-* discipline that evolved since the onset of environmental consciousness in the 1970s. While Mazmanian and Kraft (2002: 286) argues that it is not essential to agree on one definition of sustainable development (AKA: environmental sustainability, or sustainable communities), it

is essential to study the important transitions now taking place in public policy that are related to these issues. In our case, the focus will be on what [Jabareen \(2004\)](#) calls the “eco-form metaphor” of sustainable development, which represents the ecologically desired form of urban spaces and other human habitats.

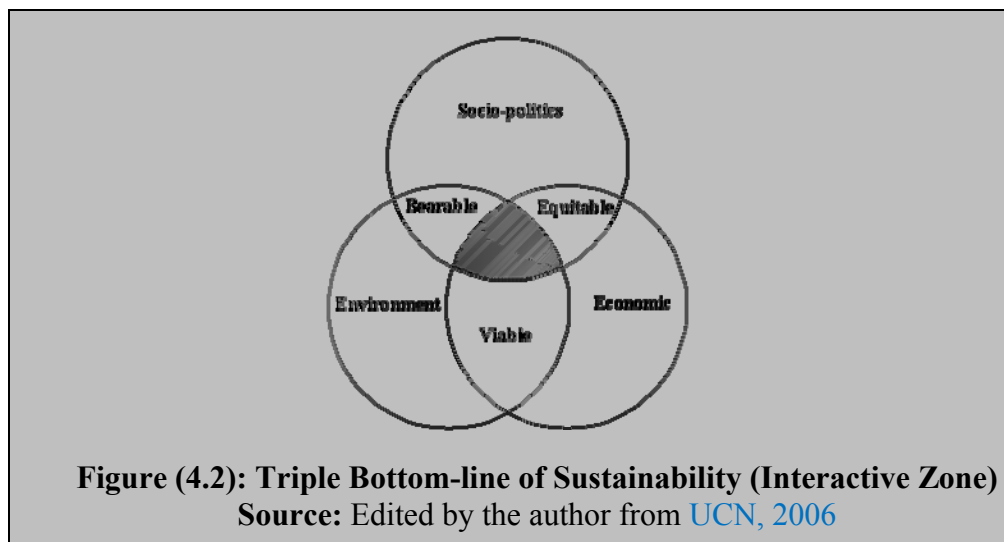
In initial oxymoronic, the contemporary epoch of urban planning discipline, lead to a great variety of urban forms, which often had little regard for their impact upon the environment ([Arbury, 2005: 15](#)). Being the first country in the world to industrialize, Britain embraced the evolution of the modern concept of urban planning “New Urbanism” ([Urban Task Force, 2005: 163](#)), “...as a reaction against the industrialisation which had created such great inequalities in living conditions by exploiting for profit whatever did not have to be paid for directly, such as housing, air, water and workers’ health” ([Relph, 1987](#)).

From the 1970s onwards, notions of sustainability began to emerge noticeably in the urban planning literature, when the UNs’ affiliated Brundtland Commission, formally the World Commission on Environment and Development (WCED), published its report “Our Common Future” in 1987 that vouched a promising future for the world, economically, socially and environmentally. The report brought sustainability into the mainstream, with the quite well known and often cited definition “*Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs*” ([WCED, 1987](#)).

[Holembeg \(1992:20\)](#) notice that the concept of sustainable development has a complex pedigree, as reams of papers have been published on the subject and many definitions is in circulation, making the concept of sustainable development “devalued to the point where, to

some, it is now a cliché”. For Deleuze the greatest danger to thinking is clichés (Deleuze and Guattari, 1991).

Nowadays in the concept of sustainable development three principal aspects/interventions are combined, namely: **Economic Intervention**: An economically sustainable system must be able to produce goods and services on a continuing basis; **Environmental Intervention**: An environmental (natural and built) sustainable system must maintain a stable resource base, avoiding over-exploitation of renewable resource systems, and depleting non-renewable maintenance of biodiversity, atmospheric stability, and other ecosystem functions not ordinarily classed as economic resources; and **Socio-political Intervention**: A socially sustainable system must achieve distributional equity, adequate provision of social services including health and education, gender equity, and political accountability and participation (Holmberg, 1992 and Rio Declaration, 1992).



The eclectic concept of sustainable development drove Leitmann (1999: 49) to note the lack of comprehensive theoretical approach for understanding its complexity, as most of the research on the topic is mono-thematic, while the issues are multi-disciplinary. This challenged Jabareen (2004) to draw “A Knowledge Map for Describing Variegated and Conflict Domains of

Sustainable Development”, by which he could inductively identify seven metaphors; each represents a specific domain in the designated cognitive map. The metaphor of ethical paradox signifies the *ethical* domain; the *material* domain is represented through the metaphor of natural capital; the *social* domain through the metaphor of fairness; the *political* domain through the global discourse metaphor; the *management* domain through the integrative management metaphor; the *visionary* domain through the utopian metaphor; and the *spatial* domain through the eco-form metaphor. The latter, within the urban planning context, suggests “compactness, high density of the built environment, intensification of its activities, efficient land planning, diverse and mixed land-uses and efficient transportation systems” (*Ibid*, 2004).

More germane, sustainability celebrated the marriage with urban planning theory, giving birth to new urban approaches. Grant (2006:57) highlights “Smart Growth” to be one of the foremost four approaches that all promotes “mixed use, mixed housing, compact form, pedestrian orientation, quality urban design, and defined centres and edges for urban neighbourhoods” (Table 4.1).

Table (4.1): Comparing the Principles of New Urban Approaches			
Traditional Neighbourhood Design	Transit-oriented Design	Urban Villages	Smart Growth
Divergent elements of each approach			
Focus on vernacular or classical architecture	Centred on public transportation hubs linked to regional system	More emphasis on self-sufficiency (with mix of housing and jobs) and Brownfield development	Adds government policies and incentives to promote change
Source: Grant (2006: 57)			

The new urban approaches, especially the “Smart Growth” gained momentum from a renewed focus on the importance of urban design, known as “New Urbanism” and the promotion of a “Compact City” model for urban growth rather than the conventional urban sprawl. Therefore, in a set forward it is important to notice the used terminologies that all pour in the

same river basin of sustainability. [Knaap et. al. \(2007: 3\)](#) exerts that definitions of Smart Growth vary, and overlap with the terms growth management, new urbanism and sustainable development. In this vein, it seems that there is no single definition of Smart Growth, as its meaning depends on different context, perspective and timeframe. However, the common thread among different views of Smart Growth is “development that revitalizes central cities and older suburbs, supports and enhances public transit, promotes walking and bicycling, and preserves open spaces and agricultural lands” ([ABAG, 2004](#)). The popularity of Smart Growth stems in large part from its focus on a more pragmatic question: *How and where should we grow?* ([Getting to Smart Growth II, 2003](#)).

Within this framework, new urbanists used catchy *concepts* in conveying their message. According to the [Webster’s New Collegiate Dictionary \(1973: 233\)](#), the meaning of “conceptualism” as an act of producing concepts is: “*a theory that universals exist in mind as concepts of discourse or as predicates which may be properly affirmed to reality*”. In this medium, relationships of communication are one of the instruments of power and can be used as tools of control over the actions of recipients. For instance, new urbanists have used the concept of “Euclidean Zoning” extensively that it developed as a common term in the modern urban planning discourse, referring to the segregation of land-uses into specified geographic districts and dimensional standards. In using the adjective “Euclidean”, the new urbanists effectively dismiss zoning by making it appear overly rational and ancient. Similarly, the development of a Smart Growth agenda proved brilliant. By defining its own solutions as “smart” the new urbanists have drawn the clear inference that other choices are “dumb” ([Grant, 2006: 6](#)).

The following section will present the general principles of Smart Growth, which in its own as a movement represents the momentum of the newness approach of sustainable urban growth.

4.2 Principles of Smart Growth

Smart Growth is an urban planning and transportation theory that concentrates growth in the center of a city to avoid urban sprawl; and advocates compact, transit-oriented, walkable, bicycle-friendly land use, including mixed-use development with a range of housing choices. Smart Growth values long-range, regional considerations of sustainability over a short-term focus. Its goals are to achieve a unique sense of community and place; expand the range of transportation, employment, and housing choices; equitably distribute the costs and benefits of development; preserve and enhance natural and cultural resources; and promote public health (Yongseok *et. al.*, 2004).

Porter (2002) argues that “smart growth abides by a set of interrelated principles of development”. These basic principles seek to accommodate the different interests of all sectors of any society with a stake in community development. Generally speaking, the principles of Smart Growth are widely acceptable ideas about the desirable form and character of communities. Not surprisingly, which principles could be included into an organization’s list of Smart Growth development depend on the interests of that organization.

Within this framework, the Smart Growth Network (2003) presents the most exhaustive list on Smart Growth principles that would ensure the sound application of a sustainable urban growth agenda. The promoted ten principles of Smart Growth differ in their scope and level of intervention, in terms of physical, socio-cultural and ecological tendencies. Table (4.2) categorizes these ten principles according to their sustainability theme-related tendency, keeping in mind that these principles are interrelated and organically connected. It is important to acknowledge that every aspect (i.e. physical, socio-cultural or ecological) of this localization of the Smart Growth principles has its repercussions on the other aspects. In other words, the three

binding physical principles of mixed land-uses, compact design, provision of a variety of transportation choices could be perceived as the structural framework that would enable the adoption of the other related socio-cultural and ecological principles, and *vice versa*. Therefore, the ten principles should be adopted as a bundle in the promotion of sustainable urban growth strategies, however, the scope of this research will pay a premium to the discussion and interpretation of physical tendencies, which unfortunately still remains an uncultivated discipline at least not with the sought top qualified professional and technical capacities that the Palestinian society lack.

Table (4.2): Localizing Principles of Smart Growth, According to their Theme-related Tendencies

No.	Principle	Physical	Socio-cultural	Ecological
1	Mixed land-uses			
2	Compact design			
3	Create a range of housing opportunities and choices			
4	Create walk-able communities			
5	Foster distinctive, attractive communities with a strong sense of place			
6	Preserve open space, farmland, natural beauty, and critical environmental areas			
7	Strengthen and direct development toward existing communities			
8	Provide a variety of transportation choices			
9	Make development decisions predictable, fair, and cost-effective			
10	Encourage community and stakeholder collaboration in development decisions			
Source: Edited by the Author from Getting to Smart Growth II (2003) .				

The remaining of this section will provide scant, but balanced theoretical and empirical statements related to the territorial milieu of Bethlehem area, in relation to the three physical principles of Smart Growth, namely: mixed land-uses, compact design and provision of different transportation choices, which are all interrelated and supportive to each others, as the same stance they are to the remaining principles of Smart Growth.

4.2.1 Mixed Land-uses

The fruitions of mixed land-uses application are many. It provides opportunity, convenience, and accommodates many household types and needs (principle 3), as it afford an ease of walking to several distinct yet interrelated businesses and public places, which in fact is considered the norm in a mixed-use community (principle 4). The elderly can also benefit from mixed land-uses, as more activities and public services are accessible within smaller distances. This will inevitably contribute to the development of a more thriving and harmonious society, where the public have the opportunity to meet with others and cultivate neighborly ties (principle 5). This becomes of a great importance in lieu to the *de facto* Israeli prolonged physical obstructions on the ground that have created an associated social apathy within the Palestinian social fabric (e.g. [Abdel Jawad, 1997 and Taraki, 2008](#)).

By the same token, the mixed-use policy has its positive repercussions on the ecological as witnessed on the social intervention. A mixed land-use policy means more agricultural lands and green space are reserved and such land can continue to perform its ecological functions (principle 6). Furthermore, mixed land-use and higher-density development can play an integral role in protecting water resources, along with minimizing dependency on car use, thus less air pollution will be achieved.

Within the Palestinian context, mixed land-use is a culturally favourable and welcomed strategy. All the main Palestinian cities, including Bethlehem area exhibit mixed land-use activities ([Section 5.3](#)). However, due to the weak Palestinian planning capacities, lack of physical control because of the geo-political classification, shrinkage and scarcity of suitable lands for development, land values because of the high demand rates, among others; it is vivid that this course of development needs calibration to solve the land-use conflicts. It is argued that

interdependencies shaped by apprenticeships, barter economies, and community collaboration (principle 10) would help reform the related inefficiency in the Palestinian mixed land-use strategy.

4.2.2 Compact Design

Compactness yield more higher-density developments, which is considered a key element to creating walk-able communities (principle 4) and providing more transportation options (principle 8). This means that compact design has a positive influence on the social and environmental repercussion of development as the mixed land-uses policy do (principle 1). However, compact design contributes to the economic development through achieving economies of scale (principle 9). From a retail standpoint, more density means more customers (Section 4.4).

Concurrently, higher-density development can also contribute to a wider range of housing choices, as the per-unit construction costs will plummet, allowing developers and decision-makers more flexibility to respond to the turbulent market and, thus offer a range of housing types to a variety of consumers, including young singles, who could find smaller units with convenient access to different amenities (principle 3). Needless to say, within the Palestinian context the latter argument on young singles (2 individuals) that constitute 10.4% of the total private households in the West Bank (PCBS, 2007) is influenced by the weak Palestinian capacities in terms of construction industry and the relatively high prices of construction materials, land and labour force.

Similarly, retrofitting existing neighborhoods with Traditional Neighborhood Design (TND) can help re-create functioning neighborhoods that benefit the economy (Getting to Smart Growth II, 2003), based on the simple rule of thumb; extension of functions and major public

infrastructures is cheaper than the development and upgrading of a new infrastructure systems (principle 7). TND of mixed-use, compact development and pedestrian friendly have been the predominant urban form in old Palestinian cities, especially in the old city cores of Hebron, Jerusalem, Nablus and Bethlehem (Section 5.3), among others.

Jacobs (1961) pointed out the crime prevention benefits of density and compact building design by describing the virtues of compact design as a mean for providing a critical mass of individuals to use the city's streets and public spaces (principle 5). Generally and normatively speaking, even though the crime rates in the Palestinian communities are tangibly low, compact design could be touted as a pro-active fortification strategy, at least to the Israeli incursions that intensified after 2002.

4.2.3 Provide a Variety of Transportation Choices

As more communities adopt Smart Growth principles, the benefits of linking transportation, the workplace, and housing are becoming clearer in terms of hygienic environment, healthy individuals, economic savings, and social interactions and coherency. Even though, most people still use a personal automobile for the majority of their trips, interest in improving all forms of transportation, including mass transit, biking, and walking, is on the rise (Getting to Smart Growth II, 2003).

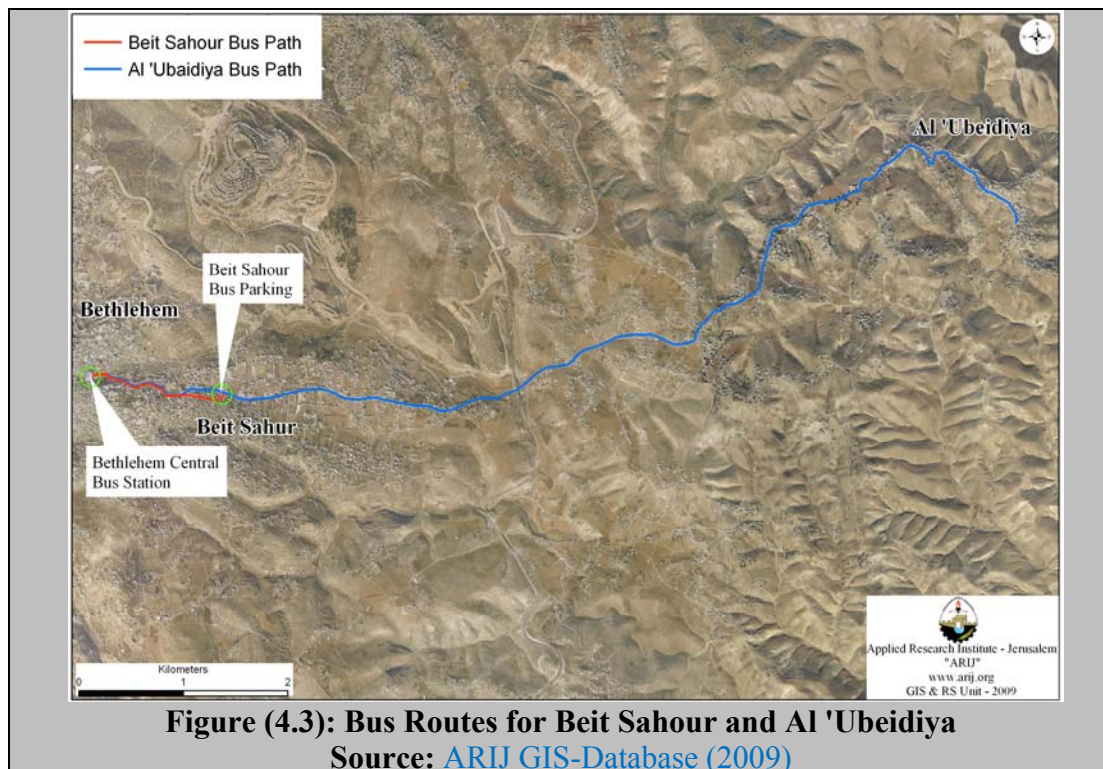
City forms that facilitate transport, specifically those that support public transport are more appropriate than city forms that do not. One may therefore conclude that, in terms of mobility and transport, the most efficient city form is the one that follows the transport network, but always revisiting the thoughts that not all forms of transport networks are equally efficient (Frey, 2005: 110).

In Palestine, due to the ravages of years of conflict and under-development, the public infrastructure networks and systems offer limited coverage. Furthermore, the network is poor in quality and is unaffordable for some vulnerable groups. Whilst household connection rates to utilities are high compared to the regional average, actual consumption rates are low due to a combination of supply shortages and inefficient distribution systems (PRDP, 2007).

El-Atrash *et.al.* (2007) notes that despite the fact that a total of 7% of the donor contributions to the PNA since its inception in 1994 (US \$473 million) and half of the Palestinian development budget over the period 1999-2003 were dedicated to the development of physical infrastructure in general and road networks in particular, about half of the OPT paved roads in 2003 were classified by the World Bank to be in poor condition and below acceptable service levels, up by 40% from its 1993. The rest of the network was a combination of fair (25%) and good (25%). This declination of local roads quality is due to the Israeli physical attacks and breakings on the Palestinian infrastructure including the road network (World Bank, 2006). Therefore, the PRDP (2007) adopts the “Road Safety Program” to strengthening planning, regulatory and enforcement capacity and rehabilitating and upgrading the public transport.

Historically, Bethlehem community has developed as an easy-to-walk city that inhabited in its core, multi-function provision nodes. Following years of technological advancement receipt from abroad mainly from occupying powers that ruled over Palestine, the Bethlehem community has developed its capacity and orientation to be a vehicle dependent one. However, it is satisfactorily safe and reliable to state that the urban constituent of Bethlehem still exhibits part of a walk-able environment, especially in the old cores. Furthermore, it is evident that the backbone of the transportation system is the road network that stretches along the main axis connecting the three cities of Bethlehem, Beit Jala and Beit Sahour (Section 5.3).

Noticeably, Bethlehem area is better serviced in terms of public transportation (mainly: busses), compared to the other localities around. Anyway, the quality and cost of public transportation within Bethlehem area are problematic if compared with other adjacent cities. For instance, a 2 km bus ride from Bethlehem City to Beit Sahour costs 2 Israeli Shekels, where a 14 km bus ride from Bethlehem City to Al 'Ubeidiya (east of Beit Sahour) costs 4 Israeli Shekels (Figure 4.3). This means that the individual expenditure using public transportation for Beit Sahour residents is 3.5 that for Al-'Ubeidiya residents, bearing in mind that bus conditions of the latter is much better and more comfortable. Needless to say, that this abstract comparison lacks the investigation of important determinants, including: the intensive use or flow of local and foreign passengers between the departure and destination points. In the same vein, Bethlehem area still suffers from other traffic related problems, chiefly: the lack of pedestrian designated areas, and shortage in the infrastructure of parking plots. Both are exacerbated by the user's violations and the weak enforcement system.



To this end, and after the succinct exposition of the underlying interdependent-principles of Smart Growth that once again is used within this context of theoretical analysis as a dialectical approach to the investigation of a sustainable urban growth formula within the Palestinian context, many scholars like [Grant \(2006: 56\)](#) still notices that although Smart Growth or New Urbanism has drawn some inspiration from theories related to sustainable development and despite the fact that the adjective “sustainable” is a popular one for new urbanists to use as a prefix to their solutions (e.g. [Urban Task Force, 2005](#)), New Urbanism reveals ambivalence about the place of nature in the city. This may best be interpreted as a response to [Haughton’s \(1999: 69\)](#) conclusion that “the form of the current urban space is seen as a source of environmental problems”.

Therefore, the question remains on *what appropriate urban form of contemporary cities to adopt in order to meet the principles of sustainability?* Micro-examining the urban planning literature proves that there is a plethora of theories emerging about sustainable urban forms. The purpose of the following sections is to revisit a number of these, examining both their rational and their implementation capability with the aim of advancing the debate and of finding the route to a sustainable urban form within the Palestinian context; *Should it be towards the compact city or not?* However, before focusing on the concept and policies of compactness, lights will be shaded on the developments of unsustainable urban growth, known as urban sprawl, with an extended discussion on its causes, in parallel to the paradox of its popularity/resentment between/by urbanites.

4.3 Urban Sprawl: A Destructive Vying for Space

The increasingly environmental, economical and socio-political problems that associate the unsustainable growth of today’s cities are considered the negative impacts of the urban sprawl

phenomenon. The brawl over urban sprawl is a difficult and thorny process, because it is the result of many interrelated causes that celebrate the multiple overlapping of different disciplines, where urban planning is in the heart of this multi-disciplinary apparatus. Therefore, considering urban sprawl usually demands to take into account several patterns including numerous socio-demographic indicators, as density or family size. In this context of theory analysis, a special attention will be given to the urban sprawl morphological aspects; the combination between built and non-built areas. In this sense, [Antoni's \(2001\)](#) definition of urban sprawl process, as the excessive “spatial expansion of the built areas of a city through time” is applicable.

Ibid (2001), sees this excessive spatial expansion with no limits that oozing inexorably over the landscape with little form or character. In other words, sprawl uses much more land per capita at present, while it is argued that the equity between generations in land consumption should be implemented so that future generations can get access to a fair amount of land resource ([Yeh and Li, 1996](#)). Sprawl separates where people live from where they work, worship, shop, go to school and hospitals and enjoy recreation. People are forced into vehicles, where the convenience trip is now an inordinate five-minute drive away by vehicles, not a five-minute walk on foot.

In paradox, there remain strips of the world community “commentators” who defend urban sprawl on the grounds that it is above all a consumer preference; preferring to leave the market to determine optimum solutions. [Gordon and Richardson \(1997\)](#) presented many consumer surveys that disclose the strong preferences of people for suburban living. [Arbury \(2005: 28\)](#) quotes Cheryl Cleary, president of the New Zealand Planning Institute stating that: “As much as some people say they want the right to choose where they live, at the same time they are likely to be saying they want the rural character on the outskirts retained. Often people don't put the two

issues together. They also want shorter travelling, less air pollution, a better sense of community. They want all these benefits of contained growth”. Nevertheless, [Gomez-Ibanez \(1991\)](#) also raises a fundamental point: the costs of containment policies, in terms of economic losses reduced quality of life, among others have not been weighed against the supposed environmental gains. [Breheny \(2005\)](#) accentuates that for deep-green environmentalists these losses are acceptable by definition, but for most policy-makers a degree of balance, and hence an understanding of gains and losses is required.

[Brugmann \(2005: 96-112\)](#) mentions five causes of sprawl, namely: anti-urban attitudes and racism; economic factors and the capitalist system; government; technology; and affluence and democratic institutions. However, in a squeamishness overview of these causes, unsurprisingly [Brugmann \(2005: 112\)](#) could conclude that “in the case of urban areas and sprawl, as in the case of virtually any vast and complicated human or natural system, there is very little simple cause and effect. Rather, there are innumerable forces, always acting on each other in complex and unpredictable ways”.

More clearly and specifically, most of the related urban planning literature defines two primarily causes to urban sprawl. The first is the associated technological developments (e.g. roads and vehicles) in the aftermath of the industrial revolution (e.g. [Brugmann, 2005](#)), and the second is the bureaucratic regulatory policies (e.g. zoning and loans) (e.g. [Grant, 2006](#)).

A turning point in the modern history of world cities was technologies led developments, more ostensibly the automobiles development that created an automobile oriented planning, where the car is the primary mean of transport. Furthermore, the revolution in information processing and telecommunications is accelerating the growth and dispersion of both economic activities and population, possibly moving towards the point where “geography is irrelevant”

(Gordon and Richardson, 1997). Mahgoub (2008) demonstrates empirical evidences in his study of Kuwait city, that the compact traditional design of Arab cities was, consequently replaced by urban sprawl because of the created automobile dependent society. Though the target area along other Palestinian cities presents a different context, it follows a similar potential perspective, as the PCBS (2004) reports that the majority of percentage distribution of licensed vehicles in the OPT is privately owned at 70%. The figures for Bethlehem Governorate are almost identical to that of the OPT (PCBS, 2007). The statistics show that in Bethlehem Governorate public transportation is not a viable option for people trying to reach them, leaving the private automobile as the only option available to residents, as there are 2.5 private vehicles, 0.4 taxis, and 0.05 public buses for every 100 inhabitants, respectively.

Zelenak (2000) argues that new urbanists consider the contemporary planning policy a major contributor to urban sprawl, as heavy-handed governments and lenders, and out-dated zoning regulations, encouraged unsustainable development patterns. Furthermore, he argues that planning and zoning segregated and concentrated the poor, and resulted in standardized ugliness. Krier (1984) push the argument further by stating that zoning rules destroy the social and physical fabric of communities. Grant (2006:50) cites Kelbaugh (1997:118) criticizing the “visual messiness” that results from zoning; while controlling uses, zoning allows a mishmash of styles and building types that creates visual incoherence instead of harmony. By the same token, Wheeler (2002) concludes that zoning was a major institutional force working against diversity of urban forms.

Krieger *et. al.* (1991:9) articulates that at the root of the problems of the city are the rules used to manage land. “Our planning tools - notably our zoning ordinances - facilitate segmented, decentralized suburban growth while actually making it impossible to incorporate qualities that

we associate with towns” (*Ibid*, 1991). More surprisingly, the recent critiques of sprawl and zoning that have gone farther than imagined, by attributing youth violence, and road rage to suburban sprawl (Duany *et. al.*, 2000). Lennard and Riley (2004) liken dysfunctional cities to dysfunctional families that may harm children. Jargowsky (2001) stresses on the crucial need to move the public debate about sprawl and zoning beyond the ugliness of strip malls, traffic jams in the suburbs, and disappearing farmland, to include the ways in which sprawl slowly, but steadily increases inequality and reduces social and economic mobility through what he calls weakened political aspect of sprawl deploying a complex set of incentives in terms of tax rules, development subsidies and zoning rules.

Along with denying people the fulfillment of a robust community life, Morris (2005: 23) argues that sprawl is also a heavy economic burden. By continuously developing land further and further out from already established civic infrastructure, sprawl increases local taxes, imposes significant national overhead costs, and is detrimentally expensive on a personal level, as a family will spend hefty budgets on automobiles and have very little to show for that expenditure.

From a health perspective, Eid *et. al.* (2007) concludes that there is a widely noticed observation on the association of urban sprawl and higher rates of obesity, thus leading many researchers to infer that urban sprawl causes obesity, or at least that they create conditions that do not encourage enough walking. However, he stresses that such evidence does not permit a one-to-one correlation. The higher observed rates of obesity associated with urban sprawl are also, consistent with the sorting of obese people into sprawling neighborhoods (*Ibid*, 2007). This led Grant (2006: 50) to argue that improving social conditions calls for radical changes in urban form.

For New Urbanism, design of the urban form is both the cause and the cure. New urbanists and Smart Growth advocates would argue that the problems caused by useless zoning and automobile oriented planning could be solved by the right design formula for the city that promotes and encourage codes and covenants instead of rigid zonings, and sustainable modes of transport, including public facilities and bicycling instead of dominated private car means.

To this cocktail, it is quite important to remember that the mandate of newness sustainable urban approaches, including “Smart Growth” is to facilitate the search for character and identity, and to repair the ailing landscape (Kelbaugh, 2002).

The following section addresses the logic behind adopting the concept of compactness within the Palestinian cities, along with a flexible and polycentric structural model at the city-regions that would ensure a sustainable urban growth through harmonizing the prevailing urban-rural dichotomy, and in lieu to the high Palestinian urban growth rates and Israeli colonization activities, which concurrently increase/decrease the demand/supply on land functions, respectively.

4.4 Compact City Model

A growing attention to the importance of developing a more sustainable urban form has marked many of the international reports during the last three decades, including: the WCED’s Brundtland’s Report “*Our Common Future*”, 1987; the European Commission (CEC’s) “*Green Paper on Urban Environment*”, 1990; and the United Nation’s Earth Summit “*Agenda 21*”, 1993. This growing attention came as a response to the many interrelated socio-political, economical and environmental repercussions of present development in modern cities. While, the Brundtland’s Report set out the concept of sustainability in the scene of today’s development,

both the CEC Green Paper and Agenda 21 had considerable significance and impact on the debate about the city, chiefly because of the political weight supporting them (Frey, 2005: 34).

The Agenda 21 with the slogan “think globally; act locally”, framed an attack strategy to the increasing number of regional, national and global environmental problems, such as global warming at the local level by adopting plans for both local and national sustainable development. Hempel (1999: 52) argues that since after the adoption of Agenda 21, interest in community-oriented strategies has grown as something of an adjunct to the general ideas of sustainable development. Critics who dismissed the term *sustainable development* as oxymoronic welcomed the opportunity to replace the word *development* with *community*, and many concerned citizens and local officials have become advocates of Smart Growth; a movement that stresses regional efficiency, environmental protection and fiscal responsibility in land-use decisions. Logically, its supporters include many sustainability advocates (Ibid, 1999). The Agenda 21 suggests that the objectives of urban sustainable community should include: “a compact urban form; the preservation of open space and sensitive ecosystems; reduced automobile use; reduced waste and pollution; the creation of livable and community-oriented human environments; decent, affordable and appropriately located housing; improved social equity and opportunities for the least advantaged; and the development of a restorative local economy” (cited in Wheeler, 2000: 134). In tandem, the CEC Green Paper, also clearly called for a return to the “Compact City”, certainly influenced by the fact that many historic towns and cities have densely developed cores, which are seen as ideal places to live and work (Frey, 2005: 35). Since after, the concept of “Compact City” model is considered one of the foremost adopted models, which have been marked as an eminently sensible approach to counter act the exponential growth of conventional urban growth characterized by “Urban Sprawl” of many modern towns and cities, in developed

and developing countries alike. [Neuman \(2006\)](#) articulates that since the concept of Compact City is driven by the imperatives of sustainability, the advocates of Smart Growth axiomatically convey it to the opposite of urban sprawl ([Table 4.3](#)).

Table (4.3): Sprawl and Compact City Models Opposite Characteristics	
Urban Sprawl Model Characteristics	Compact City Model Characteristics
Low residential density	High residential and employment densities
Spatial segregation of different types of land-uses through zoning	Mixture of diverse land-uses through codes and covenants
Unlimited outward extension of new development: leapfrog development	Contained urban development, demarcated by legible limits with fine grain of land-uses (proximity of varied uses and small relative size of land parcels)
Great variances in the fiscal capacity of local governments	Sufficient government fiscal capacity to finance urban facilities and infrastructure
No centralized ownership of land or planning of land development	Unitary control of planning of land development, or closely coordinated control
All transportation dominated by privately owned motor vehicles, with a low degree of accessibility	Multi-modal transportation with high degrees of accessibility (local/regional) and street connectivity (internal/external), including sidewalks and bicycle lanes
Widespread lined commercial strip development along major roadways	Contiguous development with a three-dimensional land-use trajectory
High open-space ratio with high dispersal of impervious surface coverage urban infrastructure	Low open-space ratio with high degree of impervious surface coverage urban infrastructure, especially sewerage and water mains
Fragmentation of governance authority of land-uses among many local governmental units	Increased social and economic interactions between adjacent local governmental units and dwellers
Major reliance on a filtering process to provide housing for low-income households	Multi-family housing for special needs and diverse households on smaller lots
Source: Edited by the author from Burchell et. al. (1998) and Neuman (2006)	

The related urban planning literature provides many definitions to the Compact City model. [Burgess \(2004: 14\)](#) argues that the debate on the merits of this model in developing countries can be discussed in relation to the various elements of the definition provided: “attempts to increase built area and residential population densities; to intensify urban economic, social and cultural activities and to manipulate urban size, form and structure and settlement systems in pursuit of

the environmental, social and global sustainability benefits derived from the concentration of urban functions”. Compact cities are also called transit-oriented developments and neo-traditional towns and are promoted through the Smart Growth movement (Neuman, 2006: 12). Burton (2000) articulates that the process of achieving urban compactness is usually termed “intensification”, “consolidation” or “densification”, and involves the re-use of brown-field land, more intensive use of urban buildings, sub-divisions and conversions of existing development and an increase in the density of population in urban areas (i.e. re-urbanization). Jabareen (2006: 42) explain that the compact form can be implemented on a variety of scales, from urban infill to the creation of entirely new settlements, such as the idea of urban villages in the UK and new urbanism in the USA (Urban Villages Group, 1992; Congress for the New Urbanism, 2000). According to Jabareen (2006: 46) Smart Growth, in practice underlines some of the form concepts and disregards others. In essence, its use of compactness is adaptable to different scales, as the movement use a compactness strategy that doesn’t encourage extreme compactness, or expansion of the urban fringe. Rather, it calls for urban infill development with an emphasis on mixed land-uses that provides a variety of friendly transportation modes.

While, protagonists of the Compact City “centrists” argue that it provides many benefits and fruitions, opponents “decentrists” raise doubts and excoriate the compactness underway. The mainstream concern between centrist and decentrist has been with the quality of urban and rural life and, to a lesser extent, the aesthetics of urbanity (Breheny, 2005: 11). However, knocking on the impetus of the Smart Growth movement (i.e. land-use / transportation relationships) would provide another contentious argument. For instance, Behan *et. al.* (2008) proved using special models that the relationships between transportation and land-use demonstrates how increasing population densities within a city’s urban centre drastically reduce congestion, emissions and

gasoline consumption, and consequently reduce the effects of global warming. Controversially, [Breheny \(1995\)](#), demonstrates that only marginal savings in fuel consumption and hence emissions would result from such containment policies, making the prospectus gains very modest compared to the discomfort likely to be caused by the proposed draconian policies.

Having examined the literature ([Frey, 2005](#) and [Jenks *et.al.*, 2004, etc.](#)), evidently there are merits to be adopted and demerits to be discarded from each of the opposite positions of “centrists” and “decentrists,” leading for a compromise stance “composite city form” to reconcile the conflicted strategic objectives, albeit that “compromise positions are never very fashionable” ([Breheny, 2005: 24](#)). Within this framework, [Frey’s \(2005:38\)](#) proposal is that the argument for or against a specific city form needs to take into account the very specific structure and form of each individual city and its topographical, socio-economic and historical conditions. Therefore, there may be a generally acceptable approach and there may be a shared set of objectives, but the implication of these will inevitably reflect the morphology of each individual settlement.

Within [Frey’s \(2005\)](#) general approach, [Jabareen \(2006\)](#) using a thematic analysis to coop with the vast body of sustainable development and environmental planning literature, could propose a Matrix of Sustainable Urban Form ([Table 4.4](#)). The Matrix identifies seven design concepts related to sustainable urban forms: compactness, sustainable transport, density, mixed land-uses, diversity, passive solar design and greening, along with four different types of sustainable urban forms: the neo-traditional development, the urban containment, the compact city and the eco-city. The Matrix uses the design concept as the criteria, with a gradual scale from 1 to 3 appointing the level of sustainability in each investigated urban form. For example, a high density (scale = 3 points) means the urban form is more sustainable, and a low density, such as sprawl, means the urban form is less sustainable (scale = 1 point). Likewise, the more diverse,

mixed land-use, and compact, the more the form receives points. In addition, the more the form is based on sustainable transportation, greening and passive solar design, the more the form contributes to sustainability, and *vice versa*. Eventually, the urban form that scores higher than the others contributes more to sustainability than they do, namely the Compact City form.

Table (4.4): Matrix of Sustainable Urban Form				
Design Concepts (Criteria)	Neotraditional Development	Compact City	Urban Containment	Eco-City
Density	1. Low 2. <u>Moderate</u> 3. High	1. Low 2. Moderate 3. <u>High</u>	1. Low 2. <u>Moderate</u> 3. High	1. Low 2. <u>Moderate</u> 3. High
Diversity	1. Low 2. Moderate 3. <u>High</u>	1. Low 2. Moderate 3. <u>High</u>	1. Low 2. <u>Moderate</u> 3. High	1. Low 2. <u>Moderate</u> 3. High
Mixed land use	1. Low 2. Moderate 3. <u>High</u>	1. Low 2. Moderate 3. <u>High</u>	1. Low 2. <u>Moderate</u> 3. High	1. Low 2. <u>Moderate</u> 3. High
Compactness	1. Low 2. <u>Moderate</u> 3. High	1. Low 2. Moderate 3. <u>High</u>	1. Low 2. <u>Moderate</u> 3. High	1. <u>Low</u> 2. Moderate 3. High
Sustainable transportation	1. Low 2. <u>Moderate</u> 3. High	1. Low 2. Moderate 3. <u>High</u>	1. Low 2. <u>Moderate</u> 3. High	1. Low 2. Moderate 3. <u>High</u>
Passive solar design	1. <u>Low</u> 2. Moderate 3. High	1. <u>Low</u> 2. Moderate 3. High	1. <u>Low</u> 2. Moderate 3. High	1. Low 2. Moderate 3. <u>High</u>
Greening- Ecological design	1. Low 2. <u>Moderate</u> 3. High	1. <u>Low</u> 2. Moderate 3. High	1. <u>Low</u> 2. Moderate 3. High	1. Low 2. Moderate 3. <u>High</u>
Total score	15 points	17 points	12 points	16 points
Source: Jabareen, 2006: 47				
N.B.: Scores of the urban forms are underlined and highlighted in bold				

It is worthy to mention that the operationalization of Jabareen's Matrix within the Palestinian context could be problematic due to the unique Palestinian conditions. More specifically, though this research thesis doesn't target the refugee camps as part of its morphological analysis, the author would argue that the case of the Palestinian refugees is quit irrelevant to Jabareen's generalization at hand. However, the reference to this inductive analysis remains generically

helpful, and has provided an insightful tool for the appropriation of certain design concepts that would ensure a sustainable urban growth, through a Compact City Model, as in our case.

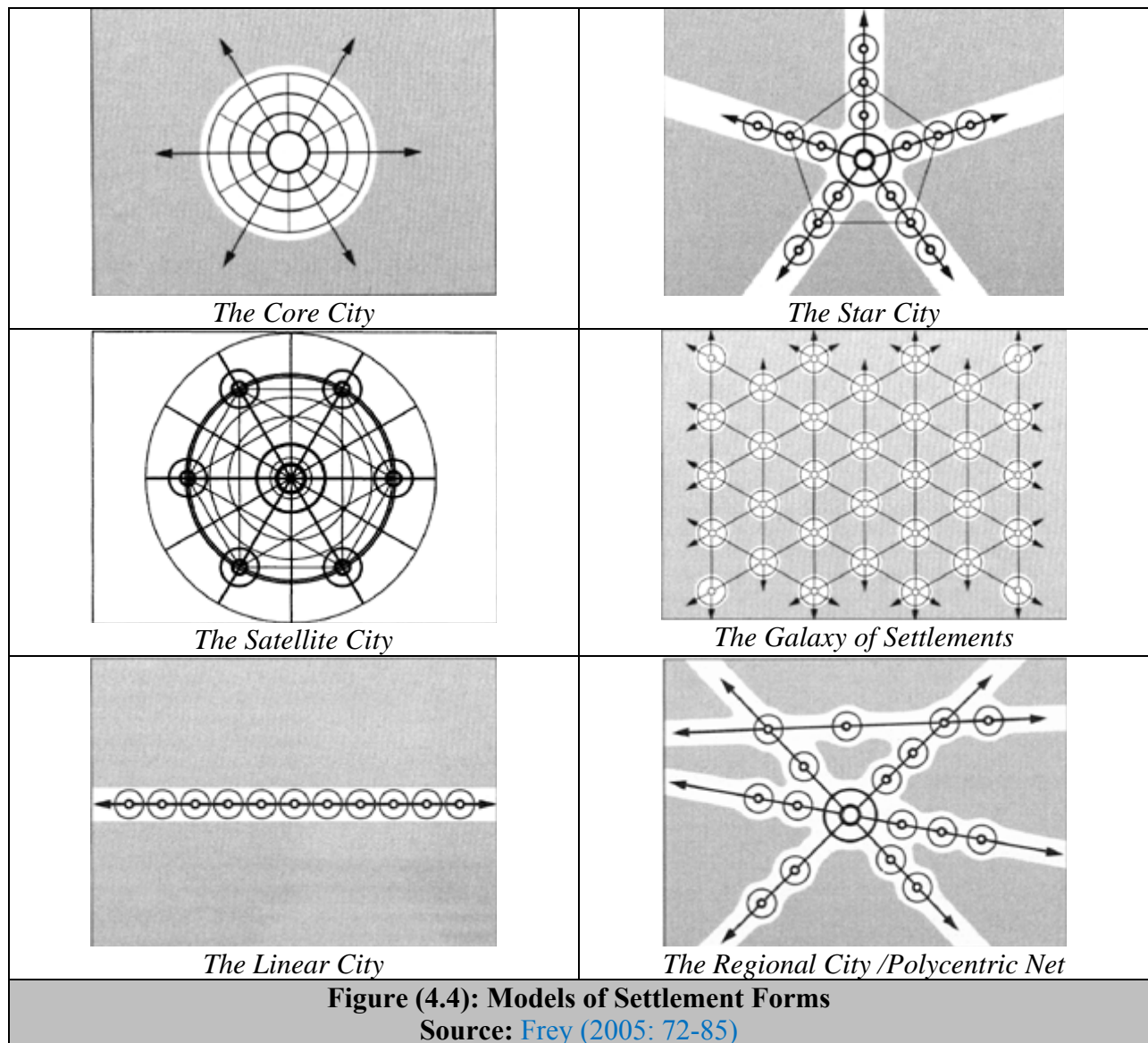
Within the Palestinian context, an American corporation called RAND introduced after a two year study and US \$2 million cost, a set of recommendations serving as a blueprint for a “*viable, independent and self-reliant Palestinian State*” (Suisman *et.al.*, 2005). The study introduced “The Arc Plan”, which is a high-speed train and fiber-optic network linking main Palestinian communities in every Palestinian Governorate in the West Bank to each other and with the Gaza Strip. The Arc Plan is a 140 mile corridor (i.e. 225 km), which would include a rail line, highway, aqueduct and an energy network, of which 137 km of the railway crosses through the West Bank; half of this runs through areas “A&B” that fall under Palestinian planning jurisdiction, while the remaining half runs over area “C” that falls under full Israeli jurisdiction (ARIJ GIS-Database, 2008).

Despite the many futile propositions of the study (El-Atrash, 2008), the Rand’s study appropriately discussed the anticipated nation’s formal structure, by the virtue of Compact City model. According to Suisman *et.al.* (2005: 12), the current and projected high population density of a Palestinian state, if combined with certain patterns of higher-density urban development and public transportation, could be an asset in the search for a sustainable formal structure for the state, in light of the *cultural, topographic-climactic*, and *economic* factors that would propel this trajectory. Culture wise, throughout the history, the Palestinian communities exhibited rich traditions of higher-density habitations, from the traditional “hosh” to a range of courtyard buildings and urban apartment dwellings. Likewise, the prevailing influences of the sharply different agro-ecological zones on either side of the hilly ridgeline terrain, desert, rocky soil and aridity that characterize part of the Palestinian communities (ARIJ, 2000), including the urban

area of Bethlehem and its hinterlands all have contributed, to a tradition of compactness that is many thousands of years old as proposed by the urban planner John Meunier (Cited in Suisman *et.al.*, 2005). Increasingly, achieving “economies of scale” is becoming one of the most important and commonly mentioned factors in the amalgamation debate at the Palestinian arena, which could be perceived as the administrative drive of the compactness urbanity (ARIJ, 2009). “Economies of scale” is a well defined, yet poorly understood concept, when connected to the amalgamation process of Palestinian Local Government Units (LGU) that mushroomed in the aftermath of the PNA inception, mainly for political reasons. Technically, economies of scale exist when the “per unit” cost of producing service declines as the quantity produced of service increases (McDonald, 1997); this is more tangible in spatially compacted areas.

To this end, the urban form of compact development would be an appropriate base for future intensified urban expansion within the Palestinian context. However, one should pay a premium to the associated city model that could guide and steer this compact development. Following Frey’s (2005) evaluation of Lynch’s (1985) catalogue of models of settlement (urban and regional) forms (Figure 4.4), one could conclude that the *regional city model* (AKA: *polycentric net*) seem to be the most appropriate urban model, basically with the lowest degree of rearrangement required, since it’s geometry can and will take any configuration upon local conditions and needs in terms of preserving natural reserves and important open spaces. In principle, the regional city model is a composite city form, since it could be shaped in different combinations of smaller core, star, satellite and/or linear cities formations. It is worthy to mention that Frey’s evaluation criteria to the different city models were based on a thorough review of generally agreed sustainability determinants, namely: physical properties of the city/city-region; provisions of the city/city-region; environmental and ecological conditions;

socio-economic conditions and visual-formal quality. [Appendix \(1\)](#) substantially summarizes [Frey's \(2005: 96-108\)](#) evaluation of the performance of city models, namely: the core city, the star city, the satellite city, the galaxy of settlements, the linear city and the regional city/polycentric net, based on these agreed sustainability determinants.



Having examined the relevance of the compactness strategy to the Palestinian context, as one underlying principle to the newness sustainable urban growth approach of Smart Growth, the

following section will expose the pros of adopting community participation as a methodological tool to endorse the local agenda of sustainable urban growth strategies.

4.5 Community Participation

Lynch (1985) typifies the theory of “good urban form” as a simple, flexible and easily applied one. Grant (2006: 16) translated this by identifying the need for a *theory of possibilities* rather than iron rules in “planning the good community”. This theory of possibilities could only be perceived by the reconciliation of community conflicted objectives: socio-politics, economical and environmental ones, by the people themselves. For that, the Smart Growth Network lists the “encouragement of community and stakeholder collaboration in development decisions”, as one of the underlying principles for adopting a Smart Growth agenda in today’s communities (Getting to Smart Growth II, 2003). Ye *et. al.* (2005; 309) note that community development as a concern represents an acknowledgment that people remaining in place create locally specific socio-cultural values that need to be protected and enhanced in the face of change or development. This uniqueness can be supported by efforts to build consensus in each community about how it wants to pursue Smart Growth, arguably through community participation in local planning efforts.

In her way to drawing a “new direction in planning theory,” Fainstein (2000) partially rally around and elaborate on the importance of community participation in three common approaches of the contemporary planning theory discourse: the New Urbanism (AKA: neo-traditionalism) that focuses on design outcomes, the political economy model (AKA: just city) that focuses on equity outcomes, and the communicative (AKA: collaborative) model that radically focuses on processes, not outcomes. While, defending the continued use of the just city model with a modified form of the political economy mode of analysis that underlies it, Fainstein (2000: 453)

accentuates on the fact that theorists within all three schools doubt the applicability of the scientific method to urban questions, as whatever their differences, all three are considered post-positivists, and sustaining this optimism depends only on translating it into practice by the virtue of community participation.

Focusing on the New Urbanism School, [Fainstein \(2000: 461\)](#) argues that, albeit it is developed primarily by architects, journalists, academia, planning practitioners and a popular movement, New Urbanism is perhaps more ideology than theory. Nevertheless, [Grant \(2006: 17\)](#) fine-tuned the argument by concluding from her review of the New Urbanism literature that its theory proves to be explicitly normative. In either argument of both commentators (being an ideology or a normative theory), New Urbanism build its deliberations on an unequivocal call for community participation. This may allow borrowing manifestations and guidelines from other planning schools, namely: communicative or collaborative traditions.

[Maginn \(2007: 25\)](#) sees community participation the new orthodoxy within urban development and regeneration (AKA: renewal), which remains as something of perennial dilemma for both institutional and community partners. A major reason for this, it is argued, is in relation to the community's "culture", which the policy makers, most often lack proper knowledge and a critically reflective understanding. In response, [Maginn \(2007:39\)](#) propose to rely on a coherent and hybrid framework: *collaborative planning theory* as a preliminary positive governance framework, and *applied ethnography* as a methodological framework that would allow institutional and community partners a way forward in developing a deeper understanding of the "culture" within local communities, as well as providing data not only on local communities, but also relating to the efficacy and efficiency of their own policy structures, processes and agents.

For Healey (2003), *collaborative planning* is a plea for the importance of understanding complexity and diversity, in a way that does not ignore individual success/failure, or avoid recognizing the way power consolidates into driving forces that shape situational specificities. By this she tends to expose the inequalities and inefficiencies of practice in order to facilitate more community participatory in urban planning processes via a process of inclusionary argumentation. Put simply, inclusionary argumentation stimulates, facilitates and sustains social learning among key stakeholders, more specifically policy agents. It helps them develop a greater appreciation and understanding of the (1) significance of “practical consciousness and local knowledge”, (2) need to pay “careful attention to the communicative contexts of dialogue”; (3) utility of critical reflection in consensus-building; and (4) importance of maintaining mutual respect throughout the policy process. However, according to Maginn (2007:31) the process of inclusionary argumentation needs to scale-up the time and efforts factors to become more knowledgeable. The latter is challenging to policy agents as it needs a special social learning process, where policy agents will bring different and varying social learning skills and capacity to policy arenas. What seems to be needed, therefore, is a methodological framework that can fast track the deliberative and social learning processes within policy structures governed by collaborative planning. The methodology being advocated here is applied ethnography.

Ibid (2007:35) cites (Rist, 2000) confirming on the crucial need to include *applied ethnography* during the three key phases - formulation, implementation and evaluation - of the policy and urban planning cycle, mainly because the methods (i.e. observations and interviews), strategies (i.e. case studies) and types of questions (i.e. “why” and “how”) that ethnographic researchers pursue may be used to profile the structure, relations, attitudes and dynamics within local communities. Therefore, the author would argue that because of these embedded

characteristics within the applied ethnography research, it is relevant and wise to operationalize such a theory within this research thesis.

A recent example of great relevance to the Palestinian context that may be attributed to Maginn's (2007) proposal is Yiftachel's (2009) "Theoretical Notes on Gray Cities". This is an article that once again put emphasis on that planning practice is intricately caught up in place. According to Graham and Healey (1999), socio-spatial nature of the places is the planner core work. Liggett (2009) praise and commend Yiftachel (2009) for rightly returns to the city or urban regime as the site where the effects, the daily spatial practices that constitute globalization are being played out. Yiftachel (2009: 97) calls for a "planning citizenship" to confront what he calls "creeping urban apartheid" that characterizes the "contemporary urban colonialism" in Palestine/Israel. The marsh towards "planning citizenship" should focus on policy participation and communal identity of the citizens of "gray" spaces, who live in *de facto* "permanent temporalities" under the pretexts of "necessary enhancement" and "security". Clearly, much remains to be explored, and the conceptual scheme outlined here raises as many questions as it provides answers. However, the articulation of "planning citizenship" can be both analytical and normative, providing theorists with a yardstick of "the way things are", and "the way they should be". Planning citizenship should include a range of measures linking spatial policy to full political, cultural and material membership in the metropolis. It may span issues such as land, housing, poverty, accessibility, livelihood, environmental quality, as well as identity, participation and empowerment. Planning citizenship should focus on material capabilities, policy participation, and communal identity as areas of high priority, as distinct from state-level citizenship with its emphasis on national identity and formal rights (*Ibid*, 2009).

Thus, from a normative standpoint, the envisaged sustainable urban growth strategies conceptualized within the new urban approach of Smart Growth could avail assistance from an organic mixture of *collaborative planning* and *applied ethnography* to promote inclusionary argumentation and consensus building, and give partnership stakeholders an opportunity to become more aware and critically reflective of their cultural relations, practices and processes, thus paving the way forward for more effective community participation. However, the author would argue that this needs a special programme to test such an approach through designated pilot projects.

Ruiter *et.al.* (1998: 284) defined many factors, which stress the importance of a positive attitude towards bottom-up participation. These factors include, among others; the design of a plan and/or project needs to be a reply to the local needs; people are the key of success of any plan or project and the more commitment of the people the more responsibility and the better maintenance and control of the project; the level of democracy and self-confidence can be improved by good participation in the planning process; and a plan needs to be flexible and changeable through continuous feedback with the public.

Isaac *et. al.* (2007) cites Leitmann (1993) defining the role of political governance limited or under certain circumstances even absent as in the case of Palestine in light of a changing and transitional political context, there becomes the role of population of crucial importance. Furthermore, Leitmann (1993) adds that an open participation process is an important feature to integrate urban and environmental planning for the reason that the populations are the source of information. In addition, environmental indicators generated at local level can contribute to the discussion by offering reference points on where environmental quality stands in a determined territory.

4.6 Summary

Sustainable urban growth is a responsive concept to the growing needs and aspiration of people, to curb urban sprawl and its adverse impacts on the natural and built environment. Smart Growth, as a pervasive new urban approach that sums all the principles and founding strategies of a sustainable urban growth agenda, and concurrently translates urban planning theory into practice through manifestations of community participation and merits of compactness would arguably usher the sustainability of today's cities. Within the Palestinian context, the target area presents a surviving example that suffers from the phenomenon of urban sprawl. Having examined the cultural, topographic-climatic and economical factors that woven the development within the Palestinian context, the target area would theoretically provide a fertile environment to test the promotion of implanting the seeds of Smart Growth, at least as a demonstration. Eschewing, ideological or normative values, the impetus of Smart Growth strategies, especially mixed land-use, compactness, and transportation relations provides a practical account for implementation, in light of the high population densities and the uncultivated capacity of transport planning within the Palestinian context. In the same token, one could conclude from this theoretical analysis that the strategies of compactness compounded by a polycentric net structural model would provide the foundation for strategizing a sustainable urban growth agenda within the Palestinian context, including the target area.

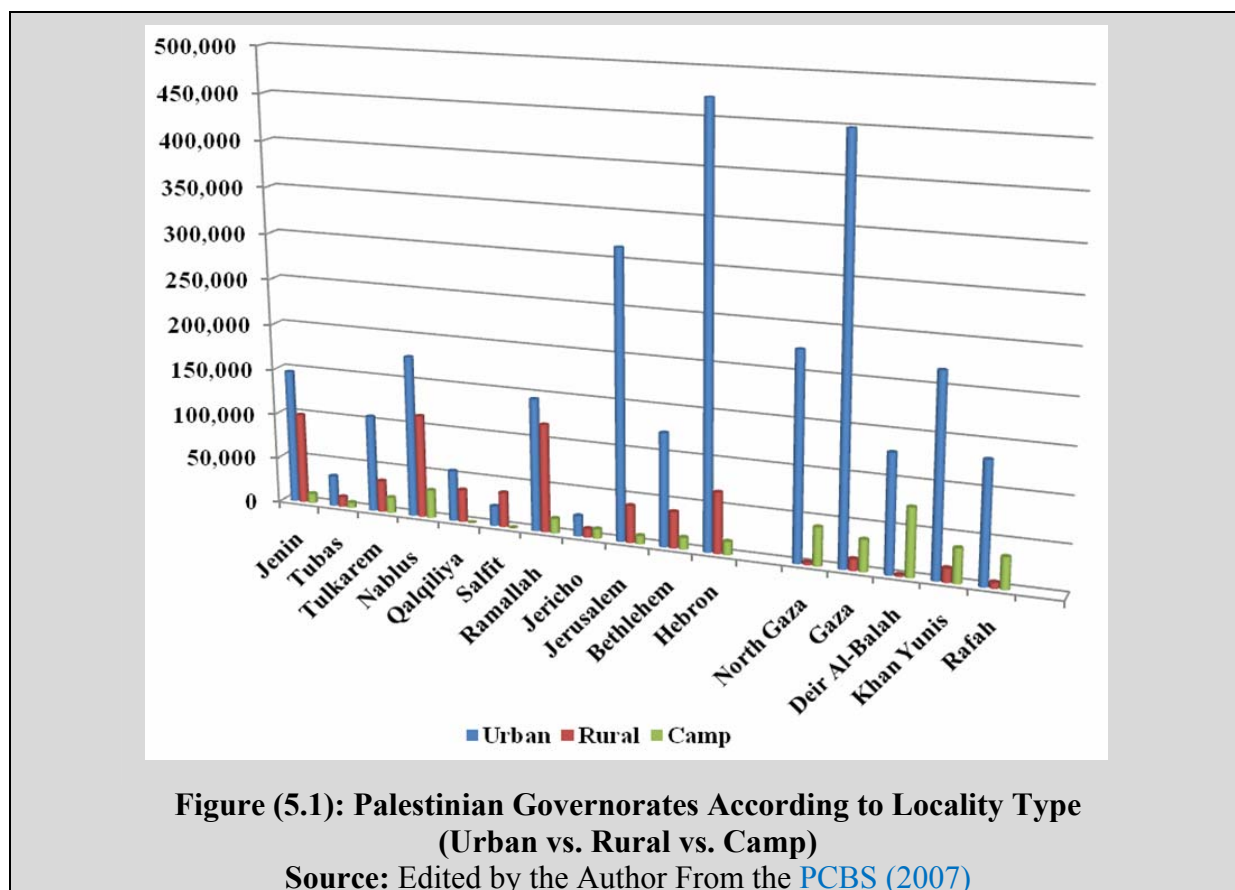
Chapter 5: Urbanization Trends and Sprawl in Bethlehem Area

This chapter analyzes the urbanization trends in Bethlehem area in comparison to other main Palestinian cities of the West Bank territory. Furthermore, the chapter dedicates a considerable profile to study the urban human settlements morphology of Bethlehem area in concert with their associated patterns. Successive to that, the chapter traces and quantifies the urban sprawl phenomenon in the target area by the simulation of a designated empirical formula using the state-of-the-art-technology of GIS, in order to show the projected effects of the business-as-usual course of urbanization.

5.1 Urbanization in Bethlehem Area

The Palestinian societal development is being urbanized, as almost three-quarters of the OPT inhabitants live in urban areas (69% in the West Bank and 81% in the Gaza Strip) (PCBS, 2007). To globalize the trends, the Secretary General of the UN, Mr. Ban Ki-moon dictates that we are living in an “urban century”, as more than half of the world’s population now living in urban areas (UNHABITAT, 2008). In our case, the dwellers of the target area constitutes 28% of Bethlehem Governorate dwellers and more than 40% of the urban dwellers of the Governorate that represent 70% of the Governorate’s total dwellers (Figure 5.1) (PCBS, 2007).

According to ARIJ (2007) the rate of natural annual growth in the target area had an average of 3.2% between the years 1997 and 2005. Though, the growth rate in the target area is less than the national growth rate which reached 3.3% (PCBS, 2007), it is considered high when compared with other countries, as the Population Reference Bureau (PRB) reports the world growth rate to be 1.2%, the Arab States to be 2.1%, and the less developed countries to be 1.5% (PRB, 2008).



The UN-HABITAT's in its latest publication entitled "State of the World's Cities 2008/2009: Harmonious Cities", assured that the driving forces behind urban growth in the fastest growing cities in the developing world (i.e. cities growing at an average annual growth rate of more than 2 percent per year, as in the case of the target area) are often complex and overlapping. However, the analysis led to the identification of the three most significant drivers of urban growth, namely: economic and industrial policies and related strategic investments in two key areas – transport infrastructure and communications and trade service sectors; improvements in the quality of life in cities; and changes in the legal and/or administrative status of urban areas ([UNHABITAT, 2008 a](#)). According to [UN-HABITAT's Global Urban Observatory \(2008 b\)](#) the later (i.e. administrative change) was the main driving force behind urban growth in Asia, in comparison to Africa or Latin America & Caribbean. Assuming that the later driver includes

de facto measures and “as though” legal procedures, as those implemented by the Israeli occupation in and around the target area, it is without any doubt has substantially caused the soaring of urban growth rates in the target area.

To elaborate more, during the last four decades of Israeli military occupation, the Palestinian sovereignty over land in the target area has drastically decreased, in opposed to the increasingly urban population growth rates. Taking the gross population density as a quantitative indicator, the gross population density in the target area has exponentially increased by a factor of 7 during 1967-2007 (Table 5.1).

Table (5.1): Gross Population Density of Bethlehem Area (1967-2007)						
City	Population		Area ³ (Dunums)		Gross Population Density (Person/km ²)	
	1967 ¹	2007 ²	1967	2007	1967	2007
Bethlehem	16,313	25,266	31,088	5,400	525	4,679
Beit Jala	6,040	11,758	14,305	4,400	422	2,673
Beit Sahour	6,812	12,367	7,118	4,800	957	2,577
Total	29,165	49,391	52,511	14,600	555	3,383

Source: Edited by the Author from: ¹ Bannourah, 1982; ² PCBS, 2007; and ³ ARIJ GIS-Database, 2009
N.B.: The areas were rounded only for calculation purposes.

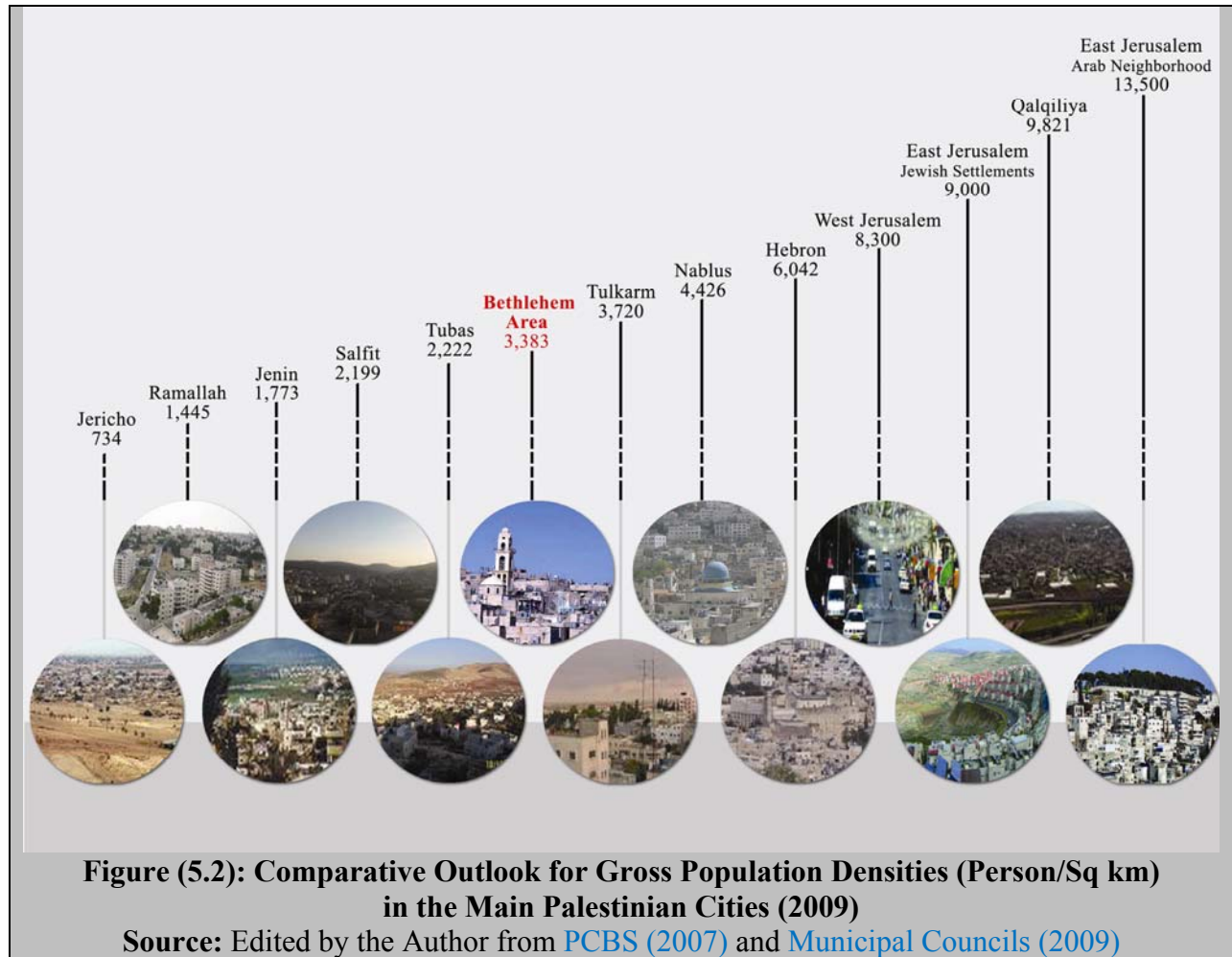
The current gross population density of the target area at 3,383 person/km² (Table 5.2) is considered relatively high when compared to other Palestinian cities (Figure 5.2), and that to the West Bank and the OPT, which reached 422 person/km² and 635 person/km² in 2008, respectively (PCBS, 2009). It is worthy to mention that the gross population density in the Arab states is 155 person/km² and 66 person/km² in the less developed countries (PRB, 2008). In this context, ARIJ (2007) indicated that the gross population density is projected to increase as the

rate of population growth is high and the access to open land is limited in the target area. If one assumes that the Israeli activities will remain as they are today (with land confiscation and with the construction of the Segregation Wall), the gross urban population density in the target area will increase to 4,520 person/km² in the year 2010 and 5,135 person/km² in the year 2015 (*Ibid*, 2007).

Table (5.2): Gross Population Density in the Main Palestinian Cities (2009)

City	Population ¹	Master-plan Area ² (Dunums)	Population Density (Person/km ²)
Jericho	18,346	25,000	734
Ramallah	27,460	19,000	1,445
Jenin	39,004	22,000	1,773
Salfit	8,796	4,000	2,199
Tubas	16,154	7,270	2,222
Bethlehem Area	49,391	14,600	3,383
Tulkarem	51,300	13,790	3,720
Nablus	126,132	28,500	4,426
Hebron	163,146	27,000	6,042
Qalqiliya	41,739	4,250	9,821

Source: Edited by the Author from: ¹ PCBS, 2007; and ² Collected via phone calls with the municipalities city engineers (June, 2009)



5.2 Morphology of Urban Human Settlements in Bethlehem Area

The target area of the three cities of Bethlehem, Beit Jala and Beit Sahour has witnessed a common developmental process of its urban settlements throughout the modern history. [Salman \(2000: 145\)](#) sums the settlement development in the target area into three undefined life time growth phases, namely:

Phase One: This phase was initiated by the local society in response to their needs and aspirations, where Bethlehem constituted the nucleus of horizontal urban development that was characterized at the time to be natural and authentic to the

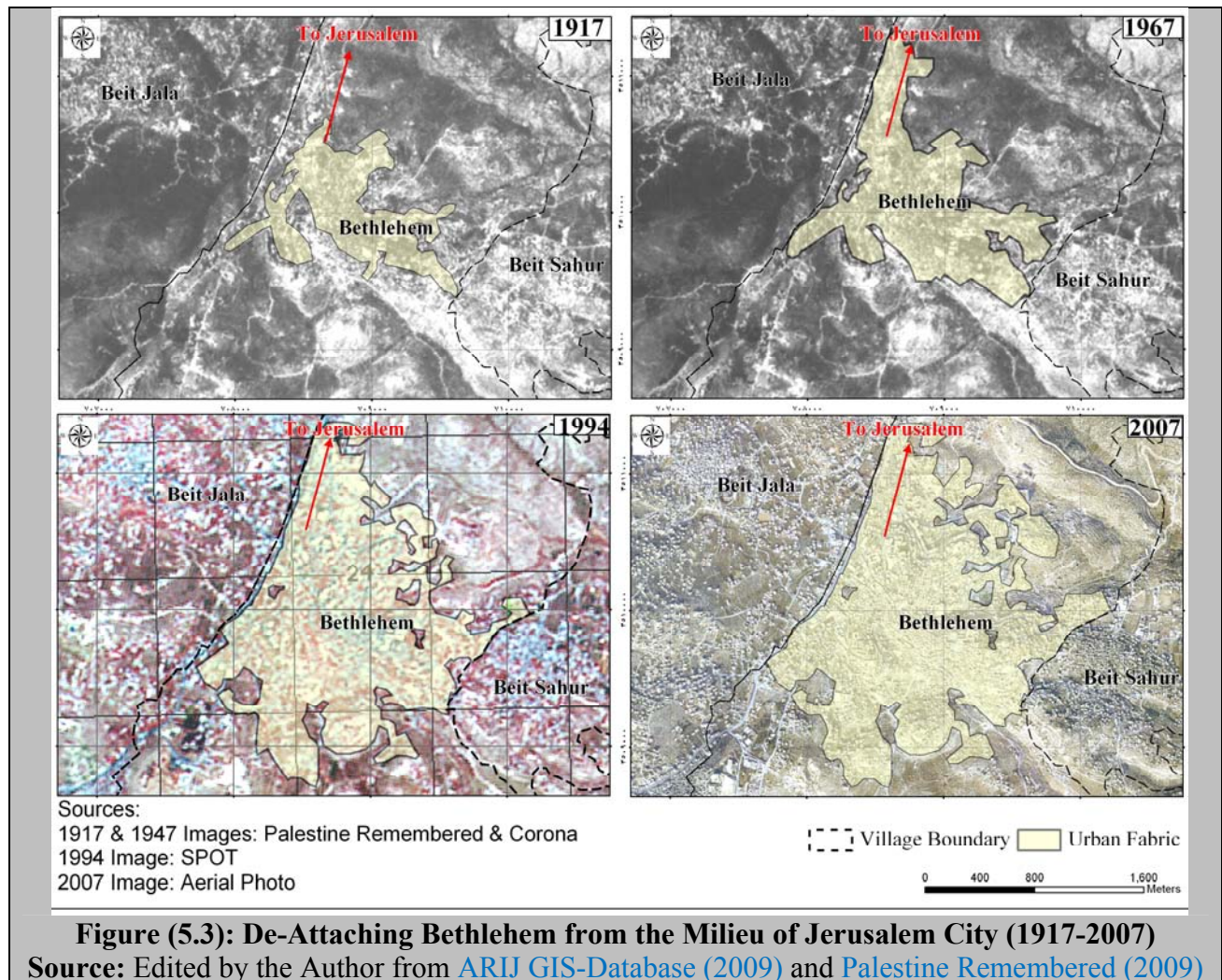
agricultural activities of the majority of the local population. A large area of land and a small proportion of built-up area have characterized the settlement typology.

Phase Two: This phase witnessed a change in the paradigm of settlement developments, where two parallel processes were encountered, namely: slow vertical development and infill development. The first (i.e. vertical development) was accompanied with the technological developments in the buildings methods and materials. The second (i.e. infill development) was propelled through matters of inheritance. However, though the later was concentrated first between the plots, the parcels at the core space where used up, and thereafter another settlement expansion through enclosing new places became essential, where a main plaza with midpoint functions, including social infrastructures (e.g. schools) and religious features (e.g. Mosques and Churches) have prevailed. This phase has developed in a compact form at the inner landscape.

Phase Three: This modern and transformational phase has depicted the change in development vision towards a vertical growth from rural to a city form. According to [Salman \(2000: 146\)](#) this transformational phase have never could be tangible without the boom in major public services and functions development that included multi-story buildings of socio-cultural and administrative facilities.

Within this framework of urban settlements morphology, it is worthy to notice that the directional and rotational trajectory of urban growth have radically changed after the Israeli Occupation of the West Bank territory back in 1967, where the target area was considered an inclusive neighborhood of Jerusalem area that was perpetuated and extracted from the milieu of its territorial realm, ultimately directing the urban growth aside from Jerusalem ([Figure 5.3](#)); the

center of life at that time. Arguably, this was the underlying motivation to conceptualize phase two, elaborated above.



5.3 Patterns of Urban Human Settlements in Bethlehem Area

Settlement patterns refer to the form, density and distribution of human settlements, and how these change over time. Settlement patterns influence the environmental impacts of settlements, how populations consume resources and produce wastes, and affect social and economic prosperity. According to [EPA \(2007\)](#), the ideal case is that which exhibits higher density human settlements and a more compact urban pattern. This is better for reducing resource inputs, such

as land, infrastructure materials, transport and energy needs, also for reducing waste outputs, such as air pollutants and greenhouse gases.

In order to micro-examine the human settlement patterns in the target area, three focus points of Al-Cinema, Al-Manshiya, and Souq Al-Sha'b have been chosen from the three cities of Bethlehem, Beit Jala, and Beit Sahour, respectively. The three focus points represent the Central Business District (CBD) in the three main cities. The micro-examination will tackle the basic pattern; density; land-use and the road fabric. This approach of micro-examination is adopted by [Caminos et. al. \(1978\)](#), who used 400x400 m square segments to describe the existing settlement situation.

In terms of practicality, [Caminos et. al. \(1978\)](#) method is adapted, where a circle with a radius of 226 m is used instead of a 400x400 m square segment (i.e. $A = \pi r^2 = 400 \times 400m \rightarrow r = 226m$). This yield to the same area under scrutiny, but with more tuned edges and no corners. [Table \(3.3\)](#) summarizes the main indices under study in the target area. These indices have been captured from [ARIJ GIS-Database \(2009\)](#), after the synthesis from other secondary sources, mainly [PCBS \(2007\)](#), and analysis of many related spatial and attribute data, which are spatially connected to the three focus points inside the target area.

The findings of the micro-examination exercise in the three focus points of Al-Cinema, Al-Manshiya, and Souq Al-Sha'b were somehow related and consistent ([Figure 5.4](#)). The **basic patterns** were relatively high in the three focus points, both in terms of ratio of total built-up area to locality block area (RBA), and ratio of buildings total floors area to locality block area (RFA). Realistically, the figures of the RBA were higher than that for the RFA in the three focus points, as the dominator that calculates in all the cases 160,000 m² (i.e. 160 dunums) were ideal,

and the numerator differ in terms of built-up and roads surface areas. However, the figures in Al-Manshiya locality segment were higher than that for Souq Al-Sha'b and Al-Cinema.

The **density** attribute data depicts high levels of compaction, as the average inhabitants per dunums in the three localities almost reach 20. This means that there are 3,502, 3,302, and 2,781 inhabitants per 160 dunums (i.e. $400 \times 400 \text{ m} = 160,000 \text{ m}^2$) in Al-Manshiya, Al-Cinema, and Souq Al-Sha'b locality segments, respectively. It is worthy to mention that in the density calculations, it was assumed that the average number of households per floor was 2.

Hitchcock (1994) outlines that population density represent averages; therefore, any discussion of density must beware the pitfalls of averages, especially when the area of concern is large. Churchman (1999) cites Evans and Cohen (1987) stressing that the same problem “*exists with average residential density, even at the neighborhood scale, because there may be a very unequal distribution of units over geographic space*”.

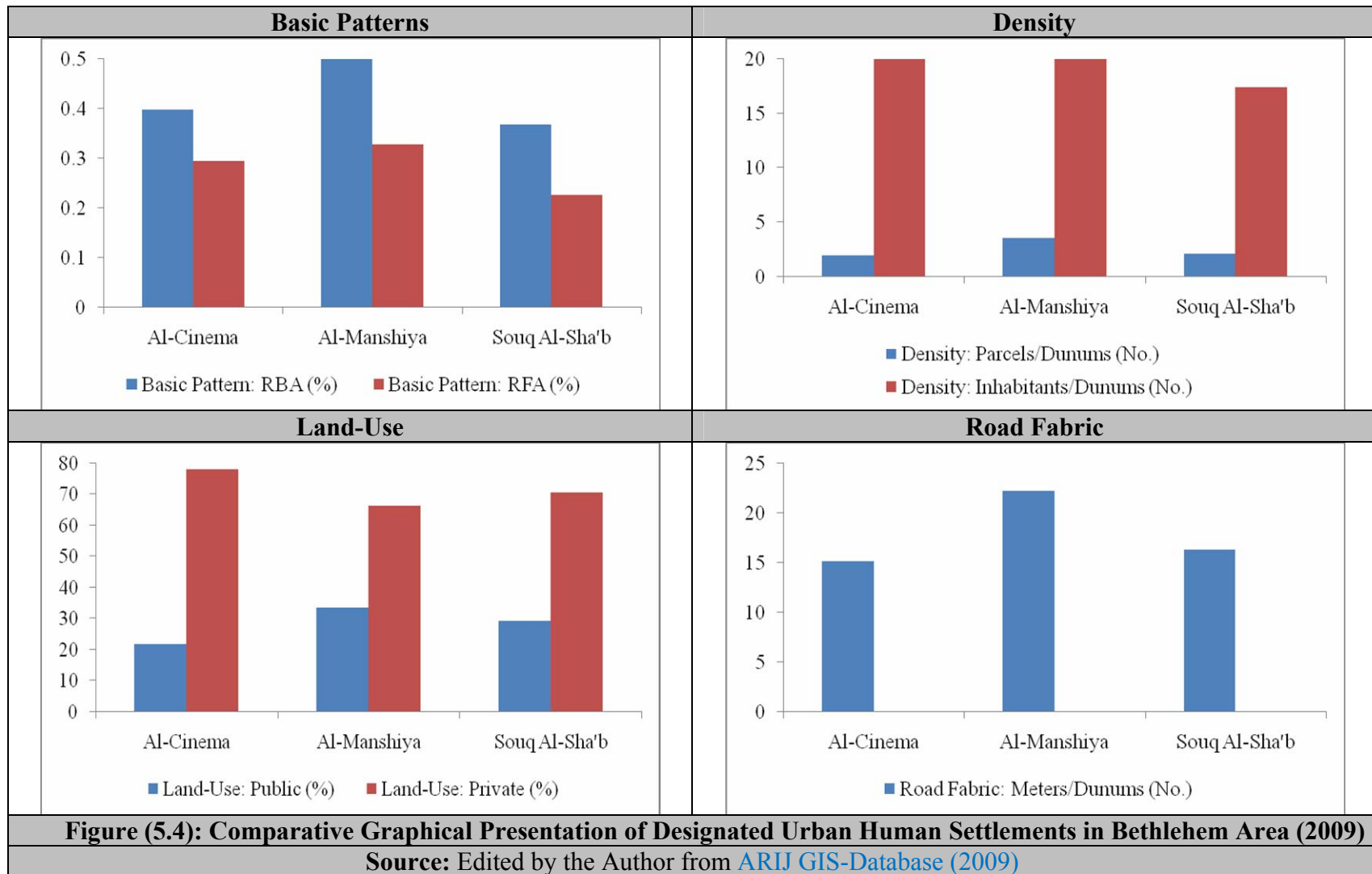
Table (5.3): Comparative Outlook for Urban Human Settlements in Bethlehem Area (2009)

		Al-Cinema-Bethlehem			Al-Manshiya-Beit Jala			Souq Al-Sha'b-Beit Sahour		
		Building (m ²)	Roads (m ²)	Total Area (m ²)	Building (m ²)	Roads (m ²)	Total Area (m ²)	Building (m ²)	Roads (m ²)	Total Area (m ²)
Basic Pattern	RBA: Ratio of total built-up area to locality block area	47,143	16,642	63,785	52,532	28,705	81,237	36,319	22,587	58,906
		RBA = 63,785/160,000 = 0.398			RBA = 81,237/160,000 = 0.508			RBA = 58,906/160,000 = 0.368		
	RFA: Ratio of buildings total floors area to locality block area	47,143	--	47,143	52,532	--	52,532	36,319	--	36,319
		RFA = 47,143/160,000 = 0.295			RFA = 52,532/160,000 = 0.328			RFA = 36,319/160,000 = 0.227		
Density	Parcels/Dunums	320/160 = 2.00			573/160 = 3.58			344/160 = 2.15		
	Inhabitants/ Dunums ¹	Buildings (No.)	Floors ² (No.)	Average Household	Buildings (No.)	Floors (No.)	Average Household	Buildings (No.)	Floors (No.)	Average Household
		190	344	4.8	243	398	4.4	156	309	4.5
		344x2x4.8/160 = 20.64			398x2x4.4/160 = 21.89			309x2x4.5/160 = 17.38		
Land Use	Public	35,000 m ²		21.88%	53,700 m ²		33.56%	46,887 m ²		29.30%
	Private	125,000 m ²		78.12%	106,300 m ²		66.44%	113,113 m ²		70.70%
Road Fabric	Meters/Dunums	2,425 /160 = 15.16			3,564 /160 = 22.28			2,608 /160 = 16.30		
	Meters/Inhabitants	2,425 / 344x2x4.8 = 0.73			3,564 / 398x2x4.4 = 1.02			2,608 / 309x2x4.5 = 0.94		

Source: Edited by the Author from [ARIJ GIS-Database \(2009\)](#)

¹ The average number of households per floor was assumed to equal 2.

² Number of floors in Al-Cinema-Bethlehem focus area was extrapolated from the ratio of floor to buildings of both Al-Manshiya-Beit Jala and Souq Al-Sha'b-Beit Sahour, mainly because there is no such attribute data for Al-Cinema-Bethlehem focus area.

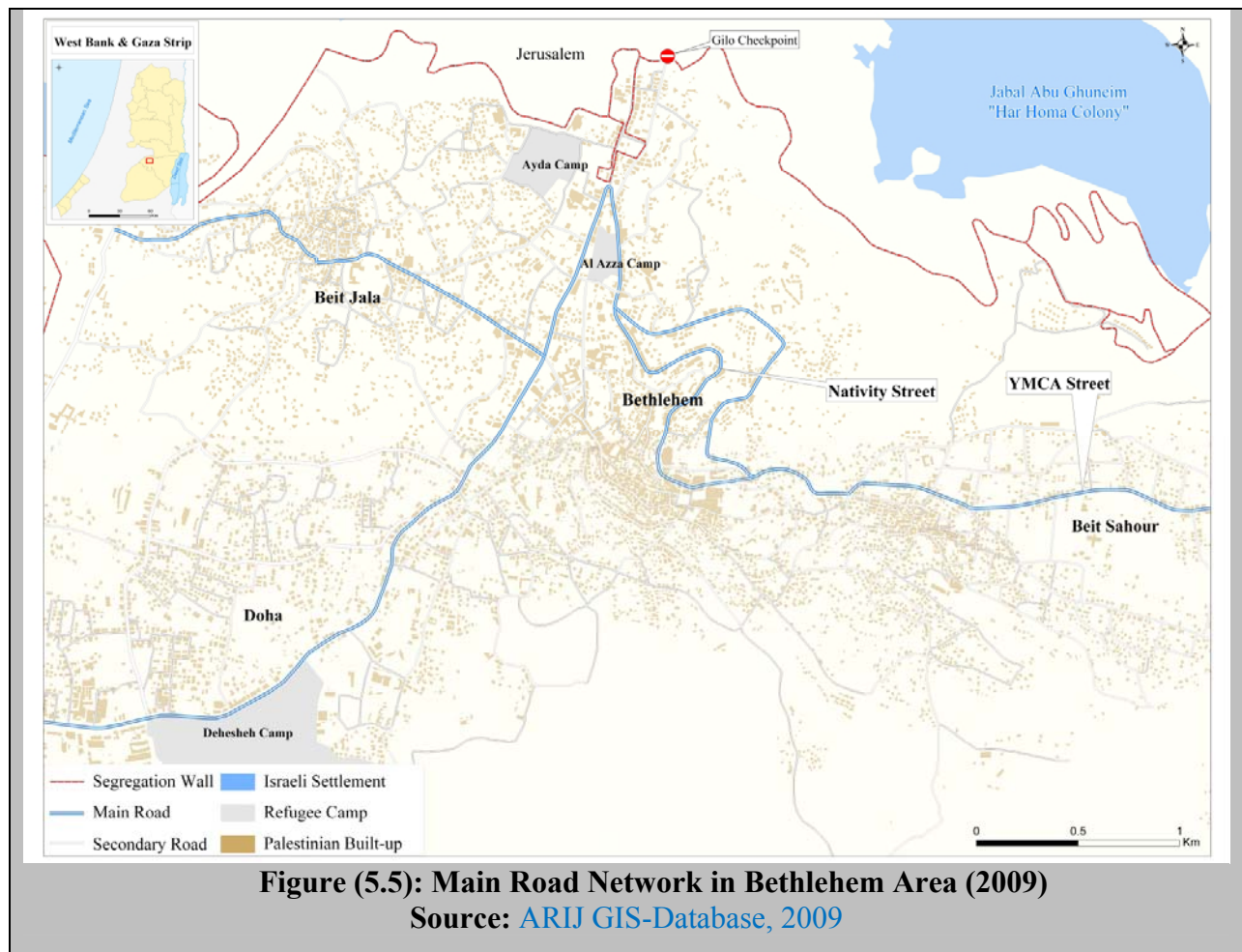


The **land-use** calculations consolidate the prevailing conviction, where the private land-use dominates that of the public uses, which sums less than one-third in average for the three locality segments. [Salman \(2000: 150\)](#) justifies the high percentage of private ownership in the target area, because of the adopted forms of compact trajectory at the centers that neglected the need for open space between the residences for public use, including: playgrounds, libraries, and green parks. This means that the CBD in the three focus points are private-centric, where merely private individual has the upper hand to decide on the economic initiatives, especially in light of the weekend capacity of local authorities to planning and management in the target area. However, it is important to note that the public lands within this analysis are the lands used by the public for common use like streets, public facilities, main features, including schools, mosques and churches. One could generalize that the functioning of public-related infrastructure in the target area is weak and in crucial need for maintenance and upgrading ([ARIJ, 2007:36](#)).

Uninterestingly, the analysis of the land-uses in the three locality segments depict a compact settlement structures, where the centers contain the intensive city functions, institutional and administrative buildings, and the most of the other services and facilities. This concentration of the different diverse activities, undoubtedly has contributed to the soaring in land prices at the city centers, which is denser in terms of households rates. As one move away from the city center towards the periphery, the urban settlement becomes less denser and more residential dominant with less parcel's sizes.

The **road fabric** analysis shows that Al-Manshiya locality segment contains more meters per dunums and inhabitants than both Souq Al-Sha'b and Al-Cinema locality segments. For instance, there is 22.28 meters of roads per dunums in Al-Manshiya, against 16.30 in Souq Al-Sha'b and 15.16 in Al-Cinema locality segment. In general, a compatible road network with the land

structure is a good sign for an effectual road network structure that could support the supply of physical and social infrastructure in a cost-effective manner. However, the type and hierarchy of the road network could directly affect the physical infrastructure costs, such as: asphaltting and traffic management. The predominant type of roads is *cul-de-sac* (dead-end) streets, which could be found within the residential areas. Another type is the main and secondary roads, such as the YMCA Street in Beit Sahour and the Nativity Street in Bethlehem (Figure 5.5). However, another road type is the Israeli by-pass roads, such as: Street No. 60 that bisects Beit Jala to secure safe linkages between the Israeli settlements and the Occupied City of Jerusalem.



5.4 Urban Sprawl in Bethlehem Area

Having micro-examined the human settlement patterns in the target area, the link is becoming much clearer with the phenomenon of urban sprawl. The remaining of this chapter is dedicated to further investigate this phenomenon in the target area.

[Brueckner \(2000\)](#) defines urban sprawl as the *excessive* spatial growth of cities, the key word in this definition being excessive. Although cities must grow spatially to accommodate an expanding population, the claim is that too much spatial growth occurs that is formless, centerless, and of a fragmented urban structure ([Morris, 2005](#)). Characteristics of sprawl can include unlimited outward extension of development; low-density residential developments; leapfrog development; dominance of transportation by private vehicles and segregation of types of land use in different zones, among others ([Carruthers and Ulfarson, 2002](#); [Handy, 2005](#)).

In the target area, a glance at an aerial photo ([Figure 5.6](#)) is sufficient to understand the fragmented and dispersed character of the urban fabric; a tight patchwork of smaller and larger neighborhoods and their connecting built-up strip developments. The morphology city pattern, including the old cities of the three twin cities can still be identified on the map, but the background with a galaxy of sprawled buildings is becoming increasingly prominent and results in a kind of peripheral condition with little regard for spatial coherence. But as in many places, of course, a number of global trends and dynamics also influence this sprawl and fragmentation. [Ryckewaert \(2002\)](#), outline many of these global trends: transport modes and attitudes; the growing network society; changing lifestyles influencing housing conditions and choice of housing location; and the metamorphosis of the countryside.

However, it is arguable that the natural disasters have also influenced the dispersion and fragmentation of the built environment in Bethlehem area. [Diala Khasawneh \(2001\)](#), inaugurates

her book entitled “Memoirs Engraved in Stone, Palestinian Urban Mansions” with a note that the first two decades of the British Mandate (1920-30’s) were characterized by rapid urban growth and the first urban sprawl, as important residential areas formed away from historic urban centers, outside the old-walled cities. This period witnessed two of the strongest earthquakes that hit the OPT, including the target area (Al-Dabbeek, 1999).

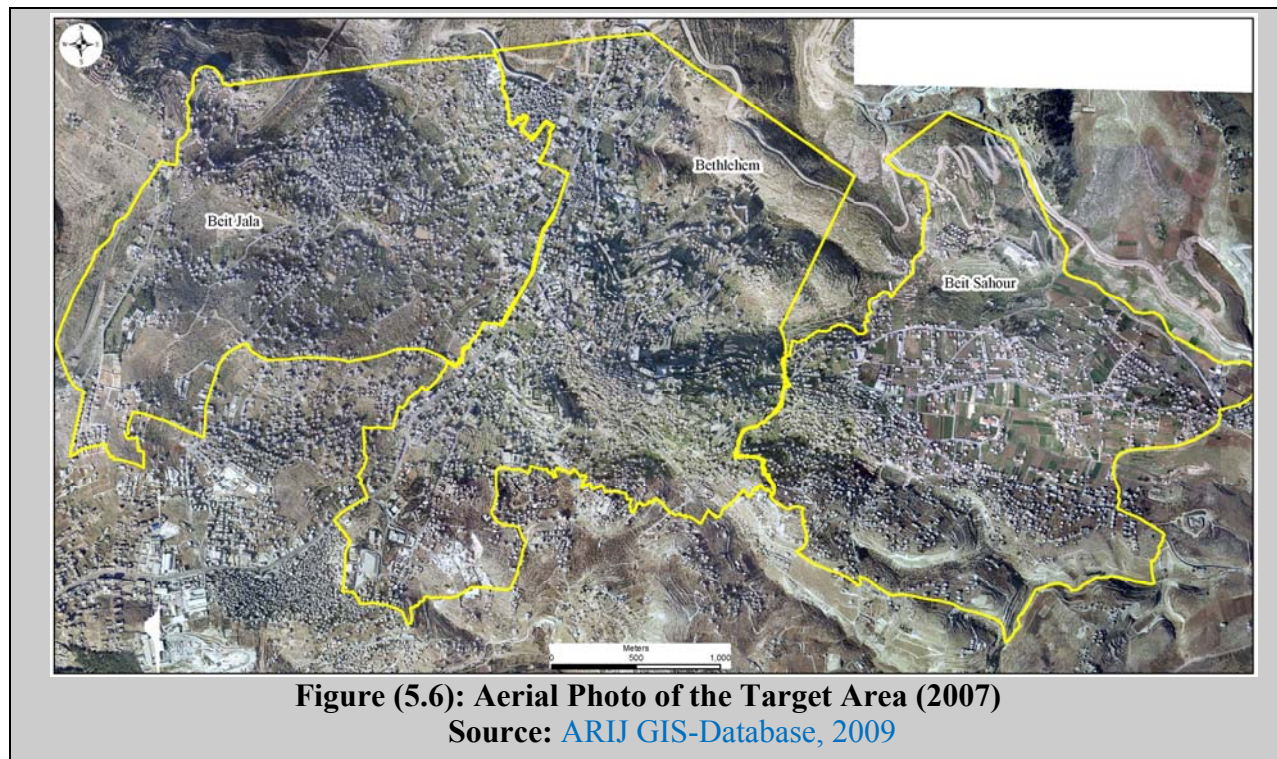


Figure (5.6): Aerial Photo of the Target Area (2007)
Source: [ARIJ GIS-Database, 2009](#)

5.4.1 Measuring Urban Sprawl in Bethlehem Area

Urban sprawl in the target area during the last decade (1997-2007) was determined by computing the area of all the Palestinian built-up from the digitized aerial photos of 2007 using GIS and comparing it with the area obtained from the AutoCad files of the municipal master-plans for Bethlehem, Beit Jala, and Beit Sahour cities. Shannon's entropy was used to capture the amount of sprawl in these time periods. Shannon's entropy can be used to measure the degree of spatial concentration and dispersion exhibited by geographical variable (Yeh and Li, 2001).

Shekhar (2005) articulates that Shannon's entropy is based on the notion that landscape entropy or disorganization increases with sprawl. Therefore, entropy value varies from 0 to 1. If the built-up distribution is maximally concentrated in one region, the lowest value 0 will be obtained. Conversely, an evenly dispersed distribution of built-up across the landscape will give a maximum value of 1 (*Ibid*, 2005). This gives an opportunity to recognize whether urban land development in the target area is towards a more dispersed or compact pattern (i.e. to measure the urban sprawl of the target area).

The percentage of an area covered by impervious surfaces such as asphalt is a straightforward measure of development (Barnes *et. al.*, 2001). Therefore, the developed areas have greater proportions of impervious surfaces (i.e. the built-up areas), as compared to the less-developed areas. Sudhira *et. al.* (2004) further consider that the urban population exacerbates the phenomenon of sprawl. The proportion of the total population in a region to the total built-up of the region is a measure of quantifying sprawl.

Entropy (E) can be calculated by using the following formula:

$$E = \sum_{i=1}^n P \text{ DEN}_i \cdot \log_e (1/P \text{ DEN}_i) \log_e(n) \dots\dots (1) \quad \text{Where } P \text{ DEN}_i = \text{DEN}_i / \sum_{i=1}^n \text{DEN}_i$$

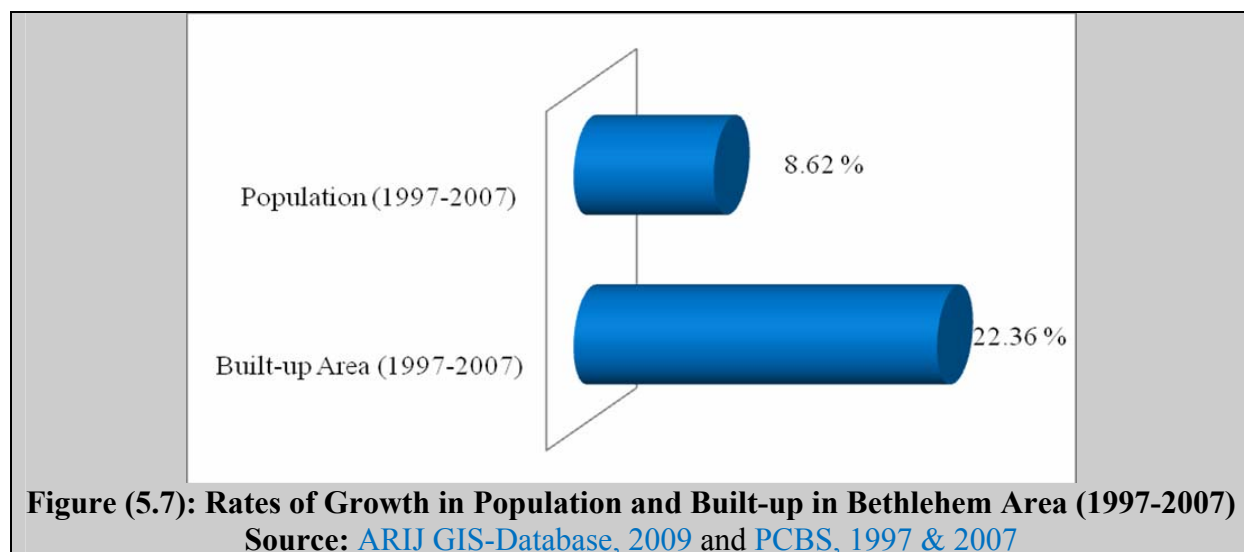
DEN_i is the density of land development that equals to the amount of land development (built-up area) divided by the total amount of land in the ith zone in a total of n zones. Since entropy can be used to measure the distribution of a geographical phenomenon, the difference on entropy between two different periods of time can also be used to indicate the change in the degree of dispersal of land development or urban sprawl (Yeh and Li, 1996).

$$\Delta E = (t + 1) - (t) \dots\dots (2) \quad \text{Where } (t) \text{ stands for time}$$

City	Municipal Area (Dunums)	Built-up Area ¹ (Dunums)		Population ²		Shanon's Entropy	
	1997/2007	1997	2007	1997	2007	1997	2007
Bethlehem	5,400	610	800	21,947	25,266	0.3377	0.3304
Beit Jala	4,400	431	482	12,239	11,758	0.3342	0.3315
Beit Sahour	4,800	350	420	11,285	12,367	0.3178	0.3167
Total	14,600	1,391	1,702	45,471	49,391	0.9897	0.9827

Source: Edited by the author from: ¹ ARIJ GIS-Database, 2009 and ² PCBS, 1997 & 2007

Table (5.4) reads that the rate of development of land in the target area is far outstripping the rate of population growth (Figure 5.7). This “leapfrog” development implies that the land is consumed at excessive rates and probably in unnecessary amounts as well. Between 1997 and 2007, population in the target area grew by 8.62% (PCBS, 1997 and 2007), while the amount of developed land (i.e. built-up area) soared to 22.36%, or more than 2.5 times the rate of population growth. Sudhira *et. al.* (2004) indicate that the per capita land consumption is inclusive of all associated land development.

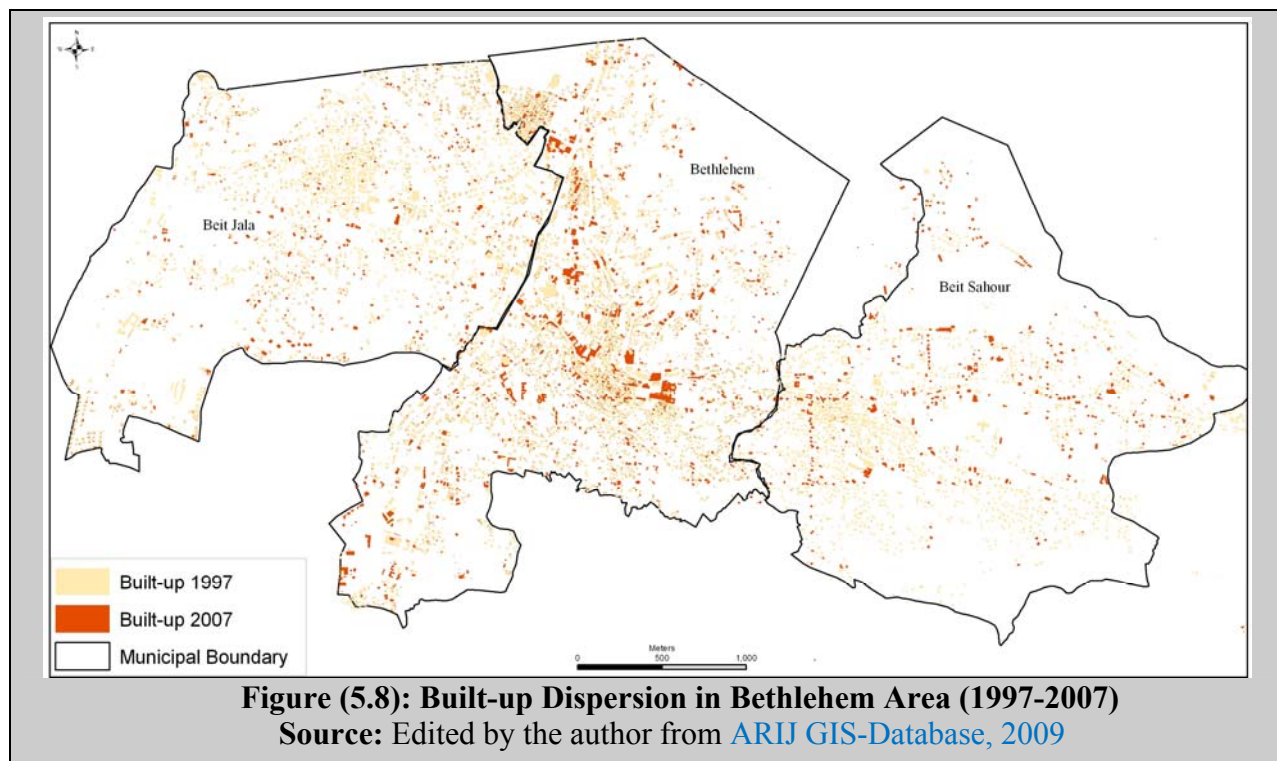


5.4.2 Urban Sprawl Modeling in Bethlehem Area

The Shannon's entropy calculations revealed that the distribution of built-up in the target area in 1997 was more dispersed than in 2007 (Figure 5.8). However, the degree of dispersion has come down marginally and the distribution is predominantly dispersed. It is argued that the Shannon's entropy calculations reveal rational results. This may be interpreted because the target area has witnessed an "infill development" (Section 5.2), where the new built-up areas have percolated within the already built environment. It should be accentuated that the entropy value indicates the degree of dispersion or compaction of the built-up in the target area. The values obtained here being 0.9897 in 1997 and 0.9827 in 2007 are above 0.5 indicating higher rate of sprawl (Shekhar, 2005).

It is worthy to mention that there are other factors that influence the quantification of sprawl. Among these are the transportation modes and the distance from the city centre (AKA: CBD). Obviously, taking into consideration the various drivers and factors that can affect endogenously and exogenously would need the development of a sophisticated methodology (Sabri and Yaakup, 2008), which is beyond the scope of this research. Therefore, the study will suffice with the simple quantification method used in section 5.4.1, as it provides an indicative value to the sprawl phenomenon in the target area.

To conclude, if the business-as-usual situation of built-up development persists, the sprawl in the target area will be exacerbated, thus affecting the urban environment and undermining the urban sustainable development in and beyond the target area.



5.5 Summary

The rate of urbanization in the target area gain momentum from the *de facto* administrative boundaries compounded by the high rates of natural urban growth at both the national and regional levels. This has been conceptualized through a common and authentic urban morphology that is characterized by high compact patterns of built-up and infrastructural lines. The morphology of the target area was directed away from the center life city of Jerusalem, after the 1967 war, causing a sprawled laden development of neighborhoods on behalf of prime agricultural lands and valuable natural resources, thus undermining the sustainability of the urban environment.

Chapter 6: Strategizing A Sustainable Urban Growth Scenario for Bethlehem Area

Strategizing a sustainable urban growth scenario for Bethlehem area that confront the many prevailing challenges, including urban sprawl is based first on localizing the sustainability concept within the Palestinian context, and then is proceeded by simulating two distinct scenarios for future spatial development in Bethlehem area. The first is a detailed projection of the status-quo and the second is an allocation of the needed land based on a computerized modeling of the most suitable areas for urban development, based on a set of pre-defined parameters, which have been assessed and weighed through a consultative process with experts in the field of interest. Nevertheless, the developed scenario, as will be seen is fitted into an ever flexible and decentralized conceptual structural re-organization for the city-region of Bethlehem, as an efficient tool for a sustainable urban-rural growth in the future.

6.1 Sustainability within the Palestinian Context

Sustainable development, as articulated in the Brundtland's Report of 1987, is considered as a need-based approach that stresses on the importance of meeting the needs of the present without compromising the ability of coming generations to fulfill their own needs. This is deeply articulated with the idea that we don't inherit our environment, but we borrow it from our children's. Albeit, the fact that there are common basic needs for all people that traditionally include food, water and shelter, and modernly developed to include sanitation, education and healthcare, there remain other specific needs, which different countries acknowledge, each according to its situation and context.

The Palestinian Ministry of Planning and Administrative Development (MOPAD) (formerly Ministry of Planning and International Cooperation (MOPIC)) drafted the "National Policies for

Physical Development for the West Bank and Gaza Strip” in 1998, in which it elaborated merely the special needs for physical development. Other special needs for social development have not been addressed at that time, which is concernedly beyond the scope and capacity of this research. According to [MOPIC \(1998 a\)](#), the prolonged Israeli Occupation has created lack of control over planning and implementation, from one side, and a total neglect for maintenance and rehabilitation of the physical environment, from the other side, leading to an unrealistic restriction to balanced urban-rural developments, the thing that resulted in urban sprawl. This situation has been re-framed ([Halper, 2008: 5](#)) after Oslo Agreement (1993-95) that constitutes an interim period and the election of the first Palestinian Legislative Council (PLC) in 1996, and consequently a new framework for Palestinian control over the planning process and, to some extent, the natural and built-up environment has been created.

Accordingly, the main challenging need of this interim period is to plan concurrently for the current situation and for the situation of an established Palestinian state. By the same token, it is crucially needed that the Palestinian people develop their own strategies, based on geo-political considerations and development that places a premium on the Israeli Planning in the OPT, and the Palestinian rights to land and natural resources are reserved ([MOPIC, 1998 a: 9](#)).

Within this context, it is sensible to define sustainability within the Palestinian context, based on the allocation of available land for urban development (space: static factor) versus the projected population growth (people: dynamic factor), mainly because land is a multi-dimensional sub-theme to the triple bottom-line of sustainability (i.e. economy, environment and socio-politics). In this regard, the sub-theme of land could be affiliated to: economic intervention when considered as a demand for infrastructural networks; environmental intervention when

discussing the preserved quota (e.g. sensitive landscape); socio-political intervention when discussed from accessibility and capacity building point of view.

6.2 Growth Projection Scenarios

An inexorable reality that characterizes the development in the target area is its prospectus pace of growth. Therefore realistically, the coming sections of this chapter will deal with two scenarios, namely: **medium** and **high** growth, in order to absorb, orient and empower this urban growth in a sustainable manner. Though, the urban growth rate in the target area is considered high, compared with other cities, but it is considered of medium growth rate, compared with other Palestinian cities. Comparatively, the medium scenario will be used to reflect the status-quo growth, where the high growth rate scenario will be used to reflect the possible absorption of returnees from the Diaspora. However, it is to the author conviction that the **slow** scenario is safely neutralized and ignored, as the crude population statistics and the status-quo urban development entails the continuation of the high population growth.

Furthermore, the rest of this chapter will identify the suitable location of the anticipated urban growth within the target area, based on a designated spatial GIS-based model that rationally follow the interconnectedness of specific parameters, including: land-use / land-cover classification, geological nature, proximity to city center and slope of land. In the same vein, a conceptual structural model for Bethlehem city-region will be identified based on the national definition for public service provision.

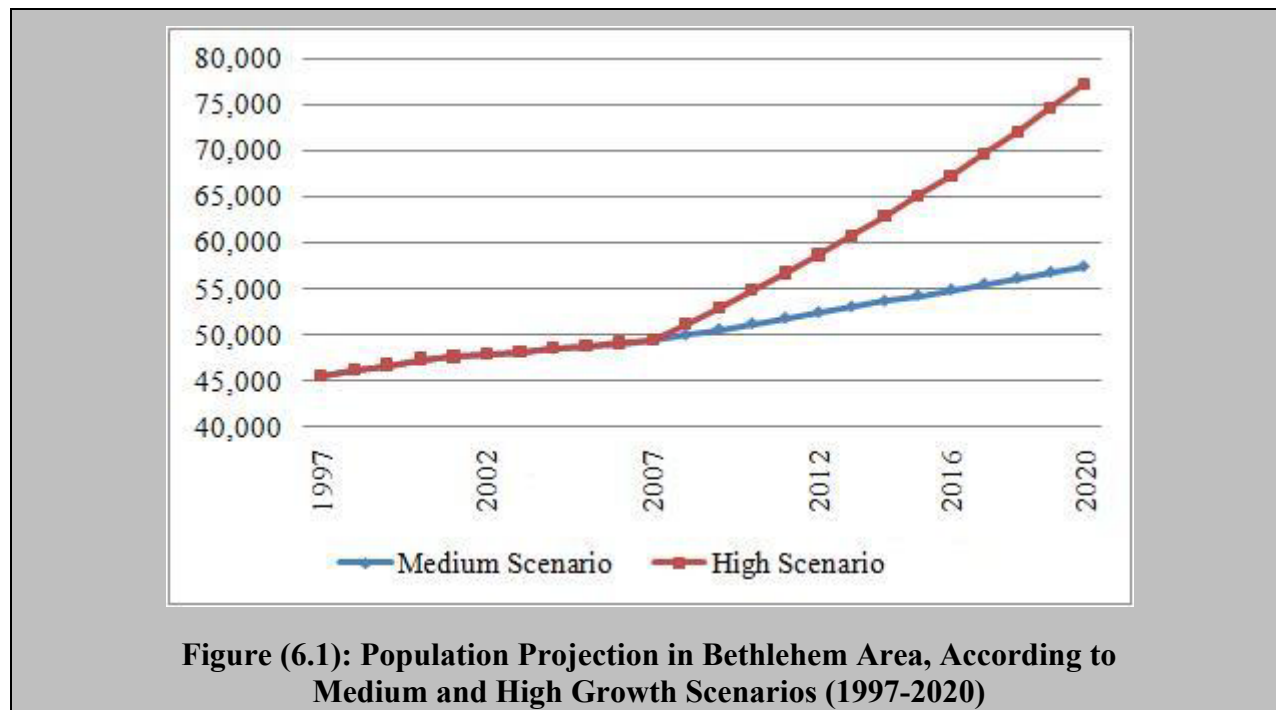
6.2.1 Population Projection

Population projection for the target area was done using the *trend* relation of Ms-Excel. The base years used for this linear projection were 1997 and 2007 that represent the census track

survey done by the PCBS. The destination year for the projection exercise was set to the year 2020.

Taking into considerations the economic hardships that strangle the Palestinian development, and the prevailing medium-to-high fertility rates, only the medium and high growth scenario rates are considered, and the low scenario was overlooked. The **medium** growth scenario will be used to represent the status-quo, where the population growth will remain constant in the foreseeable future. Though, the population growth rates in the target area is considered high in comparison to other Arabian and Asian cities, it is still under the national growth rates, therefore it will be deemed as medium development.

Nevertheless, the **high** growth scenario anticipates the propelling of the growth rates, with a considerable large number of refugees/returnees settled down within the framework of a comprehensive peace treaty due one decade, along with a very slow rate of out-migration, because of improved socio-economic conditions (Figure 6.1). It is assumed that the rate of population growth between the years 2007 and 2020 is constant at 3.5 %, in order to cover the anticipated refugees/returnees and out-migration rates.



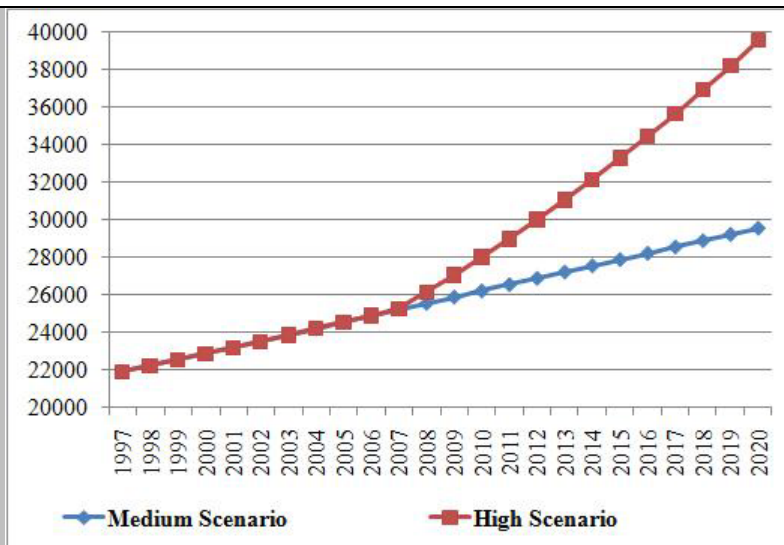
Sadaqa (2009: 89-93) undertook a focus literature analysis of the relevant studies (PCBS, 1994: MOPIC, 1998 b: Rand, 2005) that tackle the issue of forecasting the potential number of Palestinian refugees/returnees in the future Palestinian statehood. According to the analysis, a one million of refugees/returnees are expected to be accommodated across the OPT between 2010 and 2020. The one million's figure is considered a conservative one, as it exceeds the highest forecasted scenarios of the MOPIC (1998 b: 15) at 904,234, which represent the natural growth rate of the estimated figure at that time of 780,000. Furthermore, the one million's figure abides by the virtue of principles of the pertinent United Nations resolutions of 194 and 242, that vouch the accommodation of the 700,000 returnees originally from the OPT in present Israel Sadaqa (2009: 93). However, it is important to notice that the return pattern of the forecasted 1,000,000 Palestinian refugees/returnees is crucial and will ultimately affect the absorption capacity and quality. Needless to say, flattening the forecasted figure of refugee/returnees over a wider time span will cause less pressure on the natural environment and resources.

Following Sadaqa's (2009) proposal and assuming an equitable allocation of the 1,000,000 refugees/returnees in the different Palestinian Governorates according to the status-quo distribution of population, it is expected that Bethlehem Governorate portion will be 46,485. Accordingly, the target area is expected to absorb 16,465 Palestinian refugees/returnees, including 3,409 Palestinians that represent the portion of the three refugee camps of Ad Duheisha, Al 'Aza and 'Ayda refugee camps, based in Bethlehem area.

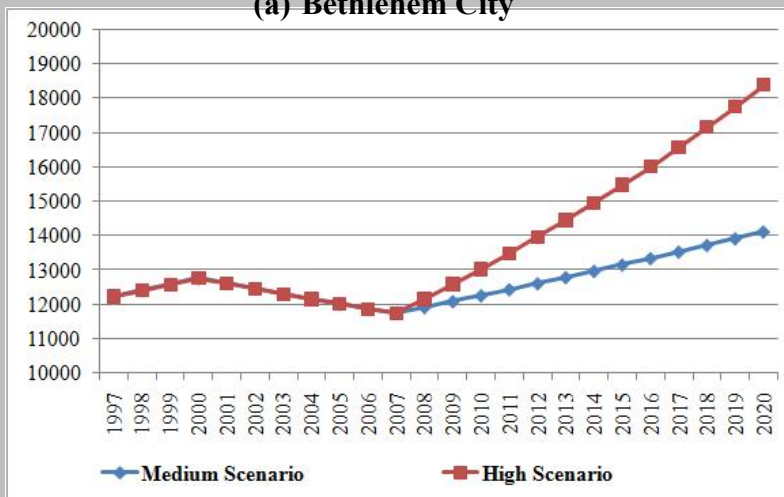
In comparison, the total difference between the **medium** and **high** projection scenario is 19,812 at the year 2020, which satisfactorily cover the anticipated refugees/returnees to the target area. This represents 40% increase to the 2007 figures of 49,391. In the **medium** scenario, the population in the target area is projected to increase by 6.1%, 11.2%, and 16.3% in 2012, 2016, and 2020, respectively. In the **high** scenario, the population is projected by 18.8%, 36.3%, and 56.4% in 2012, 2016, and 2020, respectively (Figure 6.2).

As noted in Figure (6.2), the three twin cities of Bethlehem, Beit Jala and Beit Sahour exhibit a linear trend population growth. However, in Beit Jala City the population growth decline between the years 2000-2007, mainly because of the Israeli restrictions that intensified during the second *Intifada*. Anyway, the author assumes that this decline will be stopped and special policies will be adopted to maintain the natural growth in the City of Beit Jala, following the same trend of the years 1997-2000.

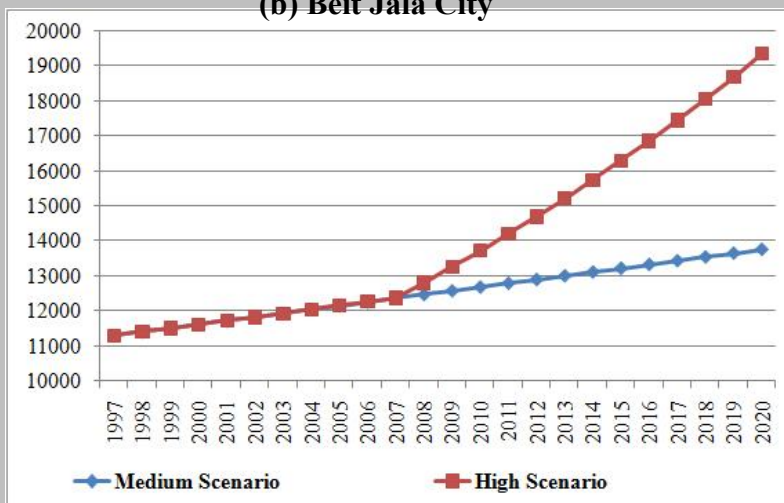
It is worthy to mention that a virtual polynomial equation has an R-squared value of more than 0.99 for both the medium and high growth scenarios (Figure 6.2). This high R-Squared value shows how well the resulting line matches the original data points or in other words it imply that the designated trend model provides perfect predictions.



(a) Bethlehem City



(b) Beit Jala City

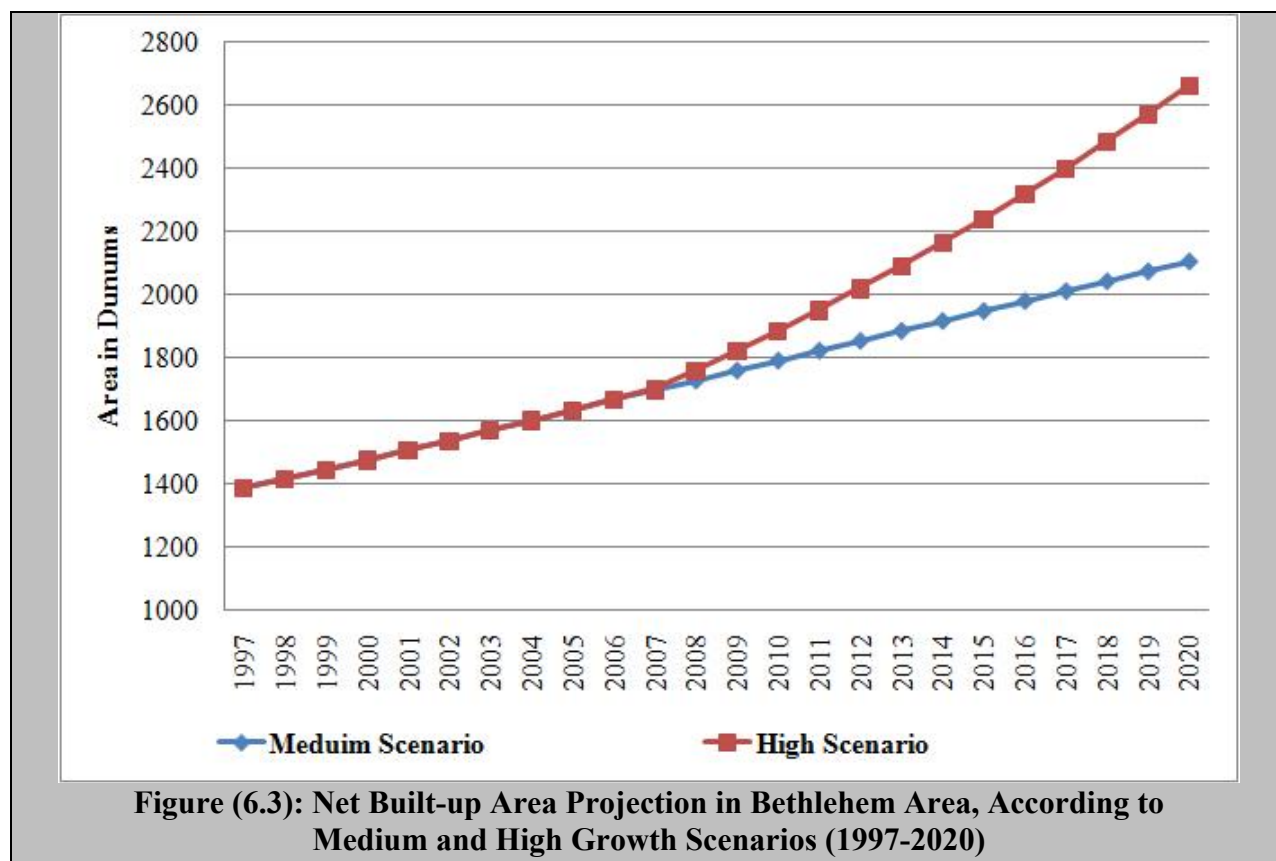


(c) Beit Sahour City

Figure (6.2): Population Projection in the Cities of (a)Bethlehem, (b) Beit Jala and (c) Beit Sahour, According to Medium and High Growth Scenarios (1997-2020)

6.2.2 Built-up Area Projection

To study the trend of urbanization in the target area, or in other words to quantify the needed land for population growth, built-up area data were captured from ortho-aerial photos for the years 1997 and 2007. Thereafter, the future directions of urban growth in the target area were projected using a linear trend function that has an R-squared value of 0.99 and 0.96 for the medium and the high scenarios, respectively (Figure 6.3).



According to the **high** scenario, the projected net built-up area in the target area is 2,662 dunums in 2020. This represents 1.56 times that of the year 2007, noting that the assumed rate of built-up development during 2007 and 2020 is set to be 3.5% per annum. Accordingly, there is a need to allocate 960 dunums (i.e. 56% of the current built-up area at 1,702 dunums) of net built-

up area till the year 2020, in order to accommodate the anticipated population growth inside the target area.

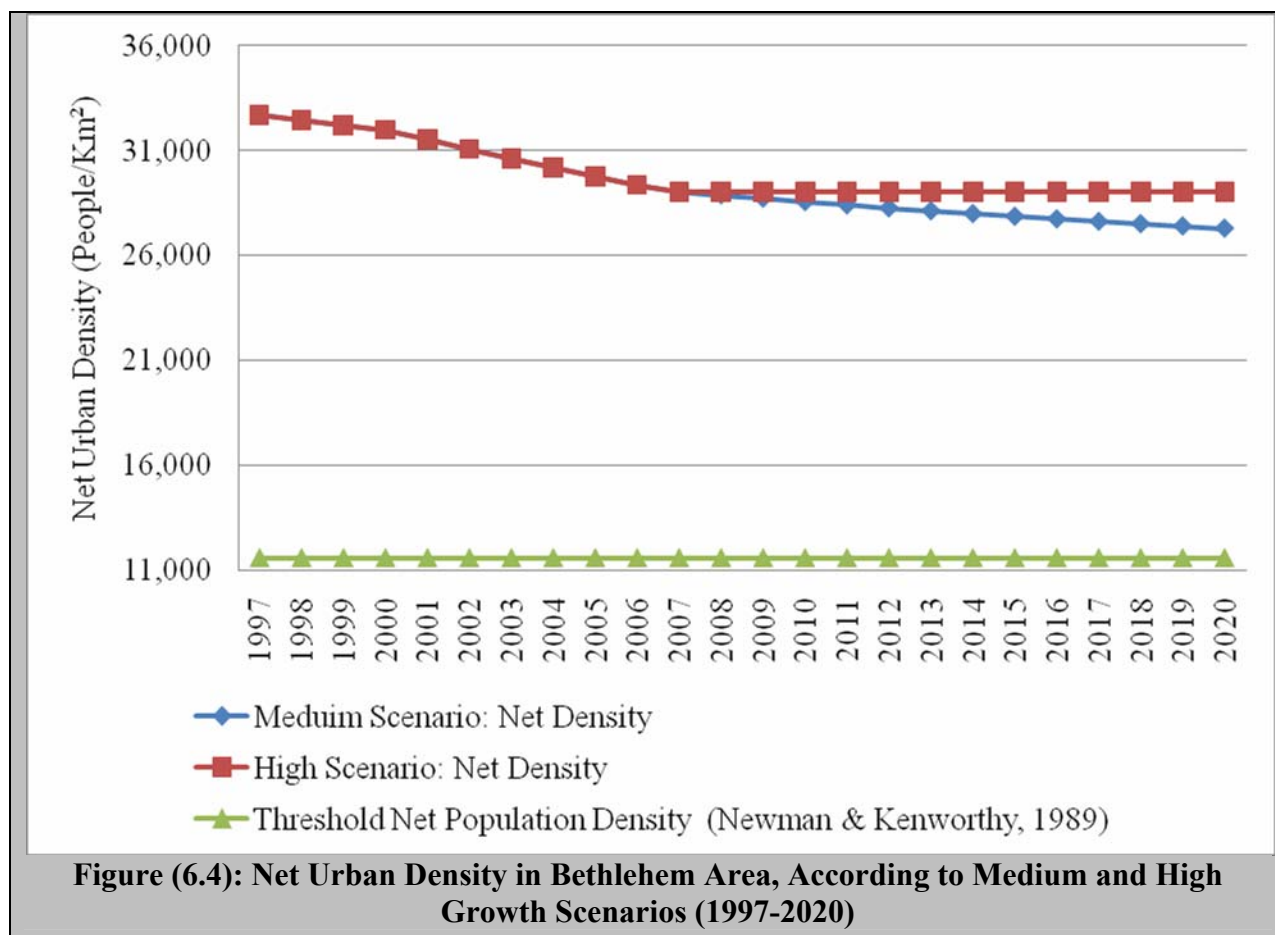
Needless to say, the projected increase of the built-up area will decrease the available open space area. According to the micro-analysis of land-use and land-cover of the target area, the plummet rate of available open spaces is 6.6%, which resembles the rate of development of the built-up areas at 960 dunums out of the total area of the three cities at 14,547 dunums. In the same trajectory, the projected net built-up area in the target area, according to the medium scenario is 2,105 dunums, which means that there is a need to allocate 403 dunums till the year 2020.

6.2.3 Net Urban Density Projection

In view of the attained figures from the population and net built-up area projections, it is expected that the net urban density considerably decrease as the rate of the projected built-up area (dominator) is larger than the rate of the projected population (numerator) in both the medium and high scenarios (Figure 6.4). To elaborate more, the grand rate of development in both the **medium** and **high** growth scenarios for the built-up area during 1997 and 2020 calculated 51% and 91%, respectively. Concurrently, the rate of development in the population trends in both the **medium** and **high** growth scenarios for the population during 1997 and 2020 calculated 26% and 70%, respectively.

Figure (6.4) shows how the **medium** and **high** scenarios of net density projection in the target area outpace the threshold net population density proposed by Newman and Keworthy in 1989, based on their major study entitled: “Cities and Automobile Dependence: An International Sourcebook”, in which they have comparatively studied 32 cities around the World. This means that the trends in both the **medium** and **high** scenarios demonstrate an unsustainable growth,

especially in terms of natural resources and agricultural lands that will be ultimately affected by the projected net densities, in case the current profile remains as it is.



6.3 Land for Future Urban Growth

6.3.1 Needed and Available Land Area for Urban Growth

Having identified the needed land for urban development in the target area using projection techniques, the question remains whether the target area could accommodate the projected 960 dunums of net built-up area. Needless to say, the needed built-up area still needs to be supported with an infrastructural and service provision base, including roads and amenities. Therefore, this section will study and analyze the current land-use and land-cover allocations in the target area, in order to check whether it is feasible, in principle to absorb the needed built-up area.

Methodologically, one could follow the CORINE classification scheme for land-use and land-cover (Appendix 2) to check-out the current land allocation strategy in the target area. The hierarchical structure of the CORINE classes allows logical class aggregation, and is extendible by adding classes to level four and five (Wehrmann, 2000), but at this level of academic-research examination the detailed level of analysis was set up to level 3 (Table 6.1).

The CORINE classification scheme for land-use and land-cover was adapted and re-structured to calculate the available land for future urban development in the target area (Table 6.2). The analysis shows that the available land for future urban development in the target area at 2,673 dunums (i.e. 18.4% of the gross area) satisfies the needed space of 960 dunums of net built-up area. However, according to the adapted definition (below elaborated in table 7.3) of the CORINE classification scheme, the available areas consists mainly from open spaces with little or no vegetation, along with shrub and/or herbaceous vegetation associations. This means that, though the status-quo urban development in the target area is feasible within the current municipal boundaries without any physical expansion, still the urban development is considered unsustainable as it will come over the allocated open space areas.

One planning model to study urban open spaces is the space standard. The premise of the space standards model is that a certain minimal size of open space is necessary per person (Sutton, 2008). Therefore, open space and the user-population are quantitatively matched in order to effectively meet the needs of the urban population. An example of this is the standards that the City of London had for many years, whereby 2.4 hectares (i.e. 24 dunums) of open space was allocated per 1,000 inhabitants (Turner, 1992: Guildford Borough Council, 2002). In our case, this means that the available open space should be increased by a factor of 2.3, as there is at present 18.48 inhabitants per dunum (i.e. 49,391 inhabitants per 2,673 dunums).

Table (6.1): Land-use / Land-cover Analysis for the Bethlehem Area (2007)						
Land-use / Land-cover Classification			Bethlehem	Beit Sahour	Beit Jala	Total
LEVEL 1	LEVEL 2	LEVEL 3	Area (Dunum)			
Agricultural areas	Arable land		803	765	602	2,170
Agricultural areas	Heterogeneous agricultural areas		1,343	178	47	1,568
Agricultural areas	Permanent crops		417	1,665	2,235	4,317
Agricultural areas	Plastic Houses		4	1	--	5
Artificial Surfaces	Artificial non-agricultural vegetated areas		112	3	52	167
Artificial Surfaces	Mine, dump and construction sites		159	8	3	170
Artificial Surfaces	Road Network		408	602	349	1,359
Artificial Surfaces	Urban fabric	Cemetery	30	--	9	39
Artificial Surfaces	Urban fabric	Palestinian Built-up Area	906	502	503	1,910
Artificial Surfaces	Urban fabric	Israeli Military Base	--	--	11	11
Artificial Surfaces	Industrial, commercial and transport unit		4	--	3	8
Water bodies	Inland waters (water bodies)		1	--	2	3
Forests and semi-natural areas	Open spaces with little or no vegetation		681	820	543	2,044
Forests and semi-natural areas	Shrub and/or herbaceous vegetation associations		431	148	50	629
Forests and semi-natural areas	Forests		--	--	21	21
Segregation Wall	Wall zone		62	65	--	127
Total Area			5,359	4,757	4,431	14,547

Source: ARIJ GIS-Database (2009)

Table (6.2): Calculations of Available Land for Future Urban Growth in Bethlehem Area

Parameter	Area (Dunums)	Percentage (%)	Remarks
Gross Area	14,547	100	The gross area is based on the formal municipal boundary of the three cities of Bethlehem, Beit Jala and Beit Sahour
Agricultural Sensitivity	8,060	55.4	Including: arable land; heterogeneous agricultural areas; permanent crops; and plastic houses
Already Developed	3,485	24	Including: Palestinian built-up areas; water bodies; cemeteries; roads; artificial non-agricultural vegetated areas; industrial; and commercial and transport unit
Artificial Surfaces: mine, dump, and construction sites	170	1.2	Including: stone quarries and facilities. These could be considered as brown fields, which are qualified for re-use or subversion "transformation" using their structures to ends other than those they were designed for
Inaccessible Areas	138	0.9	Including: Segregation Wall; and military bases
Forests and Nature Reserves	21	0.1	Mainly at Crimzan monastery in Beit Jala
Available Areas	2,673	18.4	Semi-natural areas including: open spaces with little or no vegetation; along with shrub and/or herbaceous vegetation associations
N.B.: Rounding of figures may produce some minor anomalies			
Source: Edited by the Author from ARIJ GIS-Database (2009) .			

6.3.2 Suitable Land Area for Urban Growth

After checking the demand and supply for future urban growth in Bethlehem area, it is now important to figure-out the most suitable spatial location for the needed future urban development in the target area. According to [Hofstee and Brussel \(2006\)](#), one of the main concerns of physical planning is the proper designation of suitable sites for future urban development. The identification of such suitable sites must be based upon a set of local criteria to ensure that the maximum cost-benefit ratio for a community is attained.

The various characteristics of a site (e.g. present land-use, slope and distance to central business district) influence its suitability for a specific land-use. A scoring and weighting system can be applied to the various aspects of suitability to assess the overall suitability for a specific

land-use. Certain characteristics may lead to non-suitability of a site for a specific urban land-use. For instance, steep slopes, religious values (e.g. waqf), or designation as state land, may exclude the use of a site for development, or in other words makes it unavailable.

The envisaged suitability analysis aims at helping the decision-makers to manage the built environment without jeopardizing the limited natural resources. This will guarantee avoiding any negative side effects of unplanned urban development. Ultimately, the spatial GIS-based model doesn't intend to work-out the fabric relations of mono-buildings at the micro level, nor to cartography the layout of a new and "ideal" city, but the re-design of existing cities, mainly because each existing city is unique in its physical structure and form, land-use pattern, activities, socio-economic conditions, history, topography and micro-climate and so on, and there may simply have to be different planning and design approaches for different cities in order for them to become more sustainable (Frey, 2005: 110).

Anyway, caution has to be exercised with the following outlined interventions for the suitability analysis designation:

- Land value as a suitability aspect: land value is not an independent factor, but in principle it integrates all suitability aspects, with a weighing system.
- Suitability ratings unavoidably contain an element of subjectivity: extreme caution should be observed in their application.
- Scores and weights may have an untraceable result when many aspects are included.

They are no more than a tool for a rational selection of suitable sites (Hofstee and Brussel, 2006). Therefore, in our case only four parameters are considered, namely:

- Land-use / Land-cover;
- Slope (Topography);

- Geology; and
- Proximity to City Center.

However, other important parameters including, but not limited to the cultural landscape, water sensitivity, land valuation and soil classifications were not used in the modeling, because such information are not available at the target area level, and it is not the capacity of this research to map such parameters, despite their importance and potential influence on the urban expansion in Bethlehem area.

The four used parameters (i.e. land-use / land-cover, slope, geology and proximity to city center) for determining the optimal allocation of future urban growth in Bethlehem area have the following definitions, which clearly are not exhaustive, but operational:

Parameter (1): Land-use / Land-cover

This is a critical parameter that clearly will influence the outcome of the model. It represents the present classification of land-use and land-cover based on CORINE definition (Figure 6.5). Both the *open spaces with little or no vegetation* and the *shrub and/or herbaceous vegetation associations* were assigned the highest factor grading by a designated stakeholder focus group (Appendix 3), mainly because such locations could accommodate the projected future urban population in a sustainable manner without compromising the agricultural resources, such as: the permanent crops and forest, which were assigned the least factor grading at 1. In parallel, the Palestinian built environment, including: road network, cemeteries, industrial, commercial and transport unit, inland waters (i.e. water bodies), along with the Israeli military bases and the Segregation Wall zone are all assigned the least factor grading, as areas of zero future development. However, the Israeli military bases and the Segregation Wall zone in case of any future Israeli withdrawal could be re-used, dismantled, or subverted in accordance to the

Bethlehemites needs. This requires special considerations and careful planning, where local stakeholders could help in the de-colonization of such an Israeli architecture. It is worthy to notice that the area of both the Israeli military base and the Segregation Wall zone doesn't exceed 1% (Table 6.1), and therefore wouldn't strategically influence the modeling exercise at hand.

Parameter (2): Slope (Topography)

The grade slopes (contour lines) or the topography map for Bethlehem area have an influence on the future development of human settlements, as the steeper the area is the more financial investments are needed to meet the demand for physical infrastructures. Furthermore, building on steep slopes could jeopardize the aesthetic value of the urban landscape and disorder the city sky line. Within this framework, it is considered that the less steep slopes (i.e. 0-10%) are conducive for future urban development, whereas the steep slopes (i.e. >30%) are restrictive (Figure 6.6).

Parameter (3): Geology

To sustain the ground water resources in Bethlehem area that satisfy the bulk needs of the local population, a careful land-use of such areas is considered essential, bearing in mind the mistaken and irresponsible current misuse of these resources by the local people, such as: the disposal of wastes and the disruption of catchment areas through an intensive horizontal urban expansion.

The analysis of the geological map for the target area (Figure 6.7) shows that it contains the following underground aquifers (Picard and Golani, 1987):

- The Upper Cenomanian Aquifer (C2): Shallow and composed of inter-bedded dolomites and chalky limestone.
- The Upper Cenomanian-Turonian Aquifer (C3t): Composed of inter-bedded dolomites and chalky limestone.
- Coniacian-Santorian (S1-2): Composed of limestone, dolomite, and marl.
- The Turonian Aquifer (t): Composed of massive, locally inter-bedded limestone and dolomites.

Having identified the geological aquifers in the target area, and discussing their nature with experts in the field, then by overlaying them with the interpretative soil map that reads the existence of only one soil class, namely: the Brown and Pale rendzinas, which is considerably a fertile soil for agricultural purposes (ARIJ, 2007), one could decide on the rational of factor grading for the C2, S1-2, C3t, and t classes. They have been graded as 1, 3, 4, and 5, respectively. It is important to notice that the four geological classes are nearly composed from the same materials (chiefly: dolomites, limestone, or marl), but they differ in their formation and thickness. The thicker the formation is the less vulnerable contamination of the ground water resources by human activities is, and *vice versa*. This means that the shallow aquifers are not favorable or suitable for future urban expansion, and therefore were denoted 1 as a grading factor.

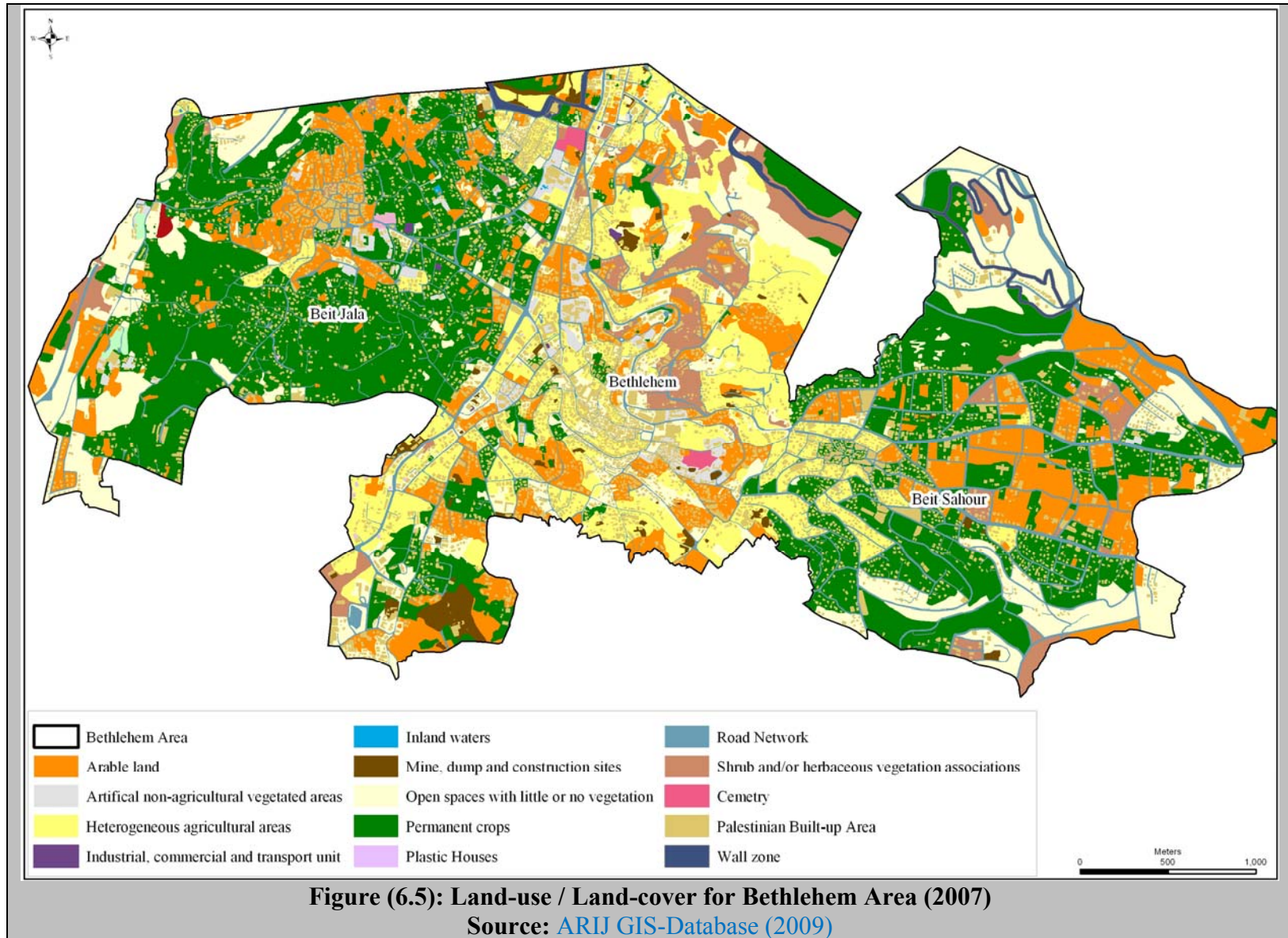
Parameter (4): Proximity to City Center

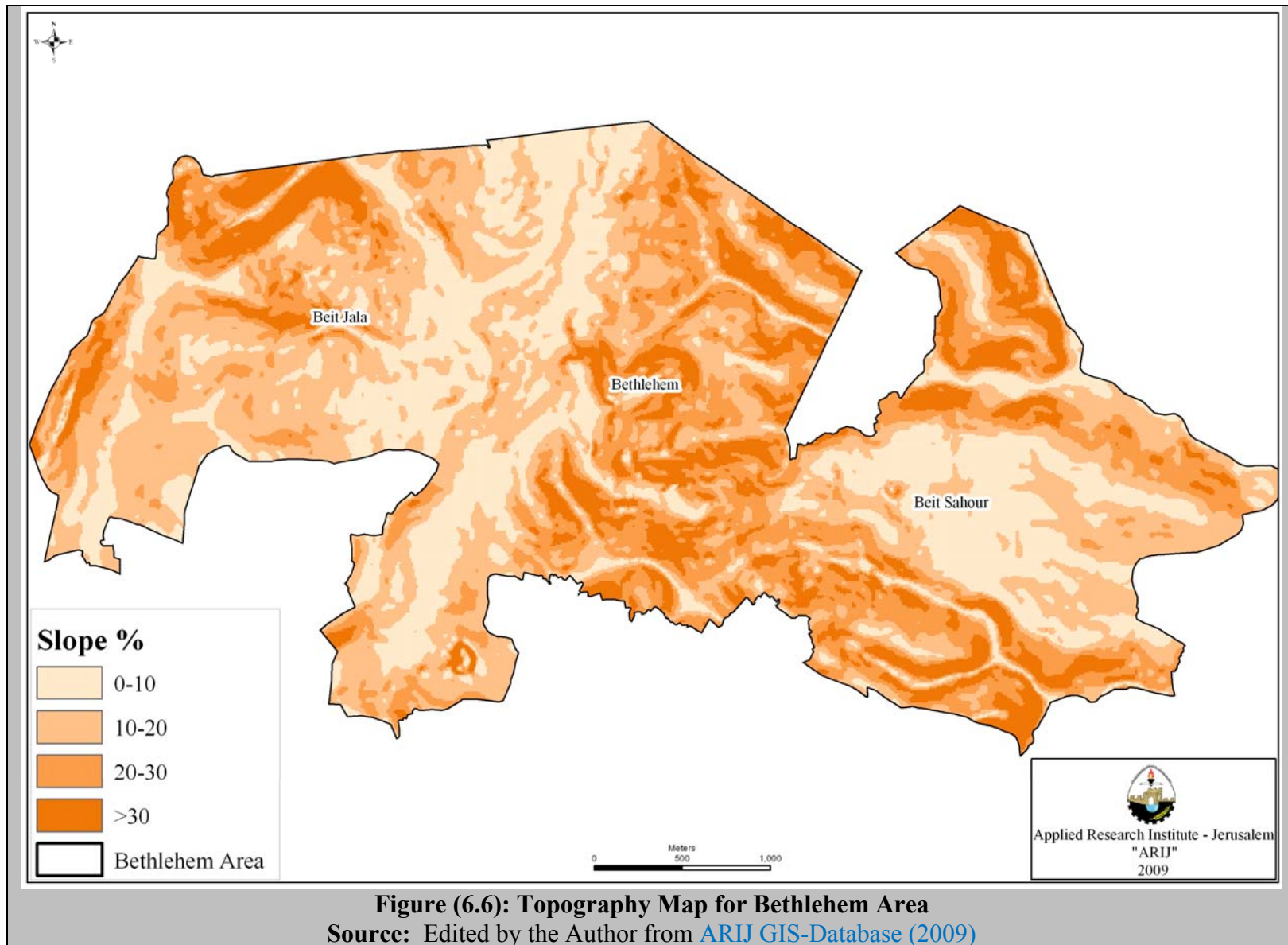
The central business district for the three cities of Bethlehem, Beit Jala and Beit Sahour are assumed at Al-Cinema, Al-Manshiya, and Souq Al-Sha'b, respectively (Figure 6.8). These centers exhibit higher population densities than the peripheries that are characterized by urban sprawl (Section 5.3). One strategy to curb this sprawl is by paying a premium to infill

development, especially at the peripheries. Therefore, the target area was divided into a five gradual buffer-zone, namely: 0-250; 250-500; 500-750; 750-1,000; and 1,000-1,250 m. The last gradual buffer-zone was given the highest factor grading of 5. It is worthy to mention that the Palestinian built-up areas beyond the demarcated buffer zones at the peripheries have been assigned with a factor grading of 5, also. However, the prospectus propelling of urban expansion in the peripheries should be compounded by an infrastructure of public transportation and water networks, etc.

This parameter partially covers other important parameters that are not available or accessible. One parameter is the cultural landscape, which is merely defined by the Bethlehem Cultural Center for Heritage Preservation (CCHP) in 2005, as the areas of the old cores in the three historic centers of Bethlehem, Beit Jala and Beit Sahour, along with a ring buffer zone. This area is apparently inside the first class of buffer zone that was denoted a factor grading of 1. This will help in the preservation of such a cultural landscape, which is considered a hot spot in current urban planning debates within the Palestinian context due to the many years of neglect and ravages manifested by irresponsible human activities.

In the same token, the land value parameter entails that the further the distance from the city centers are the less value the land is, other-things-equal or “*ceteris paribus*”. Hence, the parameter of proximity to city center is a perfect theoretical simulation of the land value parameter.





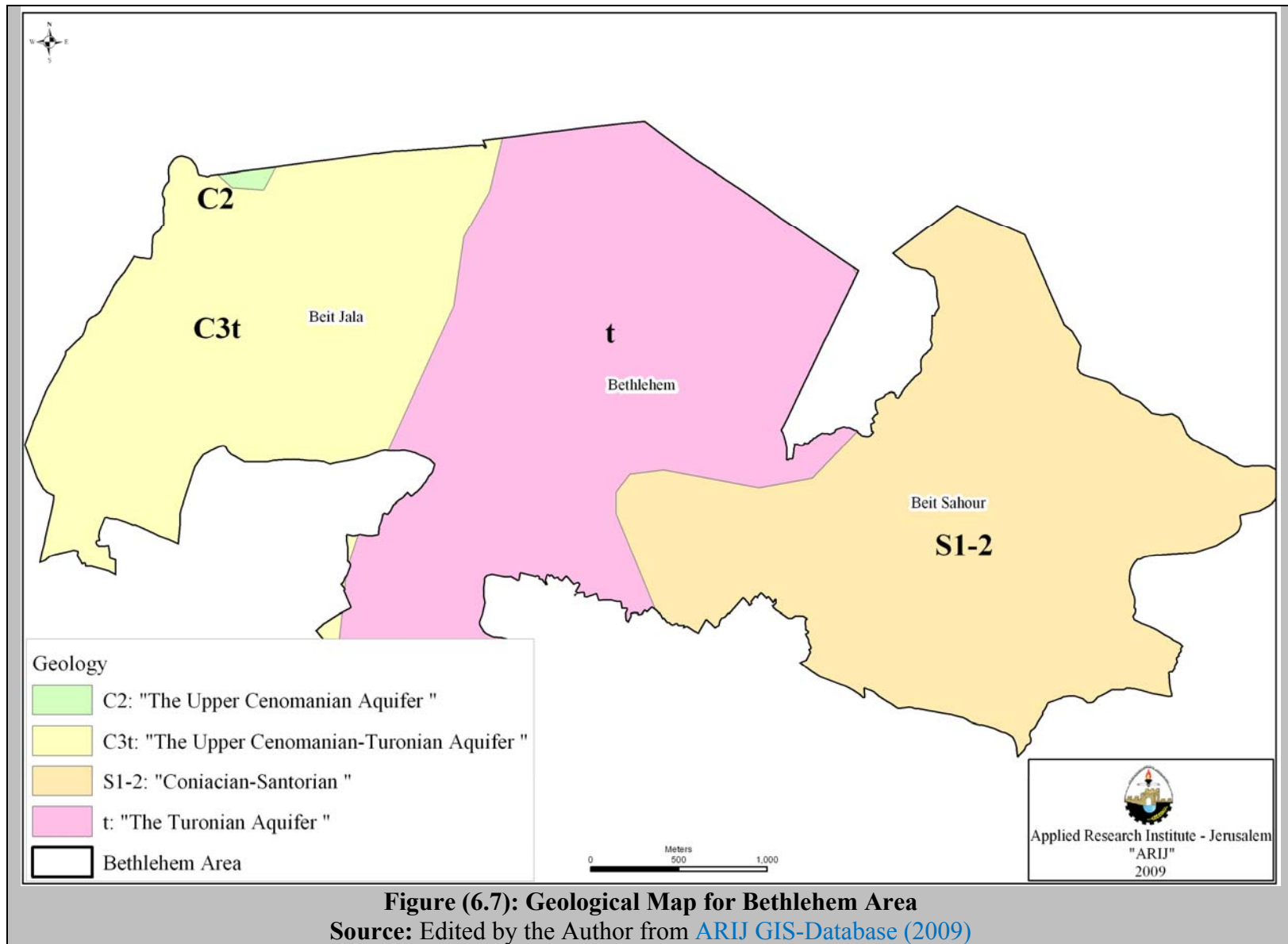


Figure (6.7): Geological Map for Bethlehem Area
Source: Edited by the Author from [ARIJ GIS-Database \(2009\)](#)

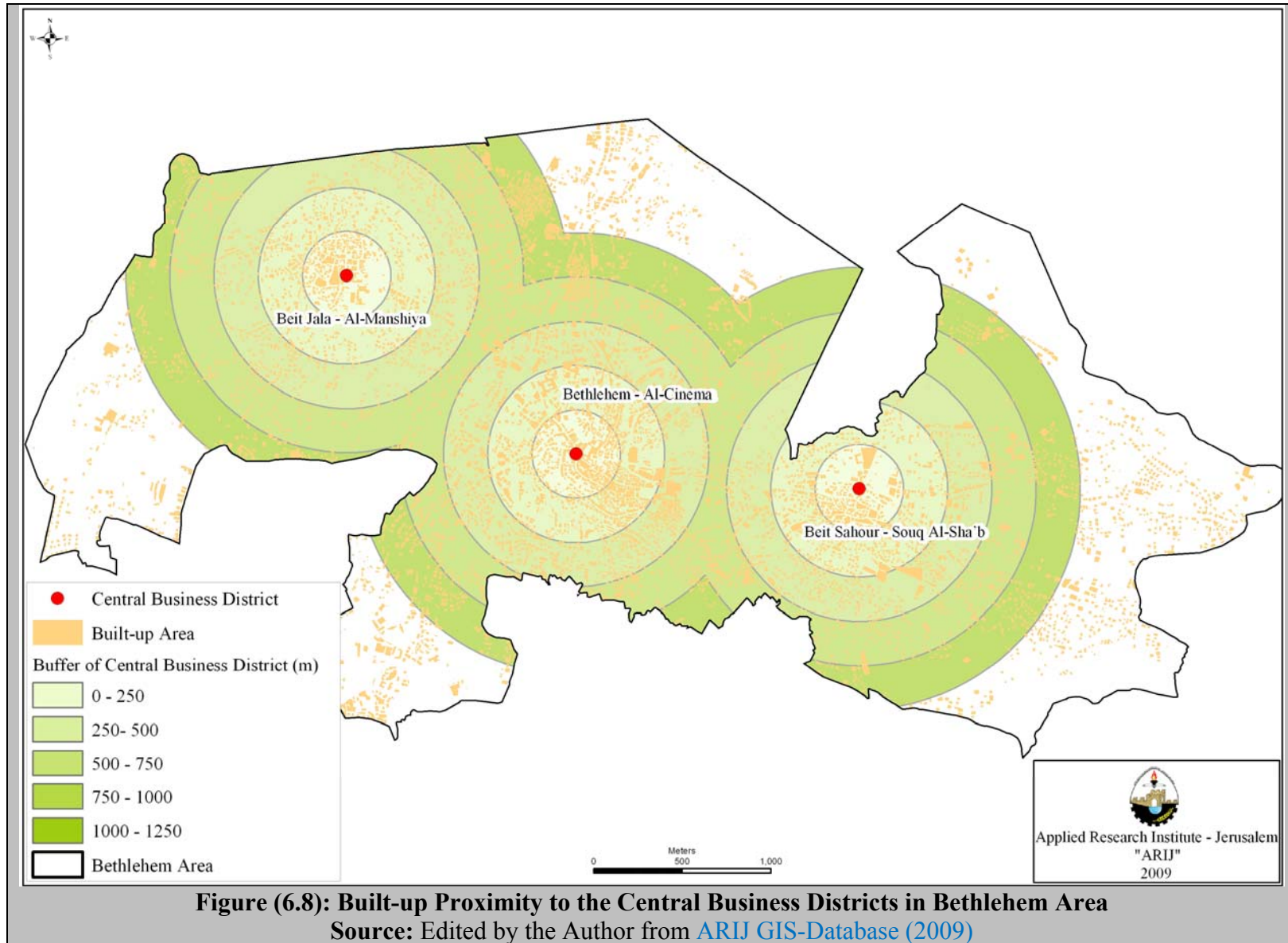


Figure (6.8): Built-up Proximity to the Central Business Districts in Bethlehem Area
Source: Edited by the Author from [ARIJ GIS-Database \(2009\)](#)

Several map layers of data (AKA: interpretative maps), such as: built-up areas and grade slopes were incorporated into a computer simulation process model. The *Arc/GIS Spatial Analyst Tool* was used to perform the spatial analysis (or a multi-criteria analysis).

The multi-criteria analysis consistently categorized five potential areas for urban growth in the area of Bethlehem, based on the extent to which they indicated suitability for urban development. The five categories are: highly suitable, suitable, moderately suitable, marginally suitable, and unsuitable. They were assigned a value of 1-5 with 5 being the highly suitable. Successive to that, a weighing factor was assigned to the four considered parameters (Table 6.3).

Both the assigned factors and weighing for the *sub-parameters* and *parameters* were given in a stakeholder consultation process with 14 experts in the field of interest (Appendix 3). The stakeholders represent multi-disciplinary fields, including: civil and architecture engineering, urban planning, GIS, landscape architecture, and environmental science and planning. The average weighing that was solicited from the stakeholders (Appendix 4) was used and entered into the developed GIS-project, and then the model for allocation of future urban growth was run. More specifically, the *spatial analysis map calculator* was used to weigh and combine the individual map layers and produce the suitability model. The used map calculator expression for the developed scenario was as follows:

$$[\text{Land-use / Land-cover}] \times 42.5\% + [\text{Slope}] \times 18.6\% + [\text{Geology}] \times 15.7\% + [\text{Proximity to City Center}] \times 23.2\%.$$

Table (6.3): Scorecard Sheet for the Developed Spatial GIS-based Model

Parameters	Sub-Parameters (Factors)	Assigned Factor (1-5)¹	Assigned Weighing (0-100%)
Land-use / Land-cover	Industrial, commercial and transport unit	1.6	42.5
	Water bodies	1.1	
	Permanent crops	1.5	
	Plastic houses	1.4	
	Road network	1.9	
	Cemetery	1.3	
	Wall zone	1.5	
	Forests	1.0	
	Israeli Military Base	1.5	
	Arable land	2.4	
	Artificial non-agricultural vegetated areas	1.7	
	Mine, dump and construction sites	2.2	
	Palestinian Built-up Area	3.1	
	Heterogeneous agricultural areas	2.7	
	Shrub and/or herbaceous vegetation associations	4.9	
Open spaces with little or no vegetation	4.9		
Slope (Topography)	0-10 %	5.0	18.6
	10-20 %	3.0	
	20-30 %	2.0	
	>30 %	1.0	
Geology	C2: Shallow and composed of inter-bedded dolomites and chalky limestone	1.1	15.7
	S1-2: Composed of limestone, dolomite, and marl	3.0	
	C3t: Composed of inter-bedded dolomites and chalky limestone	4.0	
	t: Composed of massive, locally inter-bedded limestone and dolomites	5.0	
Proximity to City Center	0-250 m	1.0	23.2
	250-500 m	2.0	
	500-750 m	3.0	
	750-1,000 m	3.9	
	1,000-1,250	4.9	
Total			100%
¹ N.B.: the assigned factors from 1 to 5 (column 3) has the following classification: 1: Unsuitable, 2: Marginally suitable, 3: Moderately suitable, 4: Suitable and 5: Highly suitable			

The suitability model is displayed on a shaded scale of one to five, five being the highly suitable and one being the unsuitable (Figure 6.9). The spatial analysis shows that the area of highly suitable locations (i.e. class 5) for future urban growth in Bethlehem area calculates 1,577 dunums, and the areas of both highly suitable and suitable locations (i.e. class 5 and 4) calculates 5,703 dunums. These figures entails that the available (i.e. supply) location for future urban growth in the target area by 2020, suffice and satisfy the projected needs (i.e. demand) at 960 dunums of net urban built-up. However, the spatial analysis, also show that the percentage of already developed areas within the highly suitable and highly suitable compounded with suitable locations is 11.5% and 21.5%, respectively. Furthermore, it is worthy to notice that the majority of the already developed areas are for the Palestinian built-up areas (i.e. houses) at 62.4% and 75.3% in both class 5 and 4, respectively (Table 6.4).

Suitability Index	Suitable Area (Dunum)	Palestinian Built-up Area (Dunum)	Already Developed¹ (Dunum)
1	20	4	12
2	3,064	244	783
3	5,760	763	1,457
4	4,126	788	1,047
5	1,577	113	181
Total Area (Dunum)	14,547	1,912	3,480

¹ The already developed areas includes: Palestinian built-up areas; water bodies; cemeteries; roads; artificial non-agricultural vegetated areas; industrial and commercial and transport unit (Table 7.3).

As noticed from Figure (6.9) that maps the suitable urban expansion locations in Bethlehem area, the highly suitable locations are oriented towards the peripheries and away from the central business district of the three targeted cities. Strategically, this entails that infill or in-ward development “intensification” compounded by up-ward “densification” in these areas would be helpful in the brawl of urban sprawl that predominantly scatter in the peripheries (Section 5.4).

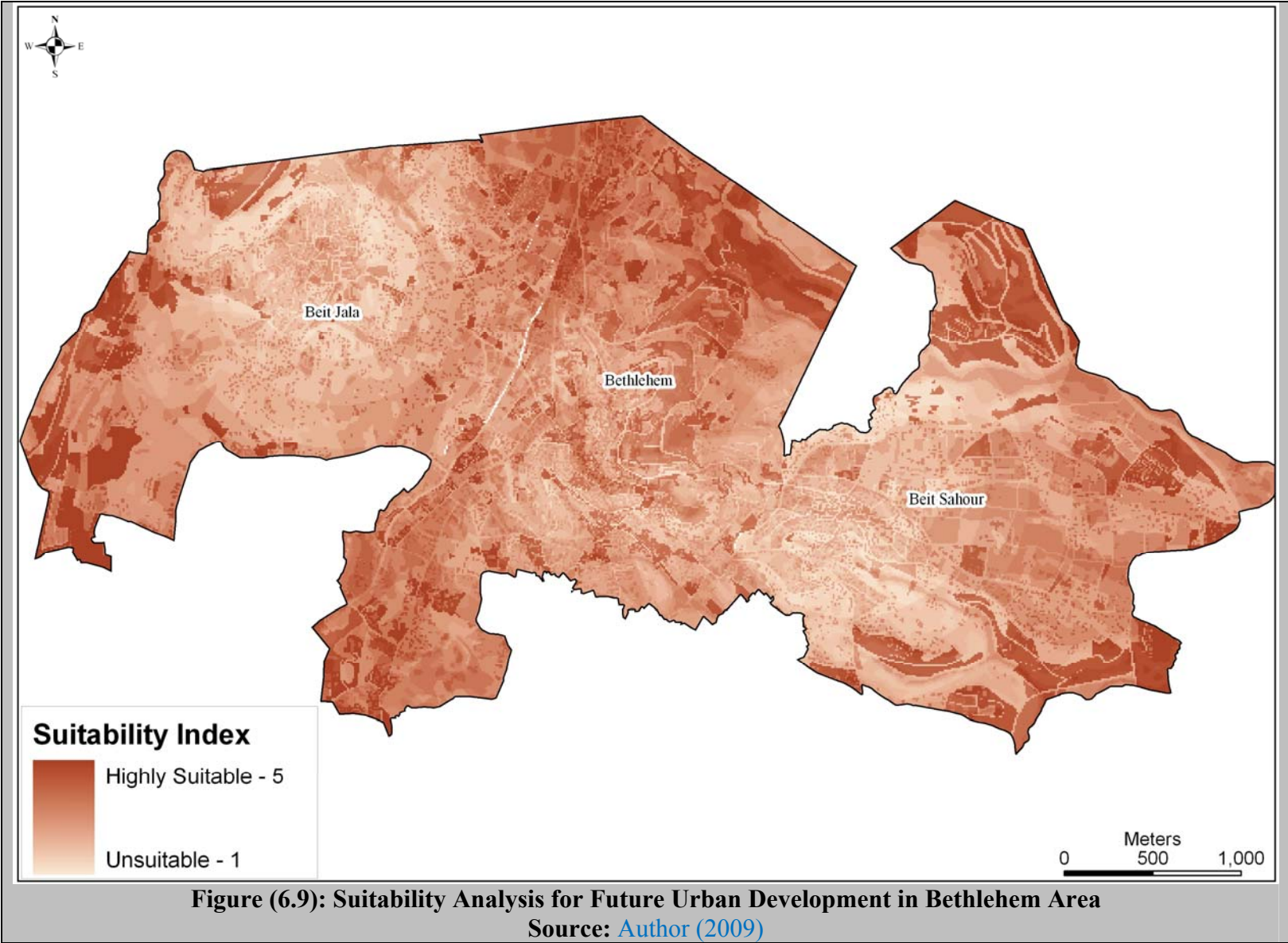
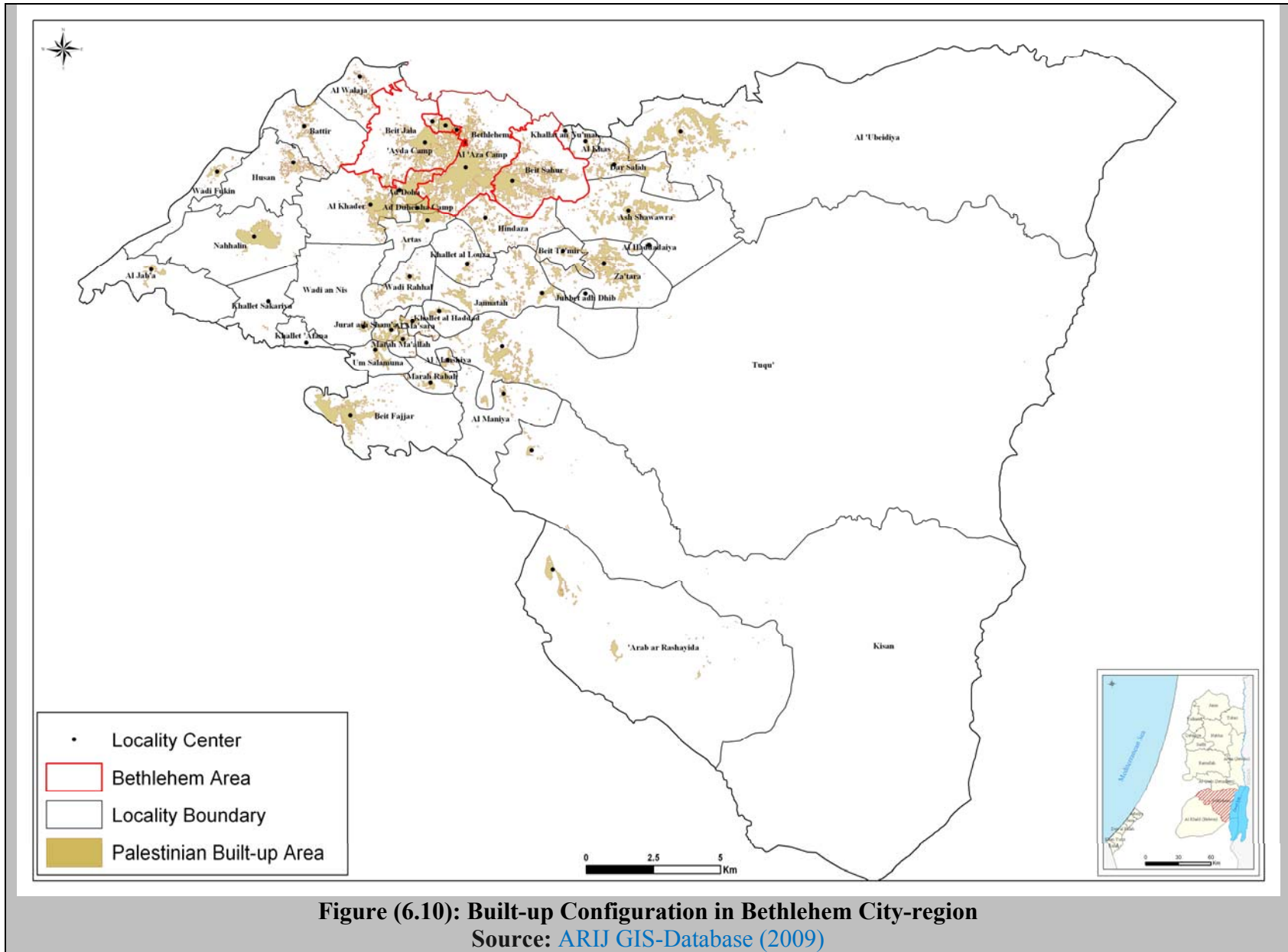


Figure (6.9): Suitability Analysis for Future Urban Development in Bethlehem Area
Source: Author (2009)

6.4 Bethlehem City-region: The Regional City Model

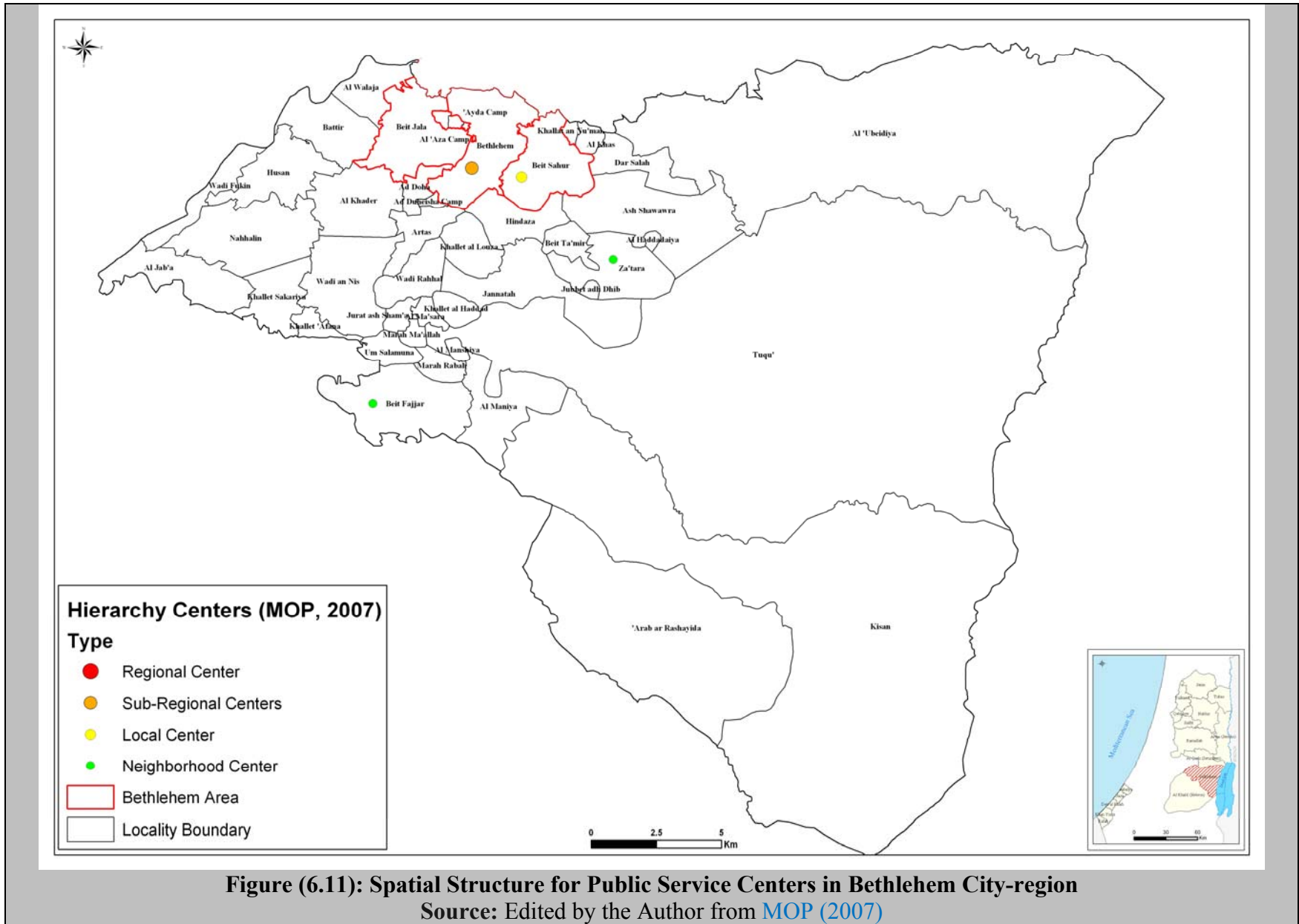
Bethlehem Governorate or city-region is an agglomeration of different development communities or clusters of smaller and larger size, which are more or less attached to each other and to Bethlehem area that constitute the three twin cities of Bethlehem, Beit Jala and Beit Sahour (Figure 6.10). A close analysis for the plan configuration of Bethlehem city-region indicates that a concentration of almost continuous urban fabric is located in the east/west centre, and a galaxy of fragmented rural agglomerations is flanked around the center. The current structure for the galaxy of rural agglomerations is dependent on the central urban center that provides the social services such as hospitals, markets, universities, among others.

The urban-rural hierarchical system of morphological fabric in Bethlehem city-region coincides with Frey's (2005: 95) conclusion that the question of a sustainable *city form* should probably be changed into the question of a sustainable *regional form*, as it becomes increasingly clear that the quest for sustainability has to take into consideration not only that of the city, but also that of the countryside with which the city ought to have a symbiotic relationship (Section 4.4). Therefore, introducing a new structural model for Bethlehem city-region can potentially support the creation of a more independent and self-sufficient rural agglomerations.



In 2007, the Palestinian Ministry of Planning (MOP) has re-defined the spatial structure for public service centers in the OPT, after the first adopted definition outlined in the National Policies for Physical Development for the year 1998. According to the new definition, Bethlehem Governorate is structured into 1 sub-regional center at Bethlehem City, 1 local center at Beit Sahour City and 2 neighborhood centers at Beit Fajjar and Za'tara (Figure 6.11). The governorate has no regional center, as only three regional centers are defined in the West Bank territory, namely: Hebron, Ramallah & Al Bierh and Nablus. The four hierarchical centers for public service provision in Bethlehem Governorate are all statistically defined as urban areas (PCBS, 2007). According to MOP (now MOPAD) (2007:91) there is a minimum level of public services provision according to centers' hierarchy. Appendix (5) summarizes these services according to the education, health, culture and administrative sectors.

The theoretical premise of the public service centers model was the Central Place Theory that mainly depends on a certain *population threshold*: the minimum number of consumers necessary to continue providing the service at a feasible base, and a specified *market range*: the minimum territory to provide minimum market, or in other words it is the shortest distance the consumer has to cross to get the service or the commodity (MOP, 2007: 29).



Following MOP (2007) spatial structure for public service centers in the city-region of Bethlehem, and based on Frey's (2007) proposal of sustainable regional form of *regional city model or polycentric net* (Section 4.4) one could conceptualize a more sustainable structural model for the city-region of Bethlehem (Figure 6.12). The proposed structural model is indeed abstract in nature and should only be perceived as an optional organizing principle that has a flexible and decentralized functional advantage over the current structural model, which is lacking proper public services. Such a model could be further developed to include notions of environment soundness and socio-culture coherency. Meanwhile, the conceptualized model is fundamental in strengthening the existing centers and/or creates new ones, facilitate accessibility and mobility and strategically correspond to the planning standards and financial incentives that would support the competition among the new centers to develop their capacities in meeting the local needs and aspirations. Future debates on LGUs amalgamation on the city-region of Bethlehem may benefit from the proposed model and build on its strategic orientation.

It is clear that the proposed centers for public service provision in the city-region of Bethlehem by MOP (2007) don't satisfactorily cover the western rural area, which is one of the most disadvantaged areas due to the Israeli unilateral segregation plan. Therefore, it is proposed to build the capacity and deploy more resources to create a neighborhood center at Nahhalin village (west of the target area), as a symmetric point of reference to the *Ibid* (2007) proposed neighborhood center at Za'tara village (east of the target area). However, in order to ensure a smooth hierarchical system of public service provision, it is proposed to create another symmetrical local center to Beit Sahour City at Beit Jala City, to act as mid-supporter providing medium-order public services to the western rural area of the city-region of Bethlehem (Figure 6.12).

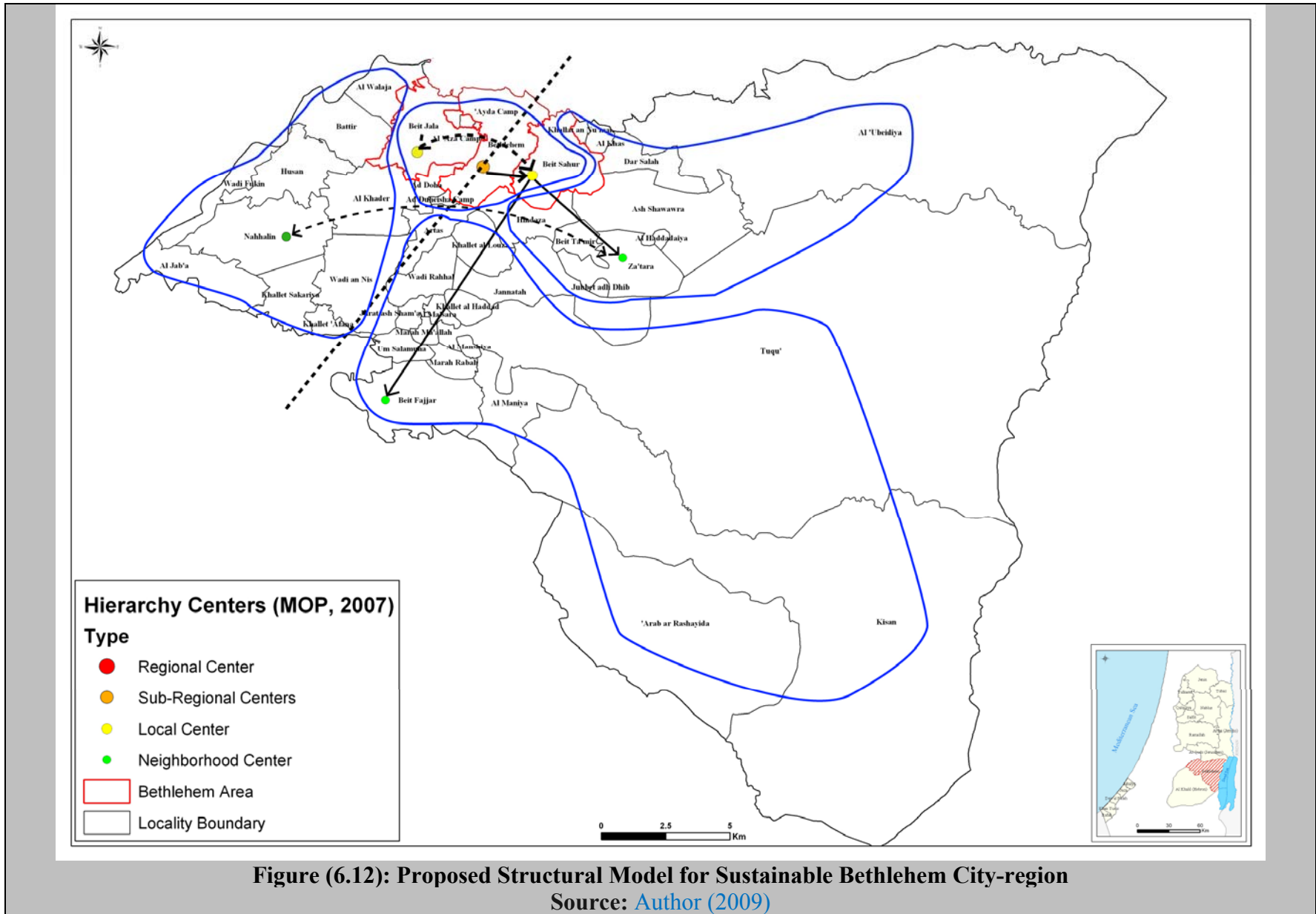


Figure (6.12): Proposed Structural Model for Sustainable Bethlehem City-region
Source: Author (2009)

The proposed conceptual model implies the arrangements of LGUs into four clusters (orange lines) (Figure 6.12). One in the center and covers Bethlehem area, another one covers the western rural areas and the remaining two covers the eastern rural areas. According to this model, each cluster has a neighborhood center, except for the central one, which has a sub regional center at Bethlehem City, and two local centers each at Beit Jala and Beit Sahour cities.

In order to functioning the conceptualized structural model for the city-region of Bethlehem properly to an extent, a set of coping strategies should be considered, in principle to provide an outline for a sustainable urban growth in Bethlehem area. According to (Fray, 2005: 184) there are two strategic options that could be used to support the sustainability of urban growth in urban areas. *First*: increase the population in the *underpopulated* areas of the city-region or those areas with population densities below the city average, by attracting local population from the countryside by offering incentives-- keeping in mind that this could be problematic at least in terms of socio-cultural activities-- or by redistribution of local populations from high-dense areas inside the city (population). *Second*: decrease the built-up size in those areas where the population is below the city average (built-up). It is argued that a trade-off between the two strategic options is not necessary in the case of Bethlehem area, instead a combination between the two options is more rational, but should be steered by a thorough micro-analysis of the local conditions against sustainability criteria, along with an extensive assessment of the required amount of work to induce the envisaged restructuring.

Realistically, the sustainability of the proposed structural model is functionless without the deep articulation of the “Israeli Occupation end” proposition. As on the ground, the geo-political classification of Bethlehem city-region into areas A, B and C is challenging to common practice, in the case of the exclusive proposal of hierarchical system by MOP (2007). However, with the

further elaborations and amendments on this original proposal, a more decentralized, flexible and adaptive system to the conditions on the ground is inevitably attained. Furthermore, the creation of a smooth urban-rural hierarchical system would ensure bridging the gap between the small rural localities and the large centers, to a large extent, at the urban localities, as Bethlehem area that started to play a regional role after the inception of the Second *Intifada* (*Ibid*, 2007:100).

6.5 Summary

Strategizing a sustainable urban growth scenario for Bethlehem area should be adaptive to the special needs and context that wrap the course of development at the local level. Using special projection techniques to simulate the future urban growth of people and built-environment (demand), and by cross examining the available areas (supply) that to accommodate the projected increase, one could strategically allocate the suitable areas for future urban growth within the current urban fabric of Bethlehem area with the ultimate aim of mitigating sprawl, based on a developed computer simulation model of GIS. The premise of the GIS-based model is exclusively founded on physical parameters, namely: land-use / land-cover, slope, geology and proximity to city center, therefore the results from the designated model analysis should be considered preliminary and merely demonstrate the usefulness of the spatial suitability analysis technique, as it doesn't adapt or interact to the socio-cultural and environmental conditions. Successive to that and on a larger scale, Bethlehem area was further analyzed and conceptualized based on its relations and dependency on Bethlehem city-region, where a polycentric net model would ensure a harmonized urban-rural development, in lieu to the current geo-political classifications that creates layers of complexity and challenge to the sustainable development process. Indeed, the conceptual structural model for Bethlehem city-region was based on Palestinian national definitions to a hierarchical system for public service provision.

Chapter 7: Framework for Promoting A Sustainable Urban Growth Strategy

The closing scene chapter at hand aims at pinpointing the prerequisite conditions to enable the environment for rolling wheels of change towards a sustainable urban form within the Palestinian context. The presented framework herein could be considered the blue prints or the implementation tools needed for the promotion of sustainable urban growth strategies within the Palestinian context. In other words, this chapter is merely presented to close the picture along with the theoretical framework, and to bridge the gap between planning on papers and on the ground. Needless to say, a set of propositions are indispensable towards achieving this goal. As previously mentioned the propositions that invoke this research are explicitly: ending of Israeli occupation; controlling the Palestinian high urbanization rates; and strengthening the Palestinian planning system. All of all, these propositions are human-made. This entails a space of trade-offs or in other words a potential and a challenge at the same time, as the Palestinian capitals still lack the proper competency, which means that special programs should address the capacity building and strengthening of those capitals, bearing in mind the overwhelming stereotypes that dominates the mentality of those capitals.

7.1 Enable the Environment

There is no need for long exposition, at this stage as to why stringent actions need to be undertaking, at once to limit the creeping urban sprawl in the Palestinian cities. It is explicable and understandable, but in its consequences by no means always consistent with the local capacities and scope of interventions. Therefore, the environment should be enabled to facilitate rolling wheels of change. The following prerequisites are essential for promoting sustainable urban growth strategies within the Palestinian context, keeping in mind that they are interrelated and dependent.

First: Vision Formulation

There is a need to formulate a strategic urban development vision at the local, regional and national levels. A clear vision would, undoubtedly clarify the role of each actor and stakeholder within the structure of decision making. In order to make sure that a consensus is reached between the stakeholders, the vision should be formulated in a participatory manner. This will ensure that social welfare considerations are given the proper weight, and local ownership of the urban development projects, which to be endorsed by the central government, will be enhanced. However, experiences had proven that participatory planning within the Palestinian context could be sometimes problematic and challenging in terms of the relationship between officials and local stakeholders; the mandate or the ceiling of such a relationship; whether its decisions would be binding, or whether it would just offer consultations, or whether it would be integrated in the political structure.

It is quite important to accentuate on the importance of instigating the local stakeholders to think from a new angle when it comes to urban growth. As the consequences of the present scenarios of urban growth could be dramatic, there is a pressing need to consider other alternatives and their effects on the sustainable development process.

Within the course of this thesis, the consultation with local stakeholders on strategizing a future urban growth scenario based on a clear vision was reduced to a trickle, mainly due to time shortages. Such an exercise, however need to be expanded to include more stakeholders, in order to ensure social ownership and support for such prospectus development. Afterwards, one could replicate the experience on different Palestinian city-regions, as a preamble to the adoption of national sustainable urban growth strategies that enjoys the support of the local society and the uniqueness of each city-region in terms of available resources and local needs.

Second: Policies Drafting

Having set the vision for Palestinian urban development, policies should be developed to achieve national objectives for managing a balanced and harmonious development between land resources and people needs and aspirations. Policies should holistically embody concepts of participation and sustainability. Furthermore, a special attention should be paid to the drafting of designated policies to ensure the capacity building and strengthening of local stakeholder's knowledge to help find the answer for the question of *How Palestinian people could grow in a sustainable manner?* In parallel, Palestinian planners and decision makers need to be acquainted with the newly emerged techniques and tools of how to manage urban growth within such a political context. Accordingly, a decision support system of updated information on urban growth in Palestine is a must. Needless to say, this management of urban growth should be implemented with continuous and coherent policies because any policies that lacks its sustainable implementation has meaningless no matter how they are good.

The argument made here is not that sustainable urban growth vision is somehow “incomplete”, or needs to be neglected. The argument is that sustainable urban growth principles (Section 4.2) describe long-term goals, and tell us little about “how to get from where we are now, to where we want to be?” Implementing new policies, and in particular gaining compliance with them, is a much bigger challenge than devising them. This is why it is important, also to build and share knowledge on initiatives to implement sustainable urban growth at national and local levels and document relevant lessons through an iterative monitoring and evaluation process, which would allow future adjustments and fine-tuning to the implementation of related strategies.

Third: Legislative and Financing Framework Development

A new proactive framework of legislative and financial determinants is needed to translate the [will be] adopted policies into amended laws, by-laws or regulations. This covers ownership of urban growth and the right to adequate housing. As the City Engineer of Beit Jala Municipality propose: *“The permitted horizontal density of building on municipal plots should be decreased, whereas the vertical density should be immediately increased to meet the local needs for urban growth”*.

Within this framework, financing and incentive structures are needed to fund local sustainable urban growth agendas and support municipal service delivery. They can be resources from the public sector, private finance or joint public-private partnerships.

7.2 Key Recommendations

Based on the archived research conducted and analyzed and on the main findings extracted from the direct observations from the target area, as well as the short deliberations conducted with the city engineers and decision makers in the city-region of Bethlehem, the following key recommendations are proposed according to priority, and within namely two outlined interventions: spatial planning and management, and administrative development. It is worthy to mention that the following listed key recommendations are applicable, in principle to other Palestinian cities and are only linked to Bethlehem case, as an act to close the picture of this research thesis. However, though the key recommendations presented herein could be perceived as general ones, but this is inevitable taken the multi-disciplinary nature of the field under study that promotes a set of local strategies for such a fuzzy concept of sustainable urban growth.

Spatial Planning and Management

- Establish a joint administrative and planning project committee for the three municipal councils of Bethlehem, Beit Jala and Beit Sahour. This designated committee should make benefit from the present common experience of joint ventures gained from the Central Joint Council for Services, Planning and Development affiliated to the Palestinian Ministry of Local Government (MOLG). This step should be the foundation to a future debate on the possibilities of the development of Bethlehem metropolitan plan.
- Orient the future urban development in Bethlehem area within the suitable plots stipulated from the multi-criteria analysis (Section 6.3.2), to maximize the benefits of land-use and minimize the conflict among urban functions, as well as to protect the natural environment from over exploitations.
- Reorganization of spatial structure at the city-region of Bethlehem (Section 6.4), to ensure a sustainable growth at the long run, through avoiding the encroachment of ecological sensitive areas, and the prevention of urban sprawl.
- Create transit-oriented nodes within the urban fabric of Bethlehem area, to support public transportation, and consequently ease the traffic congestions that consume inordinate time and efforts.
- Actively discourage inappropriate development in areas that are not transit accessible. Locate only uses that offer less transit potential in these areas.
- Formulate land inventories to ensure settlement of land disputes among individuals from one hand, and LGUs from the other hand. This will guide local decisions about physical, socio-economic and environmental development plans and schemes.

- Develop a detailed land-use plan for Bethlehem area, to protect the archeological, ecological and cultural assets. One implementation strategy could be the demarcation of green belt corridors in and around the built environment, especially the eastern parts, which are characterized with an arid or semi-arid climatology. This will guarantee an ecological-developmental balance, and minimize the adverse impacts of climate change.
- Support touristic and recreational developments within the ambit of a conservation plan for the cultural and religious figures in Bethlehem area.
- Introducing efficient tools and instruments of efficient planning for urban growth, such as: GIS to develop a spatial geographic database on the urban dwellers and their associated resources and assets.
- Develop a local urban observatory to observe, classify, analyze and decide regarding related urban issues in Bethlehem area. More specifically, the observatory will adopt a bundle of indicators, which are directly related to the local sustainable urban growth strategies, to monitor, orient and reformulate the policies of spatial planning, along with the local urban programs. Such an observatory will coordinate the concerted efforts at the local level, and holistically assess the local and national developmental policies. In supplement to that the observatory could provide technical and human trainings in the field of sustainable urban growth.
- Adopt integrated environmental and spatial planning policies that incorporate disaster mitigation policies. This could include assigning financial budgets for enhancing environmental local management programs.
- Adopt programs for family planning at the local level and formulate action plans towards their implementation. This should include public awareness campaigns to increase public

awareness of family planning issues, reproductive health and birth control methods, as well as the issues related to early marriages.

- Support the exploration of potential future scenarios of re-developing urban brown-fields. This includes the Israeli colonial legacy of military bases and settlements, along with stone quarries that mushroom in the western parts of the city-region of Bethlehem.

Administrative Development

- Drafting a clearer mandates to the pertinent ministries (e.g. MOPAD and MOLG), as well as for the affiliated departments at the municipal level, to ensure a smooth flow and channeling of urban growth related information.
- Relinquish and delegate responsibilities and resources from the national and regional levels to the local one. Such a case of decentralization could support the Palestinian quest to confront the Israeli colonial project that cut the OPT into cantons, through providing the LGUs with a rational share from the public resources.
- Modification of the building acts and codes to maximize the fruition of compact development, through the increase of vertical built-up density (based on topography) and decrease of the horizontal quota.
- Empower local public participation in the planning process through designated citizenry committees, to ensure local ownership and guarantee social welfare, especially for the marginalized strata of Bethlehem community.
- Ensure technical and financial support to widen the knowledge base on sustainable urban growth concept within the Palestinian arena.

- Provide monitoring and evaluation mechanisms that periodically review and assess the impact, effectiveness, efficiency, relevance and sustainability of urban growth projects in terms of tangible outcomes and not outputs.
- Promote strategic (multi-sectoral) planning, as a proactive tool to the volatile geo-political environment. Needless to say, this is indispensable to the development of detailed land-use plans at the local level, but this time based on the strategic orientation adopted and supported by the locals.
- Initiate local revenue driven projects, in order to achieve financial sustainability and independence from external philanthropy imposed agendas. This could be supported by Non-Governmental Organizations (NGOs), Community-based Organizations (CBO), local corporations or through a partnership with the private sector.

7.3 Epilogue

The story of this research thesis is simple and clear in terms of scope and level of intervention, but thorny and complex in terms of progress and output. Discussing the urban sprawl of Palestinian cities and the impacts on the Palestinian people and urban environment has not been satisfactorily enough. Therefore, this thesis accentuates on studying the potential of promoting sustainable urban growth strategies in the Palestinian cities, as an elusive solution to mitigate urban sprawl.

Within the Palestinian context, urban sprawl is politically accepted and encouraged, but environmentally is not. The geo-political ends are ultimately affecting the Palestinian national goals, which are reactive to the Israeli colonial project. No Palestinian can argue that encouraging the Palestinian development is a must, especially in the lands threatened for razing and confiscation by the Israeli Occupation. As noticed, the bulk of threatened Palestinian lands

for confiscation by the Israelis are on the peripheries of Palestinian cities, with a few exceptions across the West Bank. This is simply the political drive of urban sprawl in present Palestine!

Another layer of complexity and limitation to this research thesis is the prevailing local socio-cultural rituals and traditions. This what I would like to call “spatial tribalism”, where a group of people or a tribe with similar social context, and share the ownership of certain plots or land parcels that are inherited and remained as a legacy for dependencies, could propel such a phenomenon of urban sprawl. The perceptions, sense of community and attachment to the place, along with the prevailing intellectual discourse are all part to the cognitive space of individuals and groups. Therefore, urban planning is, undoubtedly subject to the context of urban environment. The Palestinian context is very similar to the urban villages (small communities) in spatial characteristics terms. These communities are gradually developing based on a social contract that governs the pace of urban development, which is based on an agricultural base.

To this cocktail, the quest for a sustainable urban form to the Palestinian cities or in other words the answer to the main question of this research thesis could be based, as exploratory, descriptively and casually analyzed and empirically evidenced, by the virtue of compact developments, mixed land-uses and concentration on both walking and accessible public transportation means. In the same token, the urban-rural dichotomy should be harmonized by providing the space for a sustainable urban growth agenda within the city-regions of Palestinian cities, following a polycentric net of decentralized and ever flexible hierarchical concentrations. In supplement to that there should be a designated formula of a local governmental policies and incentives to induce the course of change, supported and developed in consultation and partnership with the local stakeholders, with the ultimate goal of reducing environmental burdens and negative exacerbations on the urban poor.

Finally, as a combination of normative-theoretical against pragmatic-political indices, and as amalgamation between conceptual and key policy recommendations this thesis is disclosed with a strong conviction that urban planning, in general and sustainable urban growth strategies, in particular could be used as a strong tool to confront the imposed geo-political ends, prolong the socio-cultural values and sustain the urban environment within the current Palestinian context, and within the framework of a future, sustainable and independent Palestinian statehood. Meanwhile, it is hoped that this thesis will be a fertile environment and a strong base for future applied research or maybe a doctorate research study that further address the sustainability of Palestinian cities.

Sources and Bibliography

- Abdel Jawad, S. (1997). *The Zionist Scheme for the Destruction of the Palestinian Society*. Conference: 100 years after Basel.
- Abdulhadi, R. (1990). *Land-Use Planning in the Occupied Palestinian Territories*. Journal of Palestine Studies, 76 (4), PP. 46-63.
- Al-Dabbeek, J. (1999). *Seismic Engineering Notebook*, Earth Sciences and Seismic Engineering Center, An-Najah National University. Nablus, Palestine.
- Alexander, C. (1987). *A New Theory of Urban Design*. New York: Oxford University Press.
- Anani, Y. (2007). *Palestinian Landscape Values in Turmoil*. International Conference: Conservation and Management of Landscape in Conflict Regions (November 29-December 1, 2007). Birzeit, Palestine.
- Antoni, J. (2001). *Urban Sprawl Modeling: A Methodological Approach*. Cybergeog: European Journal of Geography. Dossiers, 12th European Colloquium on Quantitative and Theoretical Geography, France.
- Applied Research Institute – Jerusalem (ARIJ) (2008). *GIS Database*. Bethlehem, West Bank.
 - (2009). *GIS- Database*. Bethlehem, West Bank.
 - (2000). *Atlas of Palestine*. Bethlehem, West Bank.
 - (2007). *Policy Tools Towards Sustainable Land Use and Urban Environmental Management at Municipal Level under a Transitional Political Context-Urban Area of Bethlehem, Palestine*.
 - (2007). *Status of the Environment in the Occupied Palestinian Territory*. Bethlehem, West Bank.
 - (2009). *The Development of Joint Council Strategy-Baseline Survey*. (Unpublished).
- Arbury, J. (2005). *From Urban Sprawl to Compact City – An analysis of urban growth management in Auckland*. PhD Thesis.
- Association of Bay Area Government (ABAG) (2004). <http://www.abag.ca.gov/planning/smartgrowth/whatisSG.html> (Retrieved in: 19/4/09).
- Babbie, E. (1992). *The Practice of social Research*. Belmont, USA.
- Bannourah, T. (1982). *Efrata History: Bethlehem, Beit Jala, and Beit Sahour*. Ma'ref Press. Jerusalem, Palestine.
- Barnes K., Morgan III J., Roberge M., and Lowe S. (2001). *Sprawl Development: Its patterns, Consequences, and Measurements*. Towson University. http://chesapeake.towson.edu/landscape/urbansprawl/download/Sprawl_white_paper.pdf (Retrieved in: 9/4/09).
- Barton, J. and Plume, J. (2008). *Working Toward Urban Sustainability for Inner-city Development*. Sharjah Urban Planning Symposium X: Capital Cities, Wicked Problems: Best Practices in Planning and Policy Response Mechanisms, United Arab of Emirates.
- Bazoglu, N. (1992). *The Antalya gecekondu Pproject: Progress, Challenges and Prospects*. (Evaluation report for UNICEF's Ankara Office). Ankara: UNICEF.

- Behan K., Maoh H., and Kanaroglou P. (2008). *Smart Growth Strategies, Transportation and Urban Sprawl: Simulated Futures for Hamilton, Ontario*. The Canadian Geographer / Le Géographe canadien, Vol. 52, No. 3, pp. 291–308.
- Breheny, M. (1995). *Compact Cities and Transport Energy Consumption*. Transactions of the Institute of British Geographers NS, 20 (1), pp. 81–101.
 ——— (2005) *Centrists, Decentrists and Compromisers: Views on the Future of Urban Form*, in Jenks, M., Burton, E. and Williams, K. (eds.) *The Compact City: a sustainable urban form?* Taylor & Francis e-Library, pp. 10-29.
- Brueckner, J. (2000). *Urban Sprawl: Diagnosis and Remedies*. International Regional Science Review 23(2).
- Bruegmann, R. (2005). *Sprawl: A Compact History*. The University of Chicago Press.
- Bulmer, M. & Warwick, D. (1993). *Social Research in Developing Countries: Surveys and Censuses in the Third World*. John Wiley & Sons Limited, New York.
- Burchell, R. W., Shad A., Listokin D., Phillips H., Downs A., Seskin S., Davis S., Moore T., Helton D., and Gall M. (1998). *The Costs of sprawl - Revisited*. National Academy Press.
- Burgess, R. (2004). *The Compact City Debate*, in Jenks M. and Burgess R. (2004). *Compact Cities: Sustainable Urban Forms for Developing Countries*. Taylor & Francis e-Library.
- Burton, E. (2000). *The Compact City: Just or Just Compact? A Preliminary Analysis*. Urban Studies, Vol. 37, No. 11, 1969– 2001.
- Callahan, G. (2003). *Jane Jacobs, The Anti-Planner*. Ludwig von Mises Institute, Austria.
- Caminos, H. and Reinhard G. (1978). *Urbanization Primer: Project Assessment, Site Analysis, Design Criteria for Site and Services or Similar Dwelling Environments in Developing Areas: with a documentary collection of photographs on urbanization*. MIT Press.
- Carruthers, J. and Ulfarsson, G. (2002). *Fragmentation and Sprawl: Evidence from Interregional Analysis*. Growth and Change 33, 312–340.
- Center for Cultural Heritage Preservation (CCHP) (2005). *Anatreh Quarter: An Urban and Architectural Study of A Bethlehem Quarter*. Bethlehem, West Bank.
- Churchman, A. (1999). *Disentangling the Concept of Density*. Journal of Planning Literature 1999; 13; 389.
- Commission of the European Communities (1990). *Green Paper on the Urban Environment*. COM (90) 218 final, Brussels, Belgium.
- Congress for the New Urbanism and U.S. Department of Housing and Urban Development (2000). *Principles for Inner City Neighborhood Design*. <<http://www.huduser.org/Publications/pdf/principles.pdf>> (Retrieved in: 4/5/09).
- Conklin, J. (2006). *Wicked Problems and Social Complexity*. Dialogue Mapping: Building Shared Understanding of Wicked Problems, Wiley.
- Coon, A. (1992). *Town Planning under Military Occupation*. Aldershot, UK: Dartmouth Publishing Company Limited.
- Cooper, H. (1984). *The Integrative Research Review*. Beverly Hills, CA: Sage.
- Coward, M. (2009). *Urbicide: The Politics of Urban Destruction*. Routledge Press. New York, USA.

- Cuthbert, A. (2006). *The Form of Cities: Political Economy and Urban Design*. Blackwell Publishing.
- Deleuze, G. and Guattari, F. (1991). *What is Philosophy?* New York: Columbia University Press.
- Denzin, N. (1978). *The Research Act: A Theoretical Introduction to Sociological Method*. (2nd ed.). New York, USA.
- Dovey, K. 1999: *Framing Places: Mediating Power in Built Form*. Routledge: London, UK.
- Duany, A., Plater-Zyberk E. and Speck J. (2000). *Suburban Nation: The Rise of Sprawl and the Decline of the American Dream*. New York: North Point Press.
- Jean E., Overman H., Puga D., and Turner M. (2007). *Fat City: Questioning the Relationship between Urban Sprawl and Obesity*. *Journal of Urban Economics*, Volume 63, Issue 2.
- El-Atrash, A. (2007). *The Dilemma of Land Registration in the West Bank Territory*. (Unpublished).
- ——— (2008). *Critiquing the Proposed Arc Plan (In Arabic)*. *The Palestinian Engineering Magazine* – No. (53).
- ——— (2009). *The Influence of the Separation Wall on the Social Development of the Palestinian Community in the West Bank*. POICA Website <http://www.poica.org/editor/case_studies/view.php?recordID=1783> (Retrieved in: 4/3/09).
- El-Atrash A., Isaac J., and Salem H. (2007). *Planning Towards a Sustainable Land Transportation System in the Future Palestinian State*. *Journal of Natural Science and Sustainable Technology*.
- Environmental Protection Authority (EPA) - Government of Western Australia (2007). *State of the Environment Report - Western Australia*. <<http://www.soe.wa.gov.au/report/human-settlements/settlement-patterns.html>> (Retrieved in: 8/8/09).
- Evans, G. and Cohen, S. (1987). *Environmental Stress*. In *Handbook of Environmental Psychology*. Stokols D. and Altman I., eds. (1987). Vol. 1. New York: John Wiley.
- Fainstein, S. (2000). *New Directions in Planning Theory*. *Urban Affairs Review*, Vol. 35, No. 4, pp. 451-478.
- Falah, G. (2005). *The Geopolitics of 'Enclavisation' and the Demise of a Two-State Solution to the Israeli – Palestinian Conflict*. *Third World Quarterly*, Vol. 26, No. 8, PP 134-1372.
- Farsakh, L. (2005). *Independence, Cantons, or Bantustans: Whither the Palestinian State?* *Middle East Journal* M Volume 59, No. 2.
- Frey, H. (2005). *Designing the City - Towards a more sustainable urban form*. Taylor & Francis e-Library.
- Gerring, J. (2002). *What Is A Case Study and What Is It Good For?* *American Political Science Review* 98(2).
- *Getting to Smart Growth II* (2003). International City/County Management Association – Smart Growth Network. ISBN: 0-87326-139-9
- Gomez-Ibanez, J.A. (1991). *A Global View of Automobile Dependence*. *Journal of the American Planning Association*, 57(3), pp.376–9.

- Gordon, P. and Richardson, H. (1997) *Are Compact Cities A Desirable Planning Goal?* Journal of the American Planning Association, 63(1): 95-106.
- Gosling, D. and Maitland, B. (1984). *Concepts of Urban Design*. Academy Editions, London.
- Graham, S. (2004). *Cities, War, and Terrorism: Towards An Urban Geopolitics*. Blackwell Publishing. Malden, USA.
- Graham, S. and Healey P. (1999). *Relational concepts of space and place: issues for planning theory and practice*. European Planning Studies, Vol. 7, No. 5, pp. 623–46.
- Grant, J. (2006). *Planning the Good Community: New Urbanism in Theory and Practice*. Taylor and Francis.
- Greene, J.C., Caracelli, V.J. and Graham, W.F. (1989). *Toward A Conceptual Framework for Mixed-Method Evaluation Designs*. Educational Evaluation and Policy Analysis, 11(3), 255-274.
- Guildford Borough Council (2002). *Supplementary Planning Guidance: Open Space*. London:UK.
- Halabi, O. (1997). *Legislations of Regulations and Buildings* (In Arabic). Institute of Law at Birzeit University.
- Halper, J. (2001). *The 94 Percent Solution: A Matrix of Control*. Middle East Report, 216, PP. 14-19.
 ——— (2008). *An Israeli in Palestine: Resisting Dispossession, Redeeming Israel*. Pluto Press, London, United Kingdom.
- Hanafi, S. (2004). *Targeting space through bio-politics: The Israeli colonial project*. Palestine Report Vol. 10, No. 32.
 ——— (2009). *Spacio-cide: Colonial Politics, Invisibility and Rezoning in Palestinian Territory*. Contemporary Arab Affairs, 2:1, PP. 106-121. Routledge Press. London, UK.
- Handy, S. (2005). *Smart growth and the transportation-land use connection: what does the research tell us?* International Regional Science Review 28(2), 146–167.
- Houghton, G. (1999). *Environmental Justice and the Sustainable City*. In Satterthwaite D. (1999). *Sustainable Cities*. Earthscan, London, UK.
- Healey, P. (2003). *Collaborative Planning in Perspective*. Planning Theory, Vol. 2, No. 2, pp.101–123
- Hempel, L. (1999). *Conceptual and Analytical Challenges in Building Sustainable Communities*, in Mazmanian D. and Kraft M. (1999). *Toward sustainable communities: transition and transformations in environmental policy*. MIT Press.
- Hilal S., Petti A., and Weizman E. (2007). *Decolonizing Architecture: A Project by London/Bethlehem Architectural Studio*. <<http://www.decolonizing.ps>> (Retrieved in: 2/2/09).
- Hitchcock, J. (1994). *A Primer on the Use of Density in Land-Use Planning*. Papers on Planning and Design No. 41. Toronto, Canada: Program in Planning, University of Toronto.
- Hofstee, P. and Brussel, M. (2006). *Analysis of suitability for urban expansion in Villavicencio, Colombia*. International Institute for Geo-Information and Earth Observation (ITC), The Netherlands.
- Holmberg, J. (1992). *Making development sustainable*. International Institute for Environment and Development.

- Hulme, D. (2007). *Integrating Quantitative and Qualitative Research for Country Case Studies of Development*. University of Manchester, UK.
- Isaac J., Khalilieh S., El-Atrash A. (2008). *Geo-Demographical Outlook for Jerusalem*. The First International Conference on Urban Planning in Palestine: Current Challenges & Future Prospects, Nablus.
- Issac, J. and Abdul-Latif, F.(2007). “*Jerusalem and the Geo-politics of Depalestinization*”. Arab League Educational Cultural and Scientific Organization (ALECSO).
- Jabareen, Y. (2004). *A Knowledge Map for Describing Variegated and Conflict Domains of Sustainable Development*. Journal of Environmental Planning and Management, Vol. 47, No. 4, pp. 623–642.
 ——— (2006). *Sustainable Urban Forms: Their Typologies, Models, and Concepts*. Journal of Planning Education and Research, Vol. 26: PP. 38-52
- Jacobs, J. (1961). *The Death and Life of Great American Cities*. New York: Vintage.
- Jargowsky, P. (2001). *Sprawl, Concentration of Poverty, and Urban Inequality*. Gregory Squires, ed., *Urban Sprawl: Causes, Consequences and Policy Responses*. Urban Institute.
- Jenks, M., Burton, E., and Williams, K. (eds.) *The Compact City: a sustainable urban form?* Taylor & Francis e-Library, pp. 10-29.
- Jones, A. (2004). *Logic: Inductive and Deductive an Introduction to Scientific Methods*. Kessinger Publishing.
- Kelbaugh, D. (1997). *Common Places: Toward Neighborhood and Regional Design*, Seattle: University of Washington Press.
 ——— (2002). *Repairing the American Metropolis: Common Place Revisited*. Seattle: University of Washington Press.
- Khasawneh, D. (2001). *Memoirs Engraved in Stone, Palestinian Urban Mansions*. Journal of Palestine Studies, Winter 2001, Issue 11-12.
- Knaap, G.J., Haccou, H., Clifton K., Frece J. (2007). *Incentives, Regulations and Plans: The Role of States and nation-states in Smart Growth Planning*. Edward Elgar Publishing Limited.
- Krieger, A. Andres Duany and Elizabeth Plater-Zyberk (1991). *Towns and Town-Making Principles*. Harvard University Graduate School of Design, New York: Rizzoli.
- Krier, L. (1984). *Houses, Palaces, Cities*, D. Porphyrios (ed.), London: Architectural Design Editions.
- Leitmann, J. (1999). *Sustaining Cities: Environmental Planning and Management in Urban Design*. New York: McGraw-Hill.
- Lennard, S. and Riley Jr. (2004). *Children and the Built Environment*. *Urban Land* 63(1): pp. 68–9.
- Liggett, H. (2009). *Cities and Citizens: Situating the Planning Process*. Planning Theory, Vol. 8, No.1
- Lynch, K. (1960). *The Image of the City*. MIT Press.
 ——— (1985). *Good City Form*. MIT Press, Cambridge, Mass.
- Maginn, P. (2007). *Towards more effective community participation in urban regeneration: the potential of collaborative planning and applied ethnography*. Qualitative Research, Vol. 7. No. 1, pp. 25–43.

- Mahgoub, Y. (2008). *Kuwait: Learning From A Globalized City*, in Elsheshtawy Y. *The Evolving Arab City: Tradition, Modernity and Urban Development*. pp. 152-183. Routledge Press.
- Mazmanian, D. and Kraft M. (1999). *Toward sustainable communities: transition and transformations in environmental policy*. MIT Press.
- McDonald, F. (1997). *Urban Economics*. Prentice-Hall.
- Ministry of Planning and International Cooperation (MOPIC) (1998 a). *National Policies for Physical Development for the West Bank and Gaza Strip*. East Jerusalem, Palestine.
- ——— (1998 b). *The Regional plan for the West Bank Governorates*. East Jerusalem, Palestine.
- MOP (2007). *Defining Spatial Structure for Public Service Centers in the West Bank and Gaza Strip – A Conceptual Framework*. Ramallah, West Bank.
- Morris, D. (2005). *It's A Sprawl World After All*. New Society Publishers, Canada. ISBN: 0-86571-546-7.
- Neuman, M. (2006). *The Compact City Fallacy*. Journal of Planning Education and Research, Vol. 25, No. 1, PP. 11-26
- Newman, P. and J. Kenworthy (1989). *Cities and Automobile Dependency: An International Source Book*. Aldershot: Gower Technical.
- Office of the United Nations' High Commissioner for Human Rights (OHCHR) (1966). <<http://www.ohchr.org/english/law/ccpr.htm>> (Retrieved in: 15/1/09).
- Palestine Remembered Al-Nakba-1948 (2009) <<http://www.palestineremembered.com/index.html>> (Retrieved in: 4/6/09).
- Palestinian Central Bureau of Statistics (PCBS) (1997). *Population, Housing, and Establishment Census – 1997*. Final Results – Population Report, Palestinian Territories, First Part. Ramallah-Palestine.
- ——— (2004). *Seminar Day: Population and Development*. Ramallah, West Bank. (In Arabic).
- ——— (2007). *Population, Housing and Establishment Census 2007- Census Final Results in the West Bank Summary (Population and Housing)*. Ramallah, Palestine.
- ——— (2009). *Palestine in Figures 2008*. Ramallah-Palestine.
- Palestinian Reform and Development Plan (PRDP) (2007). Ministry of Planning, Ramallah, West Bank.
- Picard, L. and Golani (1987). *The Geological Map of Israel*. Jerusalem: Israel.
- Pieterse, J. (2002). *Globalization, Kitsch and Conflict: Technologies of Work, War and Politics*. Review of International Political Economy, 9 (1) PP. 1–36.
- Policy Research Initiative (PRI) (2005). *Social Capital as a Public Policy Tool: Project Report*. (Report commissioned by the government of Canada as part of the Social Capital Project). <http://www.policyresearch.gc.ca/doclib/SC_Synthesis_E.pdf> (Retrieved in 10/7/08).
- Population Reference Bureau (PRB) (2008). *2008 World Population: Data Sheet*. Washington, DC, USA.
- Porter, D. (2002). *Making Smart Growth Work*. Washington, D.C.: Urban Land Institute.
- Punter, J. (2003). *The Vancouver Achievement: Urban Planning and Design*. Vancouver: University of British Columbia Press.
- Relph, E. (1987). *The Modern Urban Landscape*. Croom Helm, London, UK.

- Rist, R. (2000). *Influencing the Policy Process with Qualitative Research*. in N.K. Denzin and Y.S. Lincoln (eds) *Handbook of Qualitative Research*, pp. 1001–17. Thousand Oaks, CA: Sage.
- Robson, C. (2002). *Real World Research (2nd Edition)*, Blackwell Publishing.
- Roy, S. (1987). *The Gaza Strip: A Case of Economic De-development*. *Journal of Palestine Studies*, XVII, (1), PP. 56-88.
- Ruiters, W., Sanders F. (1998). *Physical Planning: Policies, Methods and Techniques*. Faculty of Civil Engineering, Delft University of Technology.
- Ryckewaert, M. (2002). *The Planned Nature of Urban Sprawl; A Case Study in the Kempen Region, Belgium*. *The Network Society: The New Context for Planning*, 2003, PP. 245-246; ACS-PAESOP Third joint congress, Leuven, July 8-12, 2002.
- Sabri, S. and Yaakup, A. (2008). *Multi-Criteria decision making for Urban Sprawl, using Analytic Network - Process and GIS, Case of Iskandar Malaysia Region*. University of Technology Malaysia.
<<http://www.fab.utm.my/download/ConferenceSemiar/MAPO8P01.pdf>> (Retrieved in 24/2/09).
- Sadaqa, A. (2009). *Future Urban Structure and Infrastructural Networking for A Palestinian State: Scientific Model for A Sustainable Approach*. Ph.D. Thesis. Universiteit Gent.
- Salamanca, O. (2007). *Infrastructural Violence in the West Bank and Gaza Strip: The Politics of Creative Destruction*. PhD Research Proposal (Unpublished): Durham University.
- Salman, N. (2000). *Urban Development Challenges in the Middle East Arab countries: Concepts and Spatial Strategies with Reference to Land-Use and housing Towards A Sustainable City Development – Bethlehem, Palestine*. University of Stuttgart, Germany.
- Salmon, C. (2002). *The Bulldozer War*. <<http://www.counterpunch.org/salmon0520.html>> (Retrieved in 15/11/08).
- Segal, R. and Weizman, E. (2003). *The Mountain*. In Segal R. and Weizman E. (eds.) *A Civilian Occupation*. Tel Aviv: Babel Press; London: Verso.
- Shaheen, L. (2007). *The Urbanization Impact on the Palestinian Landscape*. International Conference: Conservation and Management of Landscape in Conflict Regions (November 29-December 1, 2007). Birzeit, Palestine.
- Shehadeh, R. (2002). *Palestinian Walks: Forays into A Vanishing Landscape*. Simon & Schuster Press.
- Shekhar, S. (2005). *Urban Sprawl Assessment Entropy Approach*. National Defense Academy, India.
- Strauss, A. and Corbin, J. (1990). *Basics of Quantitative Research: Grounded Theory Procedures and Techniques*. Sage Publications.
- Sudhira, H., Ramachandra, T., & Jagadish, K. (2004). Urban sprawl: metrics, dynamics and modeling using GIS. *International Journal of Applied Earth Observation*, 5, 29-39.
- Suisman D., Simon S., Robinson G., Anthony C., and Schoenbaum M. (2005). *The Arc: A Formal Structure for a Palestinian State*. Rand Corporation. <<http://www.rand.org/pubs/monographs/MG327-1>> & <<http://www.suisman.co/>>.
- Sutton, C. (2008). *Urban Open Space: A Case Study of Msunduzi Municipality, South Africa*. M.Sc. Thesis at Queen's University, Canada.

- Taraki, L. (2008). *Enclave Micropolis: The Paradoxical Case of Ramallah/Al-Bireh*. Journal of Palestine Studies Vol. 37, No. 4 (Summer 2008), PP. 6–20. ISSN: 0377-919X.
- Thompson, P. (2004). *Researching Family and Social Mobility with Two Eyes: Some Experiences of the Interaction between Qualitative and Quantitative Data*. International Journal of Social Research Methodology, 7(3), pp.237-257.
- Tukey, W. (1977). *Exploratory Data Analysis*. Addison-Wesley.
- Turner, T. (1992). *Open space planning in London: From standards per 1000 to green strategy*. Town Planning Review 63, (4): 365-386.
- UCN (2006). *The Future of Sustainability: Re-thinking Environment and Development in the Twenty-first Century*. Report of the IUCN Renowned Thinkers Meeting.
- United Nations (UN) (1993). *Earth Summit Agenda 21: The UN Programme of Action from Rio*. United Nations, New York, USA.
- United Nations Human Settlements Programme (UN-HABITAT) (2008 a). *State of the World's Cities 2008/2009: Harmonious Cities*. Nairobi, Kenya. <<http://www.unhabitat.org/pmss/getPage.asp?page=bookView&book=2562>> (Retrieved in 10/1/09).
- ——— (2008 b). *Global Urban Observatory*. Nairobi, Kenya.
- Urban Task Force (2005). *Towards an Urban Renaissance*. Queen's Printer and Controller, London, UK.
- Urban Villages Group (1992). *Urban Villages*. London: UK.
- Vieli, B. (2009). *Particulate Matter Immission in the West Bank*. Applied Research Institute-Jerusalem (ARIJ). (Un-published report).
- Weber, M. (1991). *Max Webber: Essays in Sociology*, edited by: Grith H. and Mills C., London: Routledge.

- Webster's New Collegiate Dictionary (1973). G. & C. Merriam Company. Massachusetts, USA.
- Wehrmann, T. (2000). *Development and evaluation of methods for automated land use / land cover classification*. University of Würzburg. Germany.
- Weizman, E. (2004). *Strategic Points, Flexible Lines, Tense Surfaces and Political Volumes: Ariel Sharon and the Geometry of Occupation*, in Graham S. (ed.) *Cities, War and Terrorism: Towards an Urban Geopolitics*. Oxford: Blackwell.
- ——— (2007). *Hollow Land: Israel's Architecture of Occupation*. London, UK, Verso Printings.
- Wheeler, M. (2002). *Constructing sustainable development/safeguarding our common future: Rethinking sustainable development*. Journal of the American Planning Association, Vol. 68, No.1, pp.110-11.
- Wheeler, S. (2000). *Planning for Metropolitan Sustainability*. Journal of Planning Education and Research, 20: 133-145.
- World Bank (2006). *An Update on Palestinian Movement, Access and Trade in the West Bank and Gaza*. <<http://siteresources.worldbank.org/INTWESTBANKGAZA/Resources/M&ASummary+Main+MapAugust31.pdf>> (Retrieved in 14/2/07).
- World Commission on Environment and Development (WCED) (1987). *Our Common Future*. Oxford University Press, Oxford: UK.

- World Health Organization (WHO) (2005). *WHO Air quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide*: Global update 2005.
- Ye L., Mandpe S., and Meyer P. (2005). *What Is “Smart Growth?”—Really?* Journal of Planning Literature, Vol. 19, No. 3, pp. 301-315
- Yeh, A. and Li, X. (1996). *Urban Growth Management in the Pearl River Delta: An Integrated Remote Sensing and GIS Approach*. ITC Journal, Special Habitat-II issue, 1996-1: PP. 77-86.
——— (2001). *Measurement and Monitoring of Urban Sprawl in A Rapidly Growing Region Using Entropy*. Photogrammetric Engineering and remote Sensing, Vol. 67 (1): PP. 83.
- Yiftachel, O. (2006). *Ethnocracy: Land and Identity Politics in Israel/Palestine*. University of Pennsylvania Press.
——— (2009). *Theoretical Notes on “Gray Cities”: The Coming of Urban Apartheid?* Planning Theory, Vol. 8, No.1, pp. 88–100.
- Yin, R. (2003). *Case Study Research: Design and Methods*. 3rd edition, Applied Social Research Methods Series-Volume 5. SAGE Publications.
- Yongseok Kim, Heewon Lee, Hyerim Suh (2004). *A Study on the Concept of Smart Growth and Its Implication*, Journal of Daejeon-Chungnam Chapter of Architectural Institute of Korea, AIK, Korea.
- Zelenak, E. (2000). *Brave New Urbanis*. Community Links VII (2): Issue 11, Winter 2004.

Appendices

Appendix (1): Evaluation of the performance of city models based on agreed sustainability characteristics (Frey, 2005: 96-109).

Core City	
Characteristics	Performance of City Model
Degree of containment of development	The urban fabric is highly compact and continuous from centre to edge of this city model. There are only small pockets of green space. Open land is not incorporated in between the urban fabric but surrounds the core city.
Population density relative to land needed	The gross population density may be similar or identical to that of other city models but, owing to the compactness of the urban fabric, population is concentrated. There may be a variety of densities from very high at the centre of the core city to medium at its borders with the countryside.
Viability of public transport	The provision of primary and secondary public transport systems will be viable in all areas of the core city as a result of the concentration of people; it can even be expected to be necessary in order to reduce or eliminate road congestion. The systems might become congested in the central area of this city model owing to the high concentration of city-wide activities.
Dispersal of vehicular traffic	As a consequence of the high concentration of population, primary vehicular traffic would be likely to be increasingly concentrated into a number of major routes (likely to be radials and rings) the larger the city is. This would lead to increasing congestion; the use of the car would therefore have to be restricted in the core city, at least in its central area. All secondary traffic routes should be traffic-calmed to avoid adversary effects for developed areas.
Viability of mixed uses	There is a considerable potential for mixed uses throughout the core city as a consequence of the compactness of the urban fabric and the concentration of population. The centre of the core city may accommodate a peak of city-wide activities; a smaller variety of uses may locate towards the edges.
Access to services and facilities	Owing to the containment of the urban fabric and of the population in the core city, access to services and facilities, especially for daily and weekly use, may be expected to be rather good and distances short. With increasing size and population, access to the central area and its city-wide facilities is, however, likely to become increasingly difficult as transport routes become congested.

Access to green open spaces (parks, countryside)	As only smaller parks are included in the core city, access to green open areas can be expected to be rather poor from the more central areas but good at the edge of the core city. Distances to the surrounding countryside will be reasonable only as long as the core city is of limited size; but with growing size and population distances become even greater. A symbiotic relationship with nature is generally possible but limited to areas at the city edge as access to the country from the central areas becomes more problematic with increasing size and population of the city.
Environmental conditions (noise, pollution, congestion)	Open land at the city edge does not contribute sufficiently to the improvement of the inner-city environmental conditions as air drawn from the countryside (heat dome) becomes increasingly polluted on the way into the central area. Increasing the size and population of this city model may cause growing discomfort in the form of noise, poor climate and environmental conditions as well as lack of privacy and personal outdoor space.
Potential for social mix through variety of housing	Social mix may be viable only with heavy subsidies for social housing. One reason is that there is a reduced potential for a larger variety of dwelling types in a continuously developed urban environment. Another reason is that land and property values in the core city model can be expected to be generally high. The core city is therefore likely to be socially exclusive unless the lower-income groups are supported.
Potential for local autonomy	The density and complexity of the city model are likely to prevent a high degree of participation by communities in the shaping of their own environment unless the city's micro-structure shows some form of hierarchical decomposition of the built-up area into community territories which will then allow a degree of localized autonomy.
Potential for self-sufficiency	Self-sufficiency can be achieved if, as in most traditional Chinese cities, a sufficient amount of country in the form of farmland and forests is included in the city's administrative area. The hinterland, surrounding the core city and without fragmentation, can effectively serve for a large variety of different uses.
Degree of adaptability	The high concentration of urban fabric reduces the city's adaptability to changing conditions and change is possible only by replacement.
Imageability of the city (the physical entity) as a whole	With limited size, the core city is likely to be highly imageable owing to its compact form. With growing population the imageability of the city as a whole is, however, likely to become increasingly difficult.

Imageability of parts of the city (neighbourhoods, districts, towns)	The identity of districts in the core city can be expected to require careful design attention as there is a tendency towards continuous fabric with little variety. The generation of imageable districts may be aided through the concentration of specific uses into different areas.
Sense of place and centrality	The core city is likely to have a good sense of place and centrality in its centre (usually the historical core), but surrounding areas need to be designed to have clearly distinguishable features and subcentres.

Star City	
Characteristics	Performance of city model
Degree of containment of development	Compactness can be achieved in the central core and the “fingers” but-like the satellite city model-the star city incorporates open land, in this model in between the “fingers”. Accordingly the urban fabric is fragmented though continuous in its development from core to the ends of the “fingers”.
Population density relative to land needed	The gross population density is similar or identical to that of other city models but population is dispersed into a central city and “fingers” and therefore less concentrated. The central city may have a somewhat higher density than the ‘fingers’, but there will hardly be any variation between the ‘fingers’. There may be a variety of densities from very high in the central area and around nodes along the “fingers” to medium at the edge of the central city and “fingers” to the country.
Viability of public transport	A primary public transport system would be viable as a result of the concentration of urban fabric along major radial centre-oriented transport routes. Concentric links between fingers would be less efficient as only fractions of one ‘finger’ are connected with fractions of another; these connections may therefore depend upon the car. Inside the central city a secondary transport system may be necessary and viable owing to the concentration of population; in the “fingers” a secondary system may be less viable but might be essential if development is deeper.
Dispersal of vehicular traffic	Primary vehicular transport routes are likely to be concentrated in the development “fingers” and in concentric rings linking fingers. Whereas no major problems may arise in the rings, with growing size of the city traffic along the ‘finger’ spines would cause considerable congestion and pollution, especially in the central city where traffic routes converge; the use of the car may therefore have to be largely restricted inside the central core area.
Viability of mixed uses	There is good potential for mixed uses in the core and around transport nodes along the radial routes. In the core a larger variety of uses can be accommodated; the fingers may have a more limited potential for mixed use, which may be accommodated at the traffic nodes.

Access to services and facilities	The city centre will accommodate a large variety of different city-wide activities whereas the nodes along the “fingers” are likely to provide for daily and weekly needs only. There is good access from most development areas to the city centre and to secondary centres, but access to city-wide activities is better closer to the city centre.
Access to green open spaces (parks, countryside)	All areas in the “fingers” can be considered to have good access to the green wedges; in the central city distances to the open land vary between core and edge locations, and the proportion of land to the adjacent population is smallest at the edge of the central city. Because of the reasonably short distance a symbiotic relationship of all areas with nature is, however, possible.
Environmental conditions (noise, pollution, congestion)	Owing to the extension of the open countryside into the wedges between “fingers” and right to the edge of the core, the environmental conditions are likely to be good as fresh air is drawn towards the centre via the wedges. Conditions will be better in the fingers than in the central city, which is more compact. Increased size of the city may, however, cause some discomfort in the form of pollution and noise, at least in the core area but potentially also in the more central sections of the ‘fingers’.
Potential for social mix through variety of housing	Social mix could be reasonably good in the ‘fingers’, which offer the potential of a variety of dwelling forms, from multi-storey tenement accommodation in and around the primary and secondary cores to terraces and single-family housing at the edges of the “fingers” towards the country; high land values in the core area may prevent social mix unless a proportion of housing were to be subsidized.
Potential for local autonomy	A degree of local autonomy may be possible in the “fingers” where development may be less intense and more varied. As with the core city, the central area, with higher density and complexity, may have similar but less acute problems with community participation.
Potential for self-sufficiency	Self-sufficiency can be achieved as a result of the inclusion of open land between the ‘fingers’. The open land is fragmented but the areas between the “fingers” are still of considerable continuity.
Degree of adaptability	Expansion is largely limited to the ‘fingers’, but growth increases distances to the city centre and the rigid geometry prevents major organizational changes. At the micro-scale adaptability is possible only by replacement.
Imageability of the city (the physical entity) as a whole	The imageability of the star city as an entity is good only as long as the star remains relatively small. With growing size and population the overall expansion of the city may prevent any imageability of the city as an entity.

Imageability of parts of the city (neighbourhoods, districts, towns)	The central area should be readily imageable as a result of density and concentration of activities; the nodes around transport stops in the “fingers” too may be imageable but need careful design attention.
Sense of place and centrality	The availability of a centre and subcentres in the “fingers” should generate a good sense of place and centrality as long as these places are well designed and have clearly distinguishable features and sets of activities.

Satellite City	
Characteristics	Performance of city model
Degree of containment of development	The overall city or metropolis is a cluster of towns, each potentially as compact as the core city but of limited size and spatially separated from each other. Like the star city model, the satellite city incorporates open land, in this model around the central city and the satellites, and accordingly the urban fabric is fragmented.
Population density relative to land needed	The gross population density is similar or equal to that of other city models. As in the star city, population is “decentralized”, but in this city model into separate towns rather than “fingers”. In terms of population the central city may be somewhat larger than the satellites, but there will be hardly any variation of densities between the satellites and the central city; there may, however, be a variety of densities in each of them, from very high at the central nodes to medium at the borders with the countryside.
Viability of public transport	A primary public transport system will be viable as connector of the satellites with the central city, but also of the satellites with each other; the need to travel might be somewhat reduced by the fact that each cluster is to a high degree self-sufficient in terms of urban functions. Inside the compact towns public transport is essential to avoid car dependency, and both primary and secondary systems may be viable owing to the high concentration of population; there might, however, be a danger of congestion in the central areas of the towns.
Dispersal of vehicular traffic	Primary vehicular transport is likely to be concentrated into major channels linking the towns but, owing to the overall decentralization, traffic should be dispersed and congestion avoided except in the core areas of the central city and satellites where restriction of vehicular traffic may be essential. As a result of the compactness of the central city and satellites, secondary vehicular traffic routes should be traffic-calmed.
Viability of mixed uses	There will be a considerable potential of mixed uses in the central city and the satellites owing to the decentralized concentration of the urban fabric.

Access to services and facilities	Access to central facilities in the core city and the satellites will be good as long as each satellite provides all the services and facilities required to make them largely independent from the central city; owing to the limitation of size, distances to the central core will be relatively small. The central city is likely to accommodate additional city-wide activities over and above those provided by the centres of the satellites.
Access to green open spaces (parks, countryside)	With limited size of the central city and the satellites the relationship with nature will be good as all entities are surrounded by open countryside; a symbiotic relationship with nature is therefore easily established. Access to open land is, however, somewhat uneven for central and edge locations in the central city and the satellites. The land itself is continuous as it flows around the towns.
Environmental conditions (noise, pollution, congestion)	Despite the compactness of the central city and the satellites, environmental conditions are likely to be good as a result of the fragmentation of the urban fabric and the limitation of the size and population in each of the towns; but there will be differences between central and edge locations in the towns.
Potential for social mix through variety of housing	There will be a limited potential for social mix in the central city and the satellites owing to their compactness and concentration of population; a range of different dwelling forms—from high-density low-rise in the central areas to family houses at the edge—may be provided but social housing may need to be heavily subsidized.
Potential for local autonomy	In comparison to the core city, the fragmentation of the urban fabric into smaller clusters should make it somewhat easier for communities to shape their own environment and become locally autonomous as long as the micro-structure of the clusters shows some form of hierarchy and as long as the towns are of small size. However, with continuous and unstructured development and with larger scale of the towns autonomy would be difficult to achieve.
Potential for self-sufficiency	Self-sufficiency can be achieved as a result of the inclusion of open land around the central city and satellites. The open land is somewhat fragmented but continuous.
Degree of adaptability	As long as growth is dealt with by multiplication rather than expansion of clusters the degree of the adaptation of the overall structure is high; however, stringent control would be required to prevent clusters and specifically the central city from growing beyond their optimum size. Inside each town adaptation is possible only by replacement.
Imageability of the city (the physical entity) as a whole	Imageability of the central city and the satellites is potentially very good, especially if each of them develops different forms in response to different local conditions and provided the size of the towns is limited.

Imageability of parts of the city (neighbourhoods, districts, towns)	Owing to the compactness of the urban fabric individual districts and neighbourhoods may not easily be distinguishable and require careful design and specific sets of activities to make them imageable.
Sense of place and centrality	The fact that each of the towns has a centre should generate a very good sense of place and centrality as long as the central places are well designed and have clearly distinguishable features and sets of activities.

Galaxy of Settlements	
Characteristics	Performance of city model
Degree of containment of development	Compactness can be achieved in the settlements or neighbourhoods, especially around the core and transport node, but containment of the urban fabric is poor owing to its fragmentation of the urban fabric into small development clusters. All settlements are surrounded by open land and spatially separated from one another.
Population density relative to land needed	The gross population density is similar or equal to that of the other city models, but population is dispersed to an even greater degree than in the star and satellite city into small groups of between 3,000 and 6,000 people. There will be hardly any variation of density between individual settlements, but there may be a variety of densities within each of them, from high at the central node to low at the border with the countryside.
Viability of public transport	A primary public transport system would not be viable unless the settlements clustered along existing routes between core cities. A secondary public transport system can be expected to be even less viable, owing to the relatively small population targeted at each node.
Dispersal of vehicular traffic	As the population is highly dispersed into small pockets of development, the car can be expected to be the main means of transport; vehicular traffic would, however, be dispersed on a large number of roads, and there would be no serious problem with congestion anywhere in the galaxy.
Viability of mixed uses	Mixed use in any of the settlements would be viable only to a limited degree, owing to the limited number of people supporting services and facilities.
Access to services and facilities	Access to local services and facilities at the centres of each settlement would be within walking and cycling distance, but provision would be for daily or weekly needs only. For access to any other services and facilities the settlements would rely on a core city and accessibility can be expected to be poor.

Access to green open spaces (parks, countryside)	The relationship of the neighbourhoods with nature would be good and access to the country would be within walking and cycling distance. The open land would, however, be highly fragmented and this would reduce scale and flexibility of use.
Environmental conditions (noise, pollution, congestion) Potential for social mix through variety of housing Potential for local autonomy	Owing to the limited size of settlements and the availability of open land around all of them environmental conditions would be very good throughout. The limited size of settlements favours the provision of a large variety of different dwelling forms; the potential for social mix would accordingly be high. Owing to the limited population and size of settlements communities would have an excellent opportunity to shape and actually build their own environment.
Potential for self-sufficiency	Self-sufficiency can be achieved as the result of the availability of open land around the settlements but the land is highly fragmented and might be unsuitable for larger-scale uses such as industry, forestry, and farming.
Degree of adaptability	Overall the galaxy can expand by multiplication of settlements. As a result of the high fragmentation of the urban fabric flexibility of change would, however, be minimal and adaptation would be by replacement only.
Imageability of the city (the physical entity) as a whole	Overall the imageability of the galaxy would be non-existent as the urban fabric is highly dispersed and as there is no central focus.
Imageability of parts of the city (neighbourhoods, districts, towns)	The nodes within the settlements would allow some limited imageability but the settlements may be hardly distinguishable from one another unless central nodes have clearly distinguishable features.
Sense of place and centrality	The nodes at the centres of settlements may provide some local sense of place and centrality, but overall there are no major focal points, owing to the lack of a hierarchy of centres.

Linear City	
Characteristics	Performance of city model
Degree of containment of development	Compactness can be achieved in the band of linear development, specifically around transport nodes and the development area along the central transport line. However, the linear form of this city model will inevitably result in larger and larger distances between parts of the growing city; development is continuous but overall not compact.

Population density relative to land needed	The gross population density is potentially similar or equal to that of other city models, but owing to the shallow though continuous nature of the city form, population is stretched out along the linear transport route. There will hardly be any variation of population density between different areas of this city model, but there may be a variety of densities from high at transport nodes and along the central transport line to low at the edges of the city where it meets the countryside.
Viability of public transport	The entire structure is based on linear transportation and is conducive to a main public transport system that forms the spine of the city. A secondary transport system—required if the depth of the city is increased to reduce its overall length—might, however, be less viable, owing to the smaller population size targeted at each stretch of the linear city. If the main transit system is fast with long distances between stops, access is better from the areas around the stops and worse from development between these areas.
Dispersal of vehicular traffic	A major vehicular traffic route would run in parallel with the main linear public transport line, secondary traffic routes would lead to and away from the primary linear route. As population is stretched out there might be no great danger of serious congestion in areas on either side of and away from the linear spine, but in the spine itself some congestion may occur, owing to the inevitable concentration of traffic.
Viability of mixed uses	A concentration of services and facilities is possible in the central spine area of the linear city, specifically around transport nodes; but provision is likely to be for daily or weekly needs only, owing to the limited number of people in the nodes' catchment area; lacking, therefore, is a hierarchy of provision centres.
Access to services and facilities	With shallow development depth access to services and facilities and to public transport stops is within walking and cycling distance; however, only provision for daily or weekly needs is likely to be available. Provision above this level needs to be provided by core cities which the linear city may link; regarding services and facilities the linear city form is therefore not efficient on its own.
Access to green open spaces (parks, countryside)	The limited depth of development away from the central linear transport line allows good access to the surrounding countryside, within walking and cycling distance. There are shorter and longer distances to the country depending on the location in the linear development band, but generally access can be expected to be reasonably even for almost all areas of the city. The country itself is continuous.

Environmental conditions (noise, pollution, congestion)	Owing to the shallow depth of the linear city environmental conditions are likely to be very good overall though there may be some variation between conditions in central spine and edge locations.
Potential for social mix through variety of housing	There is potential for a variety of different dwelling types from high-density low-rise around nodes and along the central spine to family homes at the borders with the countryside; the potential for social mix is therefore good.
Potential for local autonomy	The potential for local autonomy depends upon the micro-structure of this city model. It might be difficult to establish autonomous areas as the urban fabric develops continuously unless there is a clear organization of districts and neighbourhoods with their cores. A hierarchical differentiation between districts and towns is likely to be lacking.
Potential for self-sufficiency	The close relationship with the countryside would enable a symbiotic relationship between city and uninterrupted country and a high degree of self-sufficiency could be achieved.
Degree of adaptability	The structure is extendible on either end but the overall form and structure of the city is dictated by one main circulation route and therefore rigid. Local changes would be possible by replacement only.
Imageability of the city (the physical entity) as a whole	The considerable length of this city model prevents imageability of the city as an entity.
Imageability of parts of the city (neighbourhoods, districts, towns)	The imageability of parts depends on the micro-structure of this city model and may not be all that good as a result of continuous development unless the transport and provision nodes are carefully designed and differentiated.
Sense of place and centrality	With continuous linear development there is a lack of centrality which might be psychologically problematic; some sense of place may, however, develop around transport nodes.

Polycentric Net / Regional City	
Characteristics	Performance of city model
Degree of containment of development	Compactness can be achieved in nodal and linear development areas but-like the star, the combination of stars and the satellite city model-the regional city incorporates open land within its structure and accordingly the urban fabric is fragmented.
Population density relative to land needed	The gross population density is similar or equal to that of other city models, but the regional city is likely to incorporate a number of different development clusters with different sizes and populations and to provide a variety of more or less densely grouped areas. There may also be a variety of densities from very high at centres of larger clusters (towns or cities) to medium or even low at smaller and more fragmented areas.
Viability of public transport	Structure and form of the polycentric net are the result of a network of public transport lines with primary and secondary systems meeting at a multiplicity of different centres of different size, capacity and specialization. All primary and secondary transport systems in the larger development areas can be expected to be viable. In the smaller and more fragmented areas, only the secondary transport system may be feasible, and less viable owing to the fragmentation of population.
Dispersal of vehicular traffic	Vehicular traffic would generally be dispersed except where converging on larger centres, where congestion is likely to occur. Roads inside higher-density development areas should therefore be traffic-calmed to avoid environmental and functional problems; major vehicular traffic routes should be outside or in between development areas.
Viability of mixed uses	Owing to the potential for the forming of a multiplicity of hierarchically differentiated centres the potential for mixed use is good but variable. The larger development areas will accommodate more intense and more city-wide activities and therefore a large variety of different uses; the smaller development clusters may have provisions for daily or weekly needs only and therefore accommodate a smaller number of different uses.
Access to services and facilities	Access to provision centres should generally be good but can be expected to be uneven; a hierarchy of public transport systems will, however, provide the required mobility for inhabitants to have considerable choice between centres of provision of different size, capacity and specialization.

Access to green open spaces (parks, countryside)	The fragmentation of the urban fabric and the incorporation of open land will allow good but (with varying distances from centres of larger or smaller development areas) uneven access to green spaces. Some of the open land may be trapped between development, which would reduce its environmental impact and usability; other green spaces may be continuously linked to the country; but overall a symbiotic relationship with nature could be established.
Environmental conditions (noise, pollution, congestion)	Environmental conditions should be good overall but they are likely to be uneven as a result of larger or smaller development areas, of more or less continuous development in parts of the regional city. Higher concentration of development may cause some noise, pollution and congestion problems; in smaller and/or more isolated development areas environmental conditions will be very good.
Potential for social mix through variety of housing	There is good potential for social mix as a result of the diversity of development clusters, but it is likely that there will be differences between larger development areas with higher densities at their centre (less potential for a variety of forms of habitation and social mix) and smaller development areas with lower densities (more potential for a variety of forms of habitation and social mix).
Potential for local autonomy	The potential for local autonomy is good in the smaller development areas and in those larger areas which have a clear hierarchical structure of areas and nodes.
Potential for self-sufficiency	The overall potential for self-sufficiency is as high as for the other city types, but within the different areas of the regional city there will be better and worse access to more continuous and more fragmented open land with various degrees of usability of the land.
Degree of adaptability	The entire structure of the regional city is open-ended and adaptable as it has no rigid geometry and can grow and shrink at macro-scale; changes at micro-scale are expected to be by replacement only.
Imageability of the city (the physical entity) as a whole	The potentially limitless size of the regional city prevents imageability of the city as an entity.
Imageability of parts of the city (neighbourhoods, districts, towns)	Nodes and transport channels can be expected to have a strong visual image provided they, and the areas they serve, have distinguishable design features and sets of activities.

Sense of place and centrality	The multiplicity of different nodes at the centres of different urban areas should provide a strong sense of place and a sense of centrality at different hierarchical levels.
-------------------------------	--

Comparison of the expected performance of the six city models (Frey, 2005: 109)						
Criteria	Core City	Star City	Sat. City	TODs, TNDs	Lin. City	Reg. City
Degree of containment of development	+	+/-	+/-	-	-	+/-
Population density relative to land needed	+	+/-	+	+	+	+
Viability of public transport	+	+/-	+	-	+	+
Dispersal of vehicular transport	-	+/-	+/-	+	-	+/-
Viability of mixed uses	+	+/-	+	-	+/-	+/-
Access to services and facilities	+/-	+/-	+/-	-	+/-	+/-
Access to green open spaces (parks, countryside)	-	+	+	+	+	+
Environmental conditions (noise, pollution, congestion)	-	+/-	+/-	+	+	+/-
Potential for social mix through variety of housing	-	+/-	+/-	+	+/-	+/-
Potential for local autonomy	-	+/-	+/-	+	+/-	+/-
Potential for self-sufficiency	+	+	+	+	+	+
Degree of adaptability of city to changing conditions/needs	-	+/-	+/-	-	+/-	+
Imageability of the city (the physical entity) as a whole	+/-	+/-	+/-	-		+/-
Imageability of parts of the city (neighbourhoods, districts, towns)	+/-	+/-	+/-	+	+/-	+/-
Sense of place and centrality	+/-	+/-	+	-	-	+
Equal weights	-1	+2	+6	+1	+1	+6
Weighted (bold)	-4	+1	+2	0	0	+3
N.B: Sat.=satellite; TOD=transit-oriented development; TND=traditional neighbourhood development; lin.=linear; reg.=regional						

Appendix (2):**CORINE Classification Scheme**

- Agricultural Areas
 - Arable Land
 - Heterogeneous Agricultural Areas
 - Pastures
 - Permanent Crops
 - Permanently Irrigated Land (Green Houses)

- Artificial Surfaces
 - Artificial Non-Agricultural Vegetated Areas
 - Industrial, Commercial and Transport Unit
 - Mine, Dump and Construction Sites
 - Urban Fabric
 - Animal Parks
 - Israeli Settlement
 - Israeli Military Bases
 - Built-up Areas

- Forests and Semi-Natural Areas
 - Forests
 - Open Spaces with Little or no Vegetation
 - Shrub and / or Herbaceous Vegetation Associations

- Water Bodies
 - Inland Waters
 - Marine Waters

- Wetlands
 - Coastal Wetlands
 - Inland Wetlands

Appendix (3):

List of Interviewed Stakeholders for the Scorecard Filling					
No.	Name	Affiliation	Position	Phone No.	E-mail
1	Eng. Hanan Manoly	Beit Sahour Municipality	City Engineer	02-2773666/7	h_manoly@yahoo.com
2	Eng. Nasri Morcos	Bethlehem Municipality	City Engineer	0522672014/ 02-2770594	ngmorcos@gmail.com
3	Eng. Nadim Hadweh	Beit Jala Municipality	City Engineer	0599256090/ 02-2742601	cityeng@beitjala-city.org
4	Eng. Anwar Shbaneh	Ministry of Local Government-Bethlehem Regional Directorate	Head of Engineering and Regulation Directorate	0599885367/ 02-2232385	anwar_shbaneh@hotmail.com
5	Eng. Hamza Halaybeh	Applied Research Institute-Jerusalem (ARIJ)	GIS Expert	02-2741889	hamza@arij.org
6	Mr. Issa Zboun	Applied Research Institute-Jerusalem (ARIJ)	Municipal Development & GIS Expert	0598906666	issa-zboun@yahoo.com
7	Dr. Ali Ayyash	Al-Quds Open University	Assistant Professor / Soil Science Expert	0599031899	abuayyash2000@hotmail.com
8	Eng. Fadi Dwaik	Palestinian Polytechnic University (PPU)	Environmentalist	0599703611	fadidwaik@arij.org
9	Eng. Abeer Safar	Applied Research Institute-Jerusalem (ARIJ)	Environmentalist – Water and Environment Department	02-27441889	abeer@arij.org
10	Dr. Salem Thawaba	Birzeit University	Assistant Professor – Architecture Engineering Department	0599645050	sthawaba@birzeit.edu

11	Dr. Ziad Mimi	Birzeit University	Associate Professor – Head of the Institute for Water Studies	0599255310	zmimi@birzeit.edu
12	Dr. Omar Zimmo	Birzeit University	Assistant Professor – Civil Engineering Department	0599839415	ozammo@birzeit.edu
13	Dr. Ali Abed Al-Hamid	An-Najah National University	Head of Urban and Regional Planning Center	0599372159	abhamid2004@yahoo.com
14	Eng. Mahmoud Hussini	Consolidated Contractor Company (CCC)	Landscape Architect	0598902085	mhi83@hotmail.com

Appendix (4):

Sub-Parameters Average Weighing by Stakeholders																	
Parameters	Sub-Parameters	Stakeholder's Answers														Average	Range
		1	2	3	4	5	6	7	8	9	10	11	12	13	14		
Land-use / Land-cover	Industrial, commercial and transport unit	3	1	1	1	1	1	1	1	2	3	1	1	2	3	1.6	1-3
	Inland waters	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1.1	1-2
	Permanent crops	1	1	1	1	2	1	2	1	4	2	1	2	1	1	1.5	1-4
	Plastic Houses	1	3	1	1	1	1	1	1	1	1	1	2	3	1	1.4	1-3
	Road Network	2	1	2	1	1	3	1	1	1	3	3	3	2	2	1.9	1-3
	Cemetery	1	1	1	1	1	1	1	1	1	1	1	1	1	5	1.3	1-1
	Wall zone	1	1	1	1	1	1	1	1	1	1	1	1	4	5	1.5	1-1
	Forests	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0	1-1
	Israeli Military Base	1	1	1	1	1	1	1	1	1	1	1	1	4	5	1.5	1-1
	Arable land	2	3	2	3	3	2	2	2	2	2	2	3	3	2	2.4	2-3
	Artificial non-agricultural vegetated areas	3	3	2	2	1	2	1	2	1	1	2	2	1	1	1.7	1-3
	Mine, dump and construction sites	2	3	2	1	1	4	1	2	3	3	3	1	4	1	2.2	1-4
	Palestinian Built-up Area	3	3	3	3	4	3	3	3	3	4	3	3	2	3	3.1	3-4
	Heterogeneous agricultural areas	3	3	2	3	2	3	2	3	3	4	3	3	3	1	2.7	2-4
	Shrub and/or herbaceous vegetation associations	5	5	5	5	5	5	5	5	5	4	5	5	5	4	4.9	4-5
Open spaces with little or no vegetation	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4.9	5-5	
Slope	0-10 %	5	5	5	5	5	5	5	5	5	5	5	5	5	1	5.0	5-5
	10-20 %	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3.0	3-3
	20-30 %	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2.0	2-2
	>30 %	1	1	1	1	1	1	1	1	1	1	1	1	1	5	1.0	1-1

Geology	C2: Shallow and composed of inter-bedded dolomites and chalky limestone	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1.1	1-2
	S1-2: Composed of limestone, dolomite, and marl	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3.0	3-3
	C3t: Composed of inter-bedded dolomites and chalky limestone	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4.0	4-4
	t: Composed of massive, locally inter-bedded limestone and dolomites	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0	5-5
City Centers	0-250 m	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0	1-1
	250-500 m	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.0	2-2
	500-750 m	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3.0	3-3
	750-1,000 m	4	4	4	4	4	4	4	4	4	4	4	4	3	3	4	3.9	3-4
	1,000-1,250 m	5	5	5	5	5	5	5	5	5	5	5	5	4	4	5	4.9	4-5

Parameters Average Weighing by Stakeholders																
Parameters	Stakeholder's Answers														Average	Range
	1	2	3	4	5	6	7	8	9	10	11	12	13	14		
Land-use/ Land-cover	20	30	40	35	20	40	45	80	60	35	30	50	75	35	42.5	20-80
Slope	35	20	20	25	10	20	15	5	10	20	20	20	5	35	18.6	5-35
Geology	25	20	30	25	10	10	15	5	10	20	20	10	10	10	15.7	5-30
City Centers	20	30	10	15	60	30	25	10	20	25	30	20	10	20	23.2	10-60

Appendix (5):

Public Service Centers' Hierarchy in the West Bank According to the Definition of Ministry of Planning (2007)					
Public Facilities		Regional Center	Sub-Regional Center	Local Center	Neighborhood Center
Education	Kindergarten	x	x	x	x
	Primary School	x	x	x	
	Secondary School	x	x	x	
	Vocational School	x			
	University	x			
Health	Health Level One	x	x	x	x
	Health Level Two	x	x	x	
	Health Level Three	x	x	x	
	Health Level Four	x	x		
Culture	Sport Club	x	x	x	
	Playground	x	x	x	x
	Park	x	x	x	x
	Women Center	x	x	x	
	Culture Center	x	x		
	Children Center	x	x		
	Public Hall	x	x	x	
	Museum	x			
	Library	x	x	x	
	Other Societies	x	x	x	
Administrative	Main Post Office	x	x		
	Post Office Branch	x	x	x	x
	Direct. of Education	x	x		
	Direct. of Health	x	x		
	Direct. of Agriculture	x	x		
	Social Affairs Office	x	x		
	Interior Affairs Office	x	x		
	Fire Station	x	x	x	
	Police Station	x	x	x	
	Religious Court	x	x		
	Civil Court	x	x		
	Slaughterhouse	x	x		
	Vegetable Market	x	x		

Source: MOPIC (1998 b: 80)