

Impact of Urbanization on Land Use and Local Communities in the West Bank

The project Final workshop **Technical Report**

On the August 8, 2004 the project final workshop was held in Ramallah under the auspices of his Excellency Mr. Jamal Al-Shubaki the Minister of the Ministry of Local Government (MoLG). The Applied Research Institute – Jerusalem (ARIJ) project staff has prepared and conducted the workshop in full cooperation with MoLG specialists. The president of ARIJ's board of trustees Mr. Daoud Estantuli has opened the workshop and welcomed the Minister as well as the workshop attendees who came from different Ministries, municipalities, village councils, NGOs, universities and private planners.

His Excellency Mr. Jamal Al-Shubaki talked about the importance of the conducted project and emphasized to utilize and benefit from the project finding and outputs for mid and long-term urban planning in Palestine. He was proud about the fruitful cooperation created between ARIJ and MoLG during the project period.

Afterwards, Dr Jad Isaac gave a brief description about the project objectives, activities and outputs. Dr. Isaac has focused on the impact of the 'Israelization' of Palestinian Territories through the construction of Israeli colonies, Separation Wall, and closed military areas on the Palestinian open space, urbanization trend and the sustainability of natural resources.

Miss Sophia Saad has presented the obtained results of land use analysis and the Palestinian urban patterns development and Israeli colonization activities in the West Bank. Furthermore, Mr. Nader Hrimat gave a brief description of the obtained results and recommendations for the conducted socioeconomic survey in the Palestinian communities.

The project developed scenarios for future urban development and its impact on the sustainability of natural resources and future planning perspectives in addition to the project results, conclusions and recommendations were presented by Dr. Nael Salman. During the last session of the workshop an open discussion took place through which the 30 different engineers, planners and specialists were given the opportunity to discuss and comment on the project conducted activities and obtained results. All participants' recommendations and comments were recorded and included in the project final book.

Acknowledgment

The Applied Research Institute – Jerusalem (ARIJ) hereby expresses its sincere appreciation and thanks for the International Development Research Centre (IDRC) for the continuous support and feedback throughout the different phases of the project “Impact of Urbanization on Land use and local communities in the West Bank”. Special thanks go to Dr. Pamela Scholey, Team Leader at IDRC, Canada, for her continuous support and invaluable inputs throughout this project.

ARIJ is also grateful to the Palestinian Ministry of Local Government (MoLG) for facilitating the process of surveying the data of master plans in the municipalities and village councils of the West Bank Governorates. Thanks are extended to MoLG Minister, Mr. Jamal Al-Shubaki, and the community leaders for their support and cooperation.

Thanks to Dr. Sari Hanafi for his contribution in building the human resources capacities at ARIJ in socioeconomic survey and analysis. Special credit is herein given to Basima Fuqaha, Ala’ Ismael, Suma Al-Juhari, Ahmed Fathi, Ezz Al-Demis and Najeh Bani Odeh for their assistance in completing the socioeconomic survey of this work in the northern West Bank Governorates.

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P.O.Box 860, Caritas Street
Bethlehem, Palestine
Telfax: +970-2-2741889
Internet: www.arij.org

Introduction

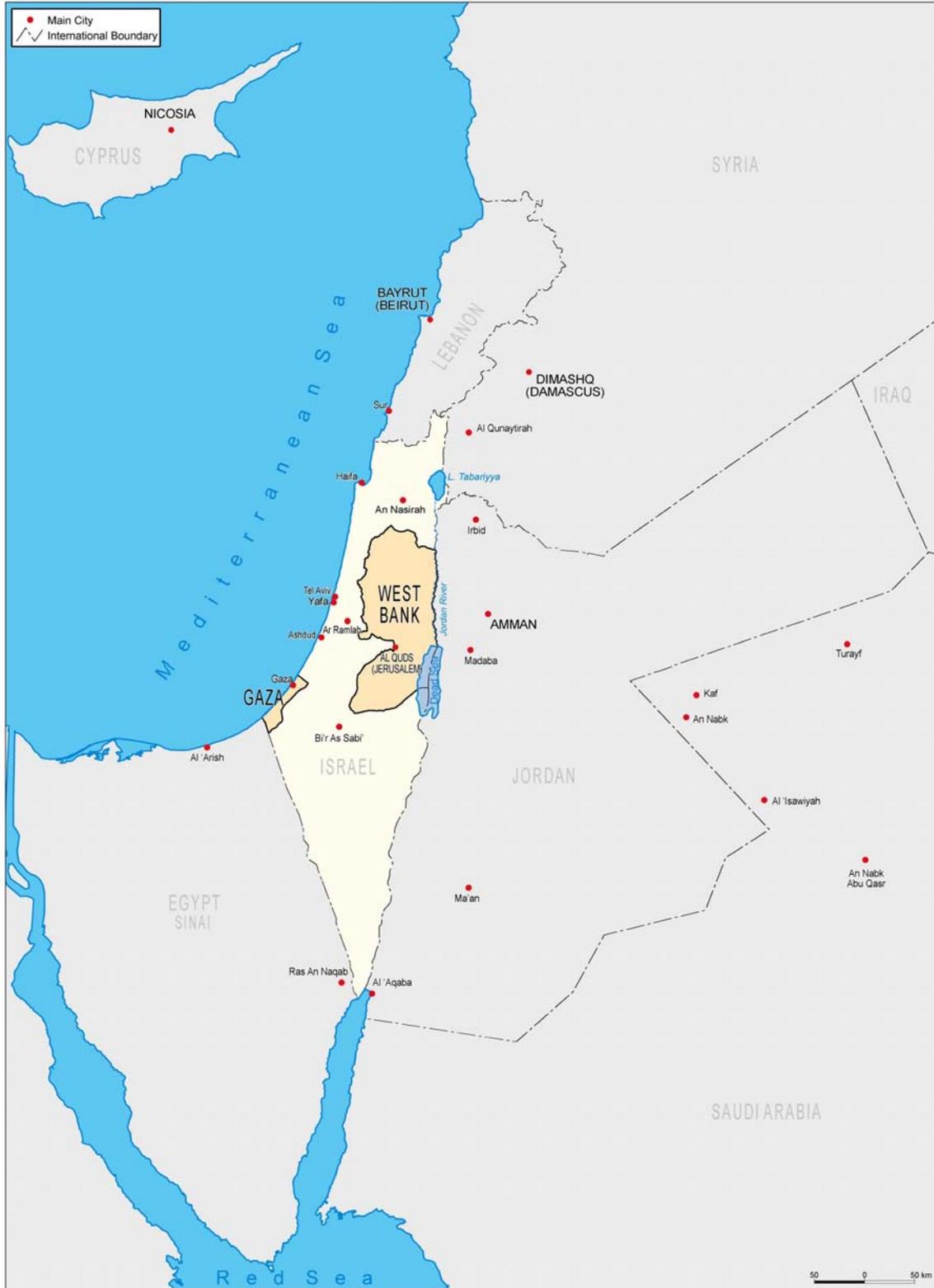
1.1 Background

The West Bank covers an area of approximately 5661 km². The territory is bordered on the east by the Jordan River and on the north, south and west by Israel, see Map 1-1. By the end of 1997, the total population of Palestinians in the West Bank, including those living in East Jerusalem was approximately 1.9 million (PCBS, 1997).

The West Bank has been subjected to a unique developmental plan, which has impacted on every aspect of the socioeconomic fabric. It is important to outline the political changes of the past century at the outset, so as to place the socioeconomic and physical findings of this research in their historical and political context.

During the last century, the administrative boundaries of the West Bank were reshaped several times by the powers that ruled Palestine, the Ottoman Empire, the British Mandate, the Jordanian Rule and the Israeli Occupation and latest, the Palestinian National Authority (PNA).

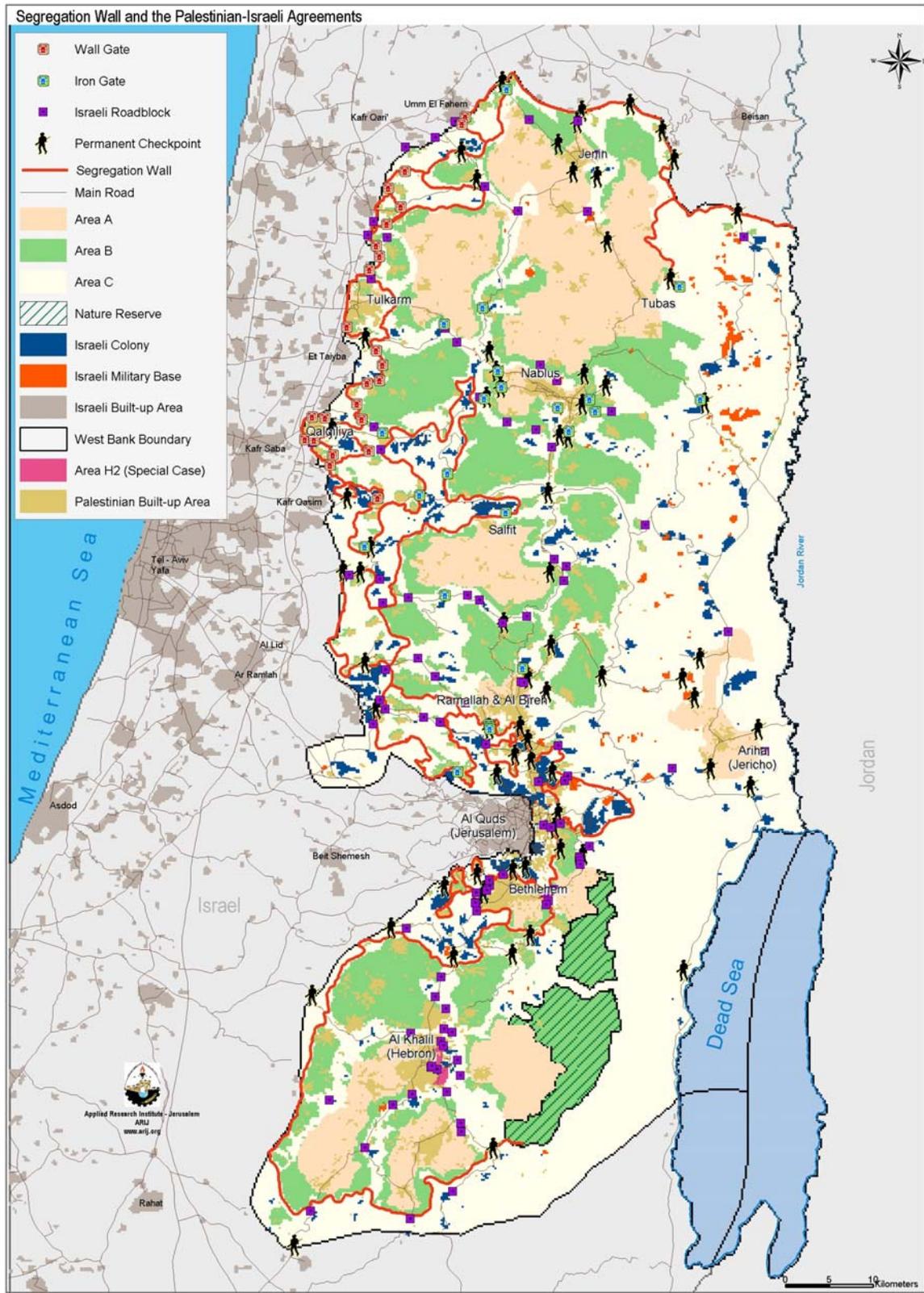
The recent administrative boundaries of the West Bank are defined according to the divisions set by the PNA after 1993. Accordingly, a number of 11 Palestinian Governorates (districts) today comprise the administrative divisions of the West Bank where the Palestinian Governorates were named after the main cities located in each one. The Palestinian Ministry of Planning (MOP) defined the main cities as regional urban centers of the Governorates according to their functions, the urban services and social infrastructure facilities they contain and the role they play in relation to the surrounding Palestinian communities and to each other. The Palestinian Governorates in the West Bank are: Jenin, Tulkarm, Nablus, Qalqiliya, Tubas, Salfit, Ramallah and Al Bireh, Jericho, East Jerusalem, Bethlehem, and Hebron.



Map 1-1: Palestine within the current regional context

During the Israeli-Palestinian negotiations that took place in Oslo in 1993, a first step agreement was reached by both sides in which Israel, the occupying power, agreed to withdraw its military forces from certain Palestinian areas including Gaza. However, the Oslo agreement divided the West Bank into three areas as follows, see Map 1-2:

1. **Zone A (Area A):** in which the PNA has full control. This zone includes the main urban areas in the West Bank such as the Palestinian main cities namely Jenin, Tulkarm, Qalqiliya, Salfit, Nablus, Tubas, Ramallah, Al-Bireh, Jericho and Bethlehem in addition to towns such as Beit Jala and Al Yamun. Hebron City was subject to a special agreement according to Taba Agreement in 1995. It was divided into two areas of different control called H1 and H2. Area H1 is considered as part of Area A, while an area housing approximately 500 Israeli settlers became Area H2 and was put under the full control of Israel. Area A initially amounted to 3% of the land in the West Bank. After the implementation of Sharm Esh-Sheikh memorandum in 2000, Area A was extended to cover about 18% of the West Bank area.
2. **Zone B (Area B):** which is under Palestinian civil administration but under Israeli security control comprises most of the Palestinian populated towns, villages and camps. After the implementation of Sharm Esh-Sheikh memorandum, Area B covered 22% of the West Bank area.
3. **Zone C (Area C):** to stay under full Israeli control until further agreements are reached. This zone includes the rest of the Palestinian Occupied Territories in the West Bank, which includes smaller and remote villages, Palestinian agricultural lands and open spaces, Israeli settlements and military sites. Area C covered 60% of the West Bank area after the implementation of Sharm Esh-Sheikh memorandum in year 2000.



Map 1-2: Geopolitical map of the West Bank

1.2 Study objectives

The division of Palestinian lands into areas A, B, and C has produced two different and parallel planning schemes: one Israeli, to serve the Israeli colonists living in the West Bank and Gaza Strip, and the other Palestinian, to serve the Palestinian people. The plans of the Israeli Authority have systematically hindered the development of the Palestinians and damaged the environment in the process. All these practices have created a geographical discontinuity at the lands under the Palestinian control. This discontinuity has resulted in a major physical impediment towards accomplishing sustainable development in Palestine.

Confiscation of land under various pretexts such as the construction of settlements and erection of the segregation zones from Palestinians living in the West Bank has imposed enormous limitations on Palestinian built up areas and significantly has raised the population density. Therefore, the lack of control over planning and implementation, and the fact that the occupation power neglected the development of Palestine for over 35 years, has led to the deterioration of urban areas and the delivery of low standard of services where the development of urban and rural areas has been unrealistically restricted. Such restriction was accompanied by unlicensed and unplanned construction and has resulted in urban sprawl and misuse of valuable agricultural land.

In addition, urban expansion associated with the encroachment on agricultural and grazing land created additional pressure on the environment and natural resources and limited the possibilities for sustainable development. Therefore, the project's goal converted into its output shows the recent urbanization trends and their impacts on Palestinian local communities. The project's output will however assist Palestinian planners and policy makers to develop comprehensive long-term strategies for future urban development and for the sustainable management of land and natural resources in the West Bank.

The overall objective of this project was to qualitatively and quantitatively analyze the urban development trends in the West Bank Governorates via time series satellite images between the years 1989-2000. The study aimed at assessing the impacts of Palestinian urban development on the local Palestinian communities and land use in addition to assessing the effects of the Israeli colonization activities on Palestinian urban development, and to make accurate projections of possible future trends of urban expansion. In order to fulfill the main objective, the following specific objectives were defined:

1. Modeling overall urban forms, and recognizing emergent trends in processes shaping the Palestinian urban structure since 1989;
2. Surveying and studying the effect of Palestinian urban activities and Israeli colonizing activities on the socioeconomic conditions of the local Palestinian

- communities, male and female populations and households and on agricultural land use;
3. Estimating future possible urbanization trends in relation to population growth scenarios and their impacts on the availability of land needed for future urban development;
 4. Modeling suitable potential sites for urbanization that could assist planners and decision makers in identifying new boundaries for future urban development.
 5. Integrating the obtained results of the spatial, mathematical and socioeconomic analyses and producing urban land use maps; and
 6. Disseminating the research results to researchers, national and local authorities, ministries, planners, and NGO's.

1.3 Study area

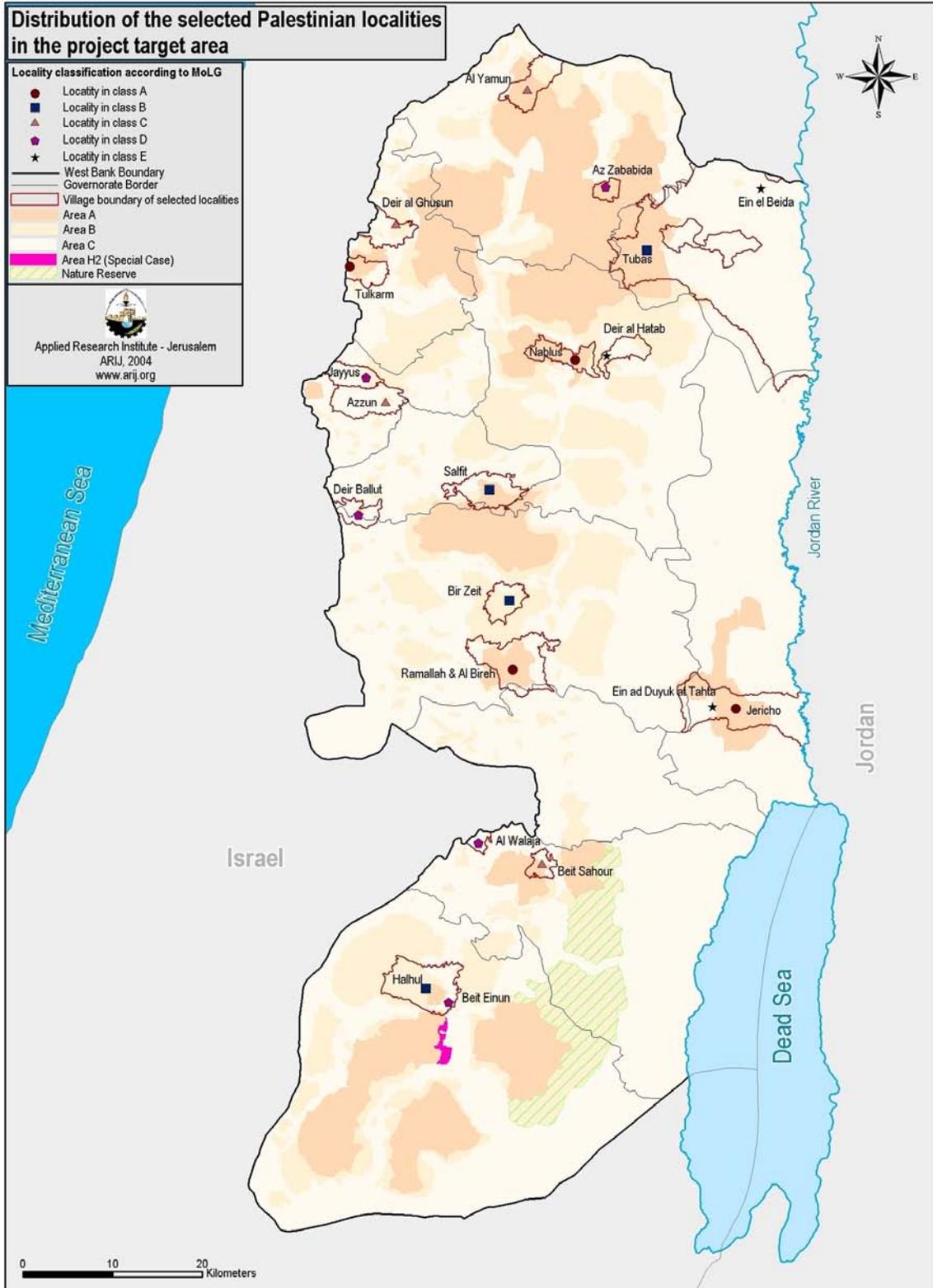
The study focused on urbanization and its physical and socioeconomic impact in all West Bank Governorates. It was conducted at a time when movements around the Occupied Territories for Palestinians were restricted and after the second Intifada (Al Aqsa Intifada) was erupted in September 2000. Whilst, and in order to integrate spatial and socioeconomic analyses at micro level, twenty of the Palestinian localities were selected from the West Bank Governorates for an in-depth analysis as specific study areas. These localities were selected using multi-steps and stratified random sampling methodology based on the following criteria, see Map 1-3:

- Geopolitical classification: areas A, B and C
- Remoteness or closeness to Israeli colonies
- MLG Classification: A (municipalities of the main cities), B (population > 15,000), C (population > 5,000 and < 15,000), D (population < 5,000) and E (small villages and hamlets).
- Locality administrative boundary (based on British mandate Village boundary definition)

All targeted Governorates were represented in the selected Palestinian localities according to the defined urban parameters and are listed in Table 1-1. Chapter four presents the integrated analysis using the selected special cases.

Table 1-1: Selected Localities at micro level

Governorate	Locality	Locality MLG Classification					Geopolitical Classification		
		A	B	C	D	E	A	B	C
Jericho	Jericho	X					X		
	Ein dyouk Tahta					X	X		
Jenin	Yamun			X			X		
	Zababdeh				X		X		
Ramallah	Ramallah	X					X		
	Birzeit		X					X	
Nablus	Nablus	X					X		
	Deir- ElHatab					X		X	
Tubas	Tubas		X				X		
	Ein-Elbeida					X		X	
Qalqiliya	Jaiyus				X			X	
	Azzoun			X				X	
Salfit	Deir Ballut				X				X
	Salfit		X				X		
Tulkarm	Tulkarm	X					X		
	Deir al Ghusun			X				X	
Bethlehem	Al Walaja				X			X	
	Beit Sahour			X			X		X
Hebron	Halhul		X				X		
	Beit 'Einun				X				X



Map 1-3: Distribution of the selected Palestinian localities in the project target area

1.4 West Bank urbanization

The Palestinian population all over the World account today for more than 9 million Palestinians distributed in the Palestinian Territories, Israel, the Arab World and other foreign countries. According to Palestinian Central Bureau of Statistics (PCBS) projections for the year 2004, the Palestinian population living in the Palestinian Territories is 3,827,914 of whom 2,421,491 (63.3%) live in the West Bank and 1,406,423 (36.7%) live in the Gaza Strip. There are approximately 661 Palestinian built-up areas in the West Bank spread over an area of 354,870 dunums¹ (ARIJ database, 2002). According to PCBS, the localities are divided into three types, Urban, Rural and Camps as follows:

- Localities whose population amounts to 10 000 persons or more are *urban*. In addition, urban refers to all localities whose population varies from 4000 to 9999 persons provided they have at least four of the following elements: public electricity, public water network, post office, health center with a full-time physician and a school offering a general secondary education.
- Localities whose population is less than 4000 persons or whose population varies from 4000 to 9900 persons but lacking four of the above mentioned elements are *rural*.
- Localities referred to as refugee camps and administered by the United Nations Refugees and Work Agency in the Near East (UNRWA) are *camps*. There are 19 refugee camps accommodating approximately 179,541 registered refugees in the West Bank (UNRWA, 2004).

In 1997 the distribution of housing units for urban, rural and camps were 48.0%, 45.5%, 6.5%, respectively (PCBS 1999). A housing unit is a building or part of a building constructed for one household only. The distribution percentage of housing units according to connections to water network, electricity network, sewage system, was 79.2%, 94.2% and 24.5% respectively. Moreover, 75.4% of the household resided in owned housing units while 12.2% from the households resided in rented housing units.

According to the Ministry of Planning and International Cooperation (MOPIC) both rural and urban areas are in need of development after 30 years of occupation:

“The Israeli territorial strategies of unrealistically limiting border expansion of cities and villages has overloaded infrastructure and increased population density in the built-up areas. It has also translated to the random, unplanned, and unlicensed construction of houses and urban sprawl. Furthermore, it has contributed to rural-urban migration by people who are unable to find housing in the rural areas” (MOPIC 1998:51).

The living conditions in the West Bank are according to MOPIC degrading due to population growth and unsatisfactory urban development. In the refugee camps the living conditions are generally lower than elsewhere. They are very densely populated, have poor sanitation, narrow streets and poor quality houses. To ensure sustainable

¹ 1km² = 1000 dunums
1 ha = 10 dunums

development, MOPIC proposes a policy which seeks to ensure the uniqueness of cities and villages while expanding and the rural character of rural areas while developing them to a standard that make it attractive to stay there.

1.4.1 Urban Patterns

Many elements contributed in shaping the patterns of Palestinian urban areas in the West Bank. The topography, the shape of the transportation routes, the surrounding agricultural and hinterlands and other resources, location, the physical structure, planning and control, were among many other elements that contributed to the development and the shaping of the urban patterns.

Some Palestinian cities have strategic locations within the West Bank such as Hebron, Ramallah, and Jerusalem. Their urban pattern was shaped as result to their location at the main nodes from which the main and regional roads radiate to connect the West Bank, and the function they perform in relation to their surrounding or other urban centers.

In other cities the urban pattern was shaped as a result of their location on areas that have natural resource potentials, water or agriculture such as the cities of Jericho and Qalqiliya. While in cities as Tulkarm, the urban pattern was shaped as a result to their location near the border line, their potential derived from their function as market areas and as nodes of connection with other regions inside the West Bank.

Defined shape patterns:

The following patterns are observed in the different urban areas:

1. Detached solo settlements: This pattern is located in separate places, has a defined shape but physically disconnected from other communities. This pattern may have different sizes of population and built-up area, it is mostly found in the northern West Bank Governorates such as Jenin.
1. Attached solo settlements: This pattern consists of built-up areas that are physically connected or integrated with other urban areas as a result of growth and expansion. It's found in Governorates such as Nablus and Ramallah.
2. Agglomeration of urban settlements: This pattern consists of areas that are physically integrated and have a defined city or road network pattern, linear, radial, star, etc.

Undefined shape patterns:

These patterns are observed in some West Bank Governorates, they can be either agglomerations of scattered undefined shapes of small or medium size clusters or leap frog built-up areas with undefined shape. This type of immature pattern is a result of either the shape of the landscape or the lack of planning and control over urban development.

The current urban pattern is a legacy of many years in which there has been a paucity of urban planning at a regional or national level. There has been no developmental strategy, taking account of the population distribution, annual growth rates and the need to allocate land for future expansion so as to accommodate future growth. The result has been that urban areas have developed more or less randomly, without any control or policy. These agglomerations lack the infrastructure necessary for the development of modern urban areas. This creates problems in terms of accessibility and the movement of goods between one city and another.

1.4.2 Israeli colonization

The jagged division of the West Bank into areas A, B, C, H1 and H2, according to the different Palestinian-Israeli peace accords has partitioned the territory into isolated cantons, which are physically separated from each other. Israeli colonies, outposts, bypass roads and lately the Segregation Wall have been built on Palestinian lands, separating the Palestinian communities from each other and from their lands. Confiscation of approximately 52% of the West Bank land under various pretexts has imposed enormous limitations on Palestinian built-up areas. Significantly, the Israeli colonization has raised the population density in Palestinian built up areas. Population densities have become even higher if one takes into consideration the segregation imposed by the Oslo Accord. Area A has a population density of 969 people/km², in Area B the population density reaches 1,118 people/km², whereas in the East Jerusalem the population density exceeds 4,000 people/km². The situation in the Gaza Strip is much worse, where population density reaches more than 3,600 people/km² (PCBS, 1997). In contrast the population density in Israel averages 261 people/km² (ICBS, 1997).

Israeli Colonies

Since the Israeli occupation of the West Bank in 1967, the Israeli land policy in the Palestinian Territories focused on land expropriation for the construction of Israeli colonies on Palestinian lands. The scope and type of land affected by Israeli colonization of the Palestinian territory is determined by the unique geopolitical ambitions of Israel to the Palestinian Territories. Two primary goals guided the expropriation of Palestinian land for the colonization project: expansion and separation from the Palestinian population. Land is therefore chosen for expropriation on hilltops overlooking and surrounding Palestinian built-up areas, areas that block the merging of Palestinian built-up areas while facilitating the merging of colonies, areas that may be easily annexed to Israeli proper in the future, or that secure economic resources, militarily advantage or negotiating leverage. During the years of occupation Israel managed to control 60% of the West Bank, over 30% of the West Bank area is confiscated and expropriated for exclusive Israeli use. The focus has been on the following regions:

- The Jerusalem area to create demographic barricades in front of any Palestinian claims to it.
- Along the West Bank's western edges so as to make the return to the 1967 borders practically impossible, and so as to make the colonies appealing to colonists, who commute to work inside Israel.

- The Jordan valley for its presumed importance to Israel's security as well as for its agricultural resources.

According to Israeli data, there are 149 colonies in the West Bank, however satellite images show approximately 210 Israeli built-up areas including East Jerusalem and excluding military sites. These built-up areas cover an area of 183 360 dunums (ARIJ database, 2003). The Israeli colonies are scattered all over the West Bank, the growth of colonies is mainly geared to the formation of blocks (i.e. they grow outwards and towards each other). The result of such growth is the grouping of Palestinian towns and villages into many separate cantons. The colonies are administered through a completely different process and the colonists live under Israeli civil law. In 2004, it is estimated that the Israeli settlements population in the West Bank is around 416 000 Israeli colonists. Between 1992 and 2004 there was a remarkable increase in the colonist population in the West Bank that reached 170%. It is worth noting that there is a discrepancy between the average growth rate for Israelis in Israel and that in Israeli colonies. The average growth rate for Israelis in Israel is 2.0% per year (the rate including non-Jews is 2.5% per year). However, the population of the Israeli colonies yearly growth rate is around 6%, which amounts to over three times the Israeli growth rate.

Israeli Outposts

The outposts are Israeli nucleus settlement structures (civilian or military) that are located beyond the 1949 Armistice Line and did not get official recognition by the Israeli government. More often than not, these outposts have the tacit approval of the Israeli government and are the precursors to new colonies. Israeli governments usually delay their recognition of those outposts for political considerations. Today there are around 184 outposts in the West Bank (ARIJ database, 2004). All of the new outpost sites are located at least 200 meters away from an existing colony (Mother colony), with many of them found 700 meters or even 2 Kilometres or more from an existing colony.

Israeli Bypass Roads

The term bypass roads came with the advent of the Oslo Accords and were not present before that. These roads are used by the Israelis to link colonies with each other and with Israel. In the agreements they are called "Lateral Roads" but people usually call them "bypass" roads because they are meant to circumvent (i.e. bypass) Palestinian built-up areas. These roads are of course under Israeli control and entail a 50 to 75 meter buffer zone on each side of the road in which no construction is allowed.

The construction of bypass roads commonly occurs along the perimeter of Palestinian built-up areas. As a result, these roads carve up the Palestinian areas into isolated ghettos and often deprive Palestinians of vital agricultural land and limit their urban expansion. This situation is very serious within the major cities of the West Bank where bypass roads form asphalt boundaries that limit the expansion and development of the Palestinian communities, and further disconnect Palestinian communities from each other.

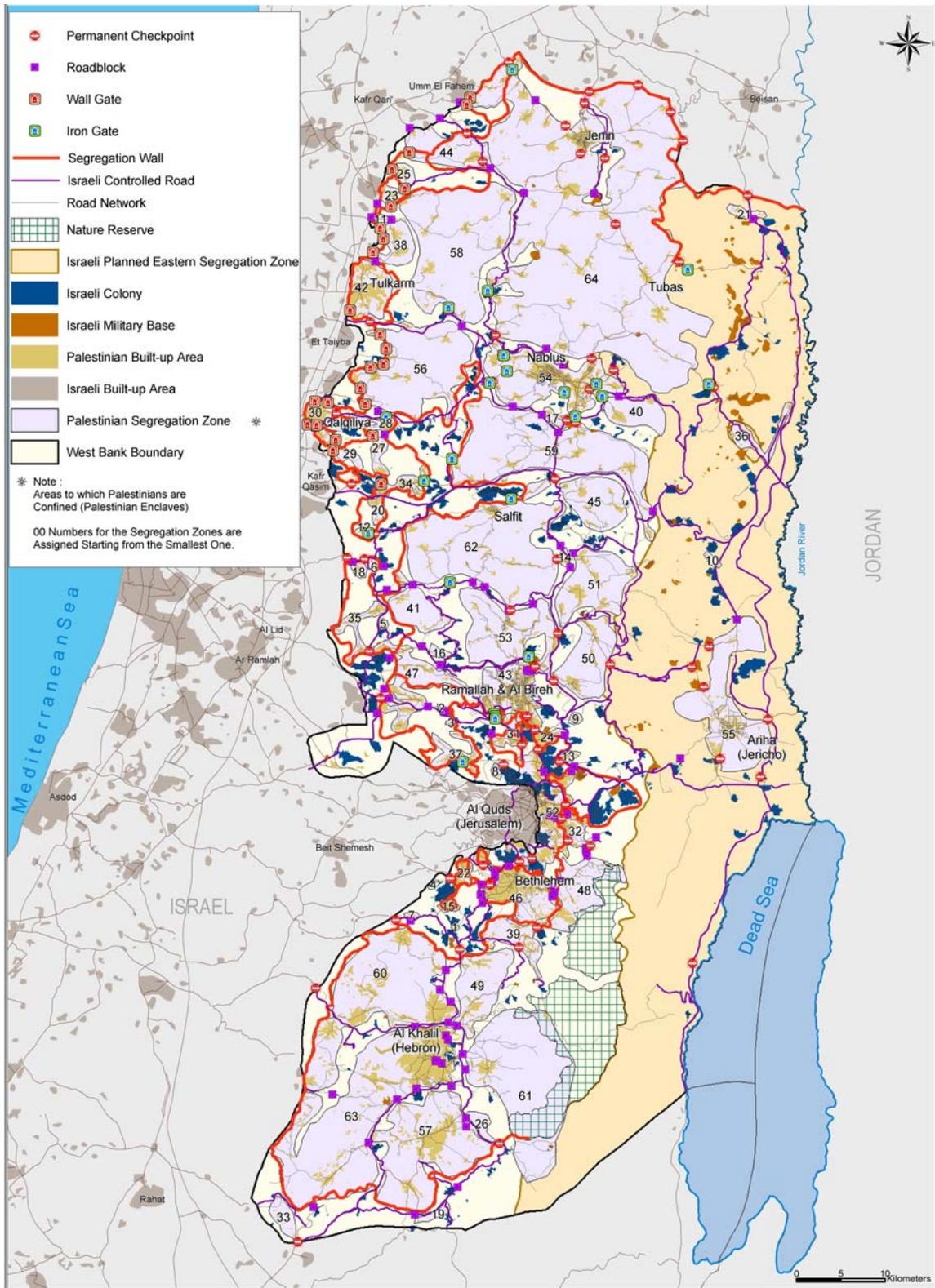
The construction of these bypass roads required the confiscation and destruction of approximately 87 km² of Palestinian land, most of which is agricultural. The role of the bypass roads became evident during the Intifada where they became the scissors that cut the Palestinian areas into 64 homelands in the West Bank, see Map 1-4.

The Israeli Segregation Wall

The Israeli Government started on the 16th of June 2002 the construction of a massive Segregation Wall between the West Bank and Israel. The Segregation Wall is currently being built on Palestinian land east of and parallel to the 1948 Armistice borders, the so-called Green Line. The Green Line, which forms the border between the West Bank and Israel, is approximately 360 kilometers in length. The path of the Segregation Wall is designed to enfold and annex Israeli colonies, valuable Palestinian agricultural lands and groundwater resources within the West Bank east of the Green Line. Since June 2002, the Israeli government has been hanging military requisition orders on trees at Palestinian lands and farms on the Palestinian side of the Green Line, declaring these lands the property of the State of Israel, see Map 1-2. The impact of the Segregation Wall on land use / land cover, water resources and Palestinian communities is discussed further in this report.

1.5 Contents of this report

The remainder of this report is in five chapters. Chapter two provides a description of the methodology adopted for the physical analysis to accomplish the objective of the research and discusses the spatial analysis results of urban growth trends at the West Bank and Governorate levels. Chapter three is divided into two sections where the first analyzes the impact of Israeli colonization activities on Palestinian urban development, while the second investigates the impact of Palestinian urbanization on local communities. It also presents the methodology of conducting the socioeconomic survey and analyzing the results. Furthermore, chapter four presents the integrated spatial and socioeconomic analysis of selected localities, as described in section 1-2 of this chapter, while chapter five predicts possible future directions of Palestinian urban development and population scenarios that are shown in illustrative figures. Finally, the last chapter outlines the importance of the findings and provides a guideline for stressing future urban land use problems the Palestinians should confront in the soon future through the set of conclusions and recommendations drawn out from the analysis.



Map 1-4: The West Bank under Israeli closure, 2003

Spatial analysis of urban growth trends at macro scale (West Bank and Governorate levels)

The structure of urban cities is dynamic, related to population and economic changes, which in turn are related to technological innovations within the urban area. In the Palestinian context, whilst these factors are important, the primary influence on urbanization is the political situation, which is a key factor in determining the degree of economic growth. During the 36 years of Israeli occupation, Palestinian urban growth was limited in its extent and rate. However, the onset of the peace process has allowed the Palestinians to rule their land; giving them more freedom to develop land under their control. This has resulted in a wave of new Palestinian urban development.

In order to investigate the trends of urbanization in the West Bank Governorates, time series GIS layers were extracted for each Governorate and utilized. The time series data includes information on urban areas for the years 1989, 1990, 1996, 1997 and 2000. The aim of this chapter is to analyze the nature of urban trends and to model the overall urban forms and dynamics and to recognize the emergent trends in the West Bank during the period from 1989 to 2002. This chapter also highlights the power of GIS and Remote Sensing technologies in classifying the land use / land cover of the West Bank through interpreting the LANDSAT images using different methods.

2.1 Methodology

The mixed urban land use in the Palestinian Territories, gathering both the Palestinian urban land use and the Israeli colonies and military bases requires studying and analyzing the current trend of urban development to assess its impact on the agriculture, water resources and the socioeconomic conditions of the Palestinian communities. Using the power of GIS and remote sensing the area and direction of urbanization trends were investigated in the West Bank Governorates. Time series LANDSAT TM data for the years 1989, 1990, 1996, 1997 and 2000 were used as the cornerstone of the analysis as well as IKONOS¹ satellite images acquired in year 2002 for data verification.

The direction of the urbanization trend is determined by observing the spatial formation of the urban area to identify locations that experienced development in land use. In this

¹ The IKONOS satellite was successfully launched in November 1999 to give the highest resolution scenes available in the public domain. The IKONOS images used are Multispectral with four-meter ground resolution having four bands distributed as true color (RGB) and near infrared (NIR) captured with less than 10% cloud interference. The imagery purchased allows the distinction of ground features with dimensions as small as four meters and is ideal for urban mapping, cadastral mapping, and GIS applications which require high positional accuracy.

context, distinction between the Palestinian and Israeli land use developments were emphasized to assess their impact on the lost agricultural land in the West Bank. The methodology adopted for this analysis is discussed in section 1.3.1. However, the future urban trends for each Governorate are investigated in chapter five where projections of land needs and land available for future urbanization considering different population scenarios were applied.

2.1.1 Spatial analysis

The change in the spatial structure of an urban area can be determined through the usage of time series aerial photos or satellite images. Using the current state of the Geographic Information System (GIS) and remote sensing technologies, it is possible to extract and plot land use patterns from these two sources of imagery. Fortunately, the existence of archive satellite images can make the task of studying the dynamical change in the structure of a city possible.

In this study, the analysis involved classifying LANDSAT TM images for the West Bank in the years 1989, 1990, 1996, 1997 and 2000 to extract the developed land in the region. The classification was carried out on the ERDAS imagine 8.5 platform through the usage of a developed logistic regression algorithm and automatic classification.

Additionally, another methodology was adopted to identify urban development in the study area after the second Intifada, erupted in September 2000, and apply accuracy assessment using high-resolution satellite data (i.e. IKONOS images) for the year 2002. The classification procedure was carried out after the IKONOS images were orthorectified and projected at the Universal Transverse Mercator (UTM) grid. The analysis was based on visual interpretation and screen digitizing. CORINE second level classification inventories were adopted to be derived out of the whole set of IKONOS images for the West Bank, see annex 1. This approach provided accurate, about 80% accuracy, up-to-date information of the latest urban developments in the region. Chapter two of this book includes maps of the classified land use / land cover inventories and their areas for each Governorate.

To achieve the goal of this research, several technical steps in the remote sensing and GIS framework were completed. These involved data organization, processing, interpretation and analysis. The resultant output was used to synthesize the observed trend on urbanization of the region.

Image pre-processing

The LANDSAT images for the years 1989, 1990, 1996, 1997 and 2000 were radiometrically corrected, georeferenced, scene cropped and processed in ERDAS imagine. The LANDSAT images were projected to the UTM WGS84 projection system. As a result, five images with root mean-square errors of less than one half of the pixel size of the images and with compatible projecting system that can further be integrated in GIS were produced.

Image analysis

Different functionalities in ERDAS imagine remote sensing platform was used to analyze the five LANDSAT images for both the Palestinian and Israeli land development. In the Palestinian context, the analysis involves applying automatic image classification to extract the Palestinian urban land use. The process entails delineating the boundary of the Palestinian urban areas on the 2002 IKONOS images to create GIS Arc coverage of these areas. The boundary is then used as the area of interest of the urban areas in classifying the LANDSAT images. The significance of this procedure is in two folds. On the one hand, the spatial resolution of 2002 IKONOS images is 4 meter, which allows more appropriate visualization of the urban area. On the other hand, constraining the analysis of the past LANDSAT images to the 2002 area of interest will reduce the bias in classification and will bound it to only Palestinian urban land use.

Logistic regression algorithm was used in an attempt to map the Palestinian built-up areas using LANDSAT TM data. The algorithm created was modified and adopted to map only the built-up areas while supervised classification, was applied to identify the vegetation cover of the target area. Therefore, the spectral properties of the built-up areas and their comparison to other major classes of land cover existing on the image were studied. The spectral properties of the built-up areas on the LANDSAT TM images were compared with the spectral properties of bare rocks, bare\low vegetated soil, other vegetation classes and shaded areas.

The LANDSAT images pixels were categorized to urban and non-urban areas. Non-urban samples were assigned the value zero, whereas urban areas were assigned the value one to create the dependent variable in the modeling process. The method followed to map the built-up areas using binary logistic regression is shown in Figure 2-1. The logistic regression equations were structured in SPSS statistical package using the radiometrically corrected six bands of the LANDSAT TM images as independent explanatory variables. Table 2-1 shows the classification results of the developed model for year 2000 based on the comparisons of observed versus predicted readings models.

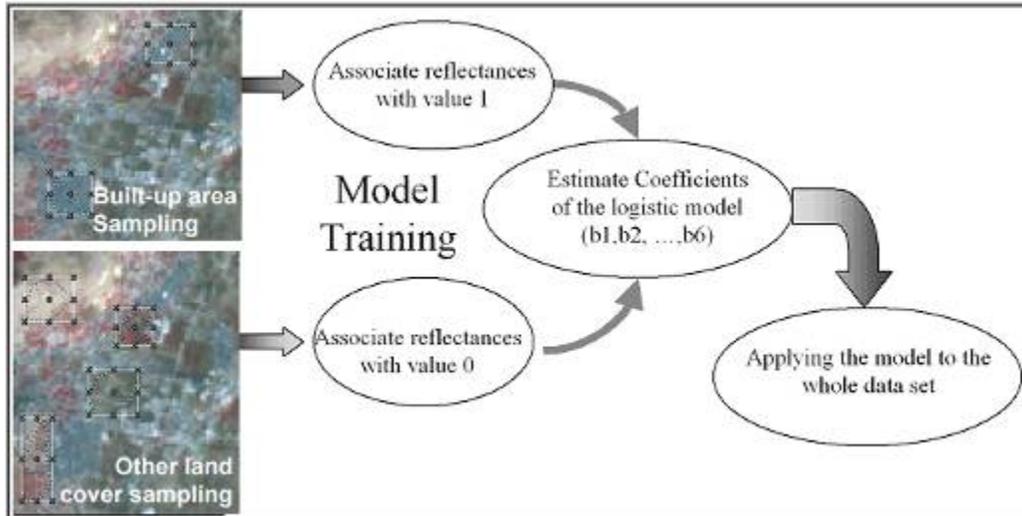


Figure 2-1: Flowchart of the method adopted to extract the Palestinian built-up area using logistic regression modeling²

The mathematical formulation of the better performing logistic regression model was built into the ERDAS Imagine graphical model maker and applied to the LANDSAT images. This resulted in a new continuous data layer with a minimum of 0 and a maximum of 1. A simple thresholding was applied to map the urban areas. All pixels with a value greater than 0.5 were classified as built-up, and those with a value less than 0.5 were classified as non-urban.

Table 2-1: Classification results of the binary model for year 2000 (the cut value is 0.5)

Observed			Predicted		
			CODE		Percentage
			0	1	Correct
Step 1	Code	0	4342	276	94
		1	325	4242	92.9
Overall Percentage					93.5

However, land cover classification in ERDAS involved employing the maximum likelihood function. In this analysis, the supervised classification was used to estimate the general vegetation cover from the different LANDSATs in years 1989, 1997 and 2000 in the West Bank Governorates. It is an automatic classification that entailed two main steps. Firstly, the training of different land classes in the LANDSAT images was defined using our recognition skills and knowledge of the spectral properties of land cover types in the study area. The classes defined included rainfed field crops and vegetables, rainfed trees, shrubs and natural vegetation, forests and irrigated agriculture including trees and field crops. Other land cover classes including open spaces, bare rock areas and built-up

² Rishmawi, K., (2001). BURNED AREA AND FIRE SEVERITY MAPPING ON THE MEDITERRANEAN ISLAND OF THASOS USING LANDSAT TM AND IKONOS IMAGES. Chania: Greece

area were merged in one class entitled 'others'. Secondly, the supervised classification produced a new image with the different classes for each specific year analyzed. It is worth mentioning that in order to obtain current data for the land use / land cover of the West Bank, the 2002 IKONOS images were classified to CORINE level 2 classification system using screen digitizing method.

The spatial analysis distinguishes between the Palestinian and Israeli urban developments and treats them as two separate processes. This is because the Palestinian land development is a natural process occurring as population increase and urban centers grow while the Israeli land development occurs mainly to confiscate land and jeopardize the unity of the study area and the rest of the Palestinian land.

Therefore, the analysis of the Israeli urban land use development did not involve automatic land classification as in the case of the Palestinian urban land use development. The boundary of the Israeli colonies is usually apparent on the satellite images since either major roads always surround these settlements to provide access to them or a fence surrounding the settlement does exist. Thus, delineating the Israeli colonies boundaries in the five time periods was sufficient for the purpose of the analysis. The delineation of boundaries was carried out by screen digitizing the colonies' clusters and creating GIS shapefiles for different time periods in years 1989, 1997 and 2003 where recent image was used to obtain the layer in year 2003.

Implementing the GIS database

The classified images presenting the Palestinian built-up area and land cover classes and coverages presenting the Israeli colonies were imported into GIS as ArcInfo grids and coverages and shapefiles. These types of data are compatible with other GIS data and can be presented in GIS as layers for further analysis. It is worth mentioning that the obtained layers of Palestinian built-up area and Israeli urban area were cropped according to the geopolitical divisions (i.e. Zones (areas) A, B and C) in order to calculate the areas used and developed as urban in those zones in the analysis time period.

Data calculation and extraction

Different figures were extracted from the GIS database using the computational functionalities available in GIS. These included total amount of Palestinian net built-up area in dunums at the West Bank and Governorate levels and in the three geopolitical zones (A, B and C) by Governorate in the five time periods, total area of land occupied by Israeli colonies in dunums in the West Bank and by Governorate in years 1989, 1997 and 2003 and total areas in km² of the land cover classes derived from the supervised classification by Governorate in the years 1989, 1997 and 2000. Furthermore, areas of current land use / land cover classes were derived for the West Bank Governorates from analyzing the 2002 IKONOS images.

Data validation

The validation of the digital data resulting from processing in remote sensing platform was carried out as an auxiliary step to check the reliability of the extracted figures. However, due to shortage of past-date data, the validation only involved comparing the

resultant urban land use grids to the 1997 SPOT and 2002 IKONOS images. In addition, several field trips were conducted to collect ground control points for different land use types using D-GPS that were used in data verification of the produced land cover classes. The results show a good match in the Palestinian built-up area distribution with about 90% accuracy, while few discrepancies are noticed in the agricultural land cover classes such as arable land, permanent crops, natural pastures, and mixed agricultural area with an accuracy range of 78-80%. Other categories include natural and manmade forests and Israeli colony developments and military bases.

2.1.2 Collection of available master plans

In order to gain an insight into the influence, which Palestinian municipalities and village councils have had on urbanization, master plan boundaries for the different Palestinian localities were collected. Master plans represent the area designated for development by local authorities, and hence the area in which building permit is issued. It is intended to study the extent to which urban development is limited to the master plan areas, and to analyze land use types within the master plan boundaries for selected special cases.

It was not easy to collect the available master plans of the Palestinian localities in the West Bank due to their large number (more than 600 localities). However, beside the conducted field survey to collect the master plans, the Ministry of Local Government (MLG) has provided the project team with its archived master plans. Most of these master plans were developed and approved by the Israeli Civil Administration Department before the PNA establishment. Though, the PNA has developed few master plans for major cities and towns. The 215 collected master plans were processed, fed into the GIS system and used in the maps produced showing the historical urban development for each Governorate in chapter two.

2.2 Spatial analysis at West Bank level

This section demonstrates the urban trends and the changes in agricultural area in the West Bank from 1989 to 2000 in relation to the political situation prevailed in that period.

2.2.1 Palestinian urbanization

Data was not available for the years between 1991 and 1996 to provide regular distribution of Palestinian built-up area in the studied period. Since the key influence was proposed to be political changes, and the political situation remained unchanged between the years of 1990 and 1995, this was not thought to have a measurable effect on the analysis. The phenomenon under investigation is a cumulative process, which is unlikely to exhibit marked inter-annual fluctuations, therefore making it fairly easy to derive an estimate for changes between 1991 and 1996 using the linear trend interpolation method. It is a numerical technique in which the observed values from the GIS for the five time periods were assigned to trend formulas. The trend formulas were then used to estimate the yearly values. The goodness of fit of the trend formulas was found to exceed 0.90. The built-up area in years 1998 and 1999 was also estimated using the data generated

from the time series analysis. Figure 2-2 illustrates the actual and estimated total Palestinian net built-up area in dunums³ in the West Bank. Map 2-1 presents the historical change in urban fabric between the years 1989 and 2000. Maps at Governorate level were produced to illustrate historical urban growth from 1989 to 2000 and would be presented in section 2-2.

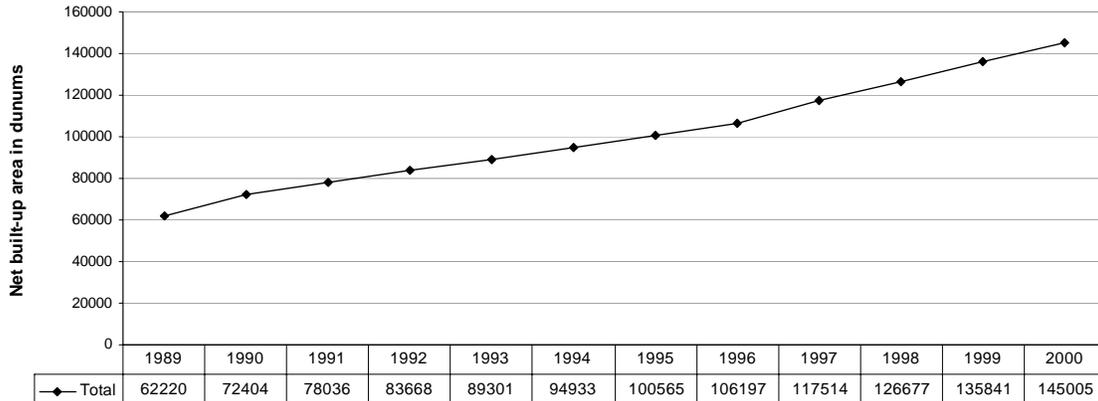
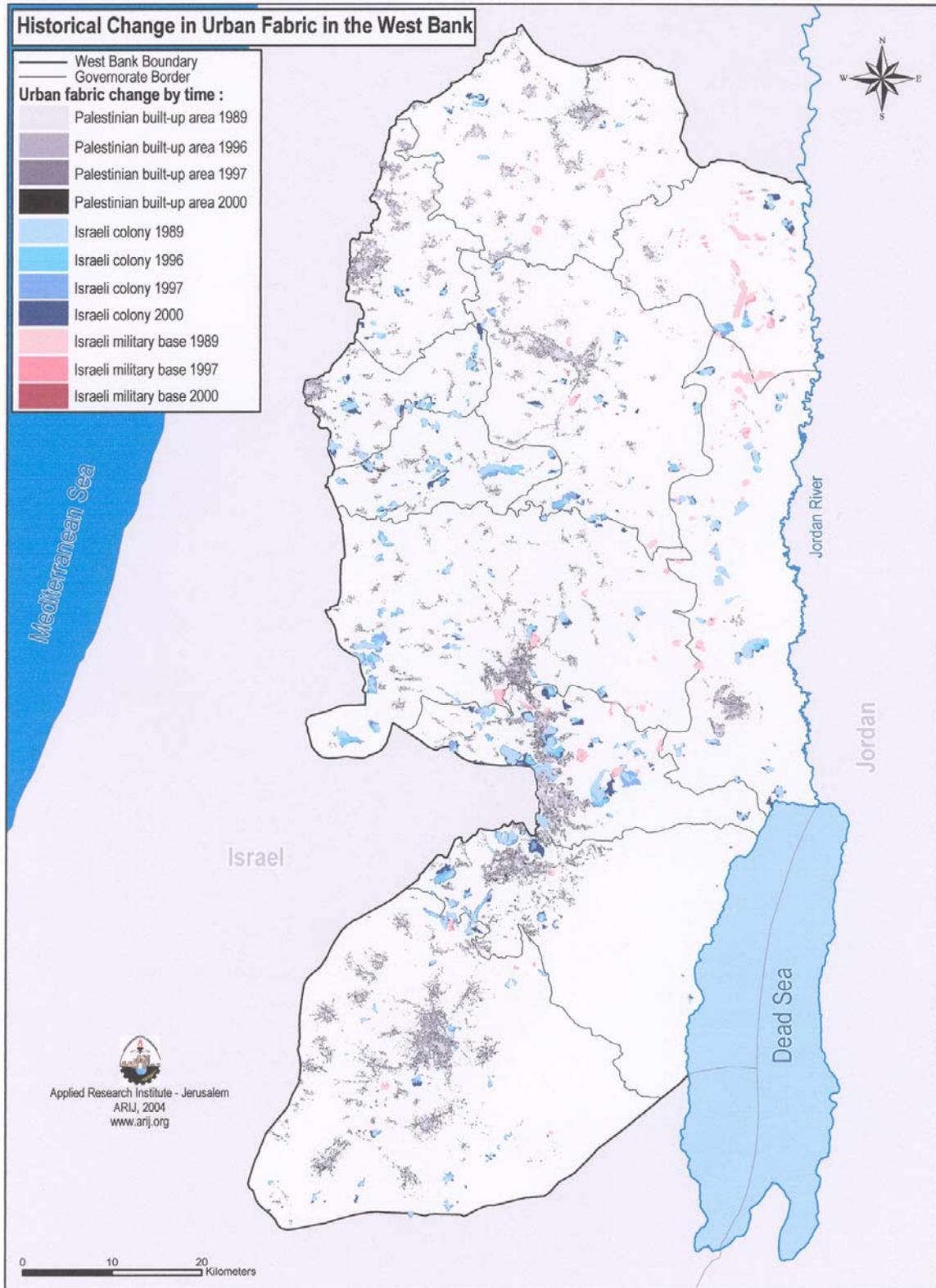


Figure 2-2: Urban trend of total actual and estimated Palestinian built-up area in the West Bank

³ 1000 dunums = 1km²



Map 2-1: Historical change in urban fabric in the West Bank

The analysis showed that the Palestinian built-up area continued to increase during 1989 – 2000. The trend chart indicates that the urban development in the 1990s has gone through two main phases of change. These two phases comprise the two time periods 1990 – 1995 and 1995 – 2000. It should be noted that it was not until 1995 that the Palestinian National Authority (PNA) started controlling major parts of the Palestinian urban areas. Therefore, in analyzing the urban trends that took place in the region the distinction can be made between the periods before and after the establishment of the PNA in 1995.

The linear trend line indicates that total urban development grew at a slow rate between the years 1989 and 1995 with approximately 6391 dunums/year and then accelerated after 1995 with 8888 dunums/year till year 2000 as illustrated in Figure 2-2. This trend observed between the years 1995 and 2000 for the West Bank was expected, due to the fact that the PNA has allowed development in the territories under its jurisdiction, and the economic situation was conducive to urban growth. The trend observed indicates that urban development is directly affected by the political situation which influences economic growth and the land development process. It is worth mentioning that the political situation has played a great role in forcing the Palestinian built-up area expansion in areas (A) where Palestinians have full control over the land resulting in consuming most of the available land and open spaces. This will be discussed further in section 2-2 showing the impact of geopolitical divisions (e.g. Areas A, B and C) on the development of Palestinian communities at Governorate level.

2.2.2 Israeli colonization activities

On the other hand, the Israeli colonies established on the West Bank lands have continued to expand with a significant increase as analyzed till year 2003, see Table 2-2. This expansion occurred on the account of the available fertile and valuable agricultural areas of the West Bank reflecting the Israeli Government's policies of building new colonies in form of clusters leading to confiscating more Palestinian lands even during the peace process, see Figure 2-3 (a & b). The

Table 2-2: Estimated total Area of Israeli colonies in dunums between the period 1989-2003 by Governorate

Governorate	1989	1997	2003
Bethlehem	5351	11409	16720
Hebron	5295	10159	13050
Jenin	1011	1992	3737
Jericho	15750	18612	22230
Jerusalem	18245	30347	37837
Nablus	3460	8468	13740
Qalqiliya	5625	7749	12200
Ramallah & Al Bireh	12123	24545	28490
Salfit	7354	13967	19110
Tubas	2474	5182	7635
Tulkarm	919	1896	3011
Total	77608	134325	177760

Palestinian lands surrounded by clusters of Israeli colonies and considered zones for future colony expansion were delineated from year 1989 to year 2003 where areas anticipated for colonies expansion were calculated.

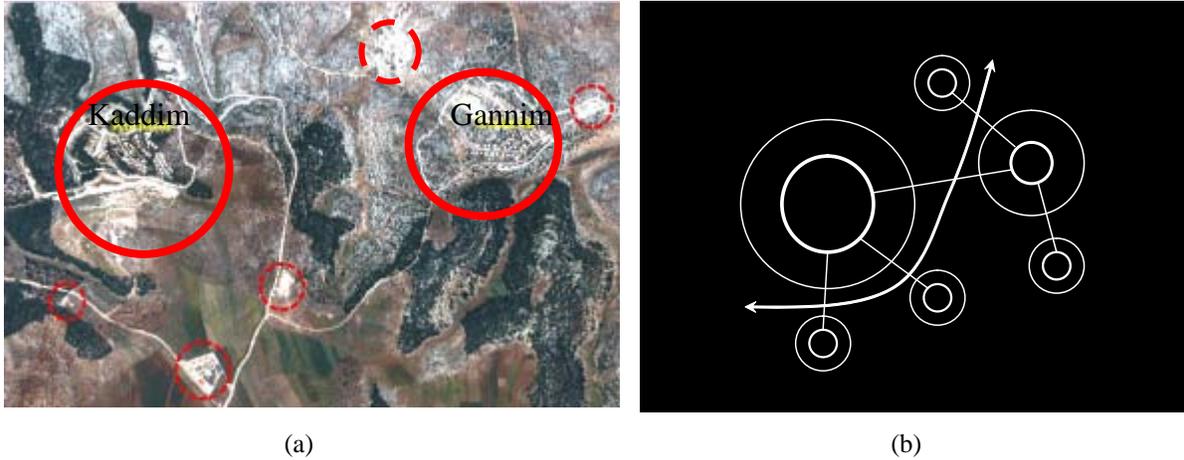


Figure 2-3: new colony satellite-neighborhoods connected to the center of the main colony

Satellite image showing the clustering of neighborhoods around a mother colony

Schematic diagram showing new colony satellite-neighborhoods connected to the center of the main colony

Figure 2-4 illustrates the estimated annual increase in the Israeli colonies area from year 1989 to 2003 in the West Bank Governorates which clearly reflects the accelerating and non-stop rate of expansion especially after the establishment of the PNA. For example, an annual expansion of 885, 291, 603, 879, 742, 857, 409 and 186 dunums/year occurred in Bethlehem, Jenin, Jericho, Nablus, Qalqiliya, Salfit, Tubas and Tulkarm Governorates respectively during the period 1997-2003. However, the total annual increase in the Israeli colonies total area was about 7090 dunums/year in the period before the PNA establishment, while it increased to approximately 7239 dunums/year after the PNA establishment till year 2003.

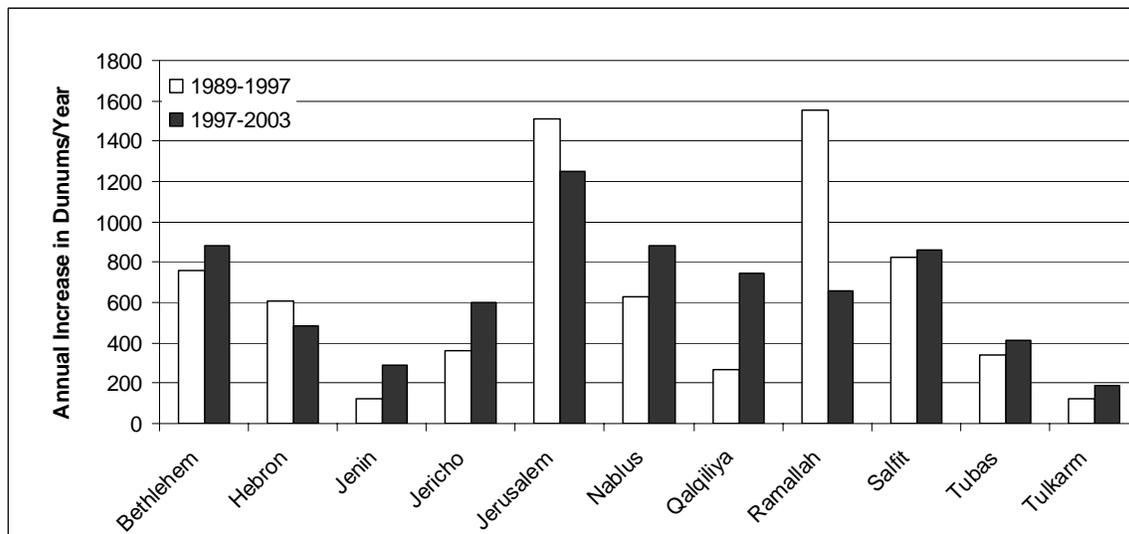


Figure 2-4: Annual increase of the Israeli colonies in the West Bank Governorates

The percentages of change (increase rate) for the Palestinian urban growth trend and for the Israeli colonies total area expansion trend in the West Bank Governorates between 1989 and 2000 are shown in Figure 2-5. The data showed that the change in Palestinian built-up area and the expansion of Israeli colonies in Jerusalem Governorate from 1989 to 2000 occurred in the same pace with about 110%. However, the Governorates of Bethlehem, Jenin, Nablus, Tubas and Tulkarm have experienced a noticeable high percentage of change through expanding the Israeli colonies between years 1989 and 2000 with 191%, 226%, 228%, 197% and 192% respectively. On the other hand, the data revealed that the highest rate of increase in Palestinian built-up area with 212% and 217% occurred in Ramallah and Salfit Governorates respectively.

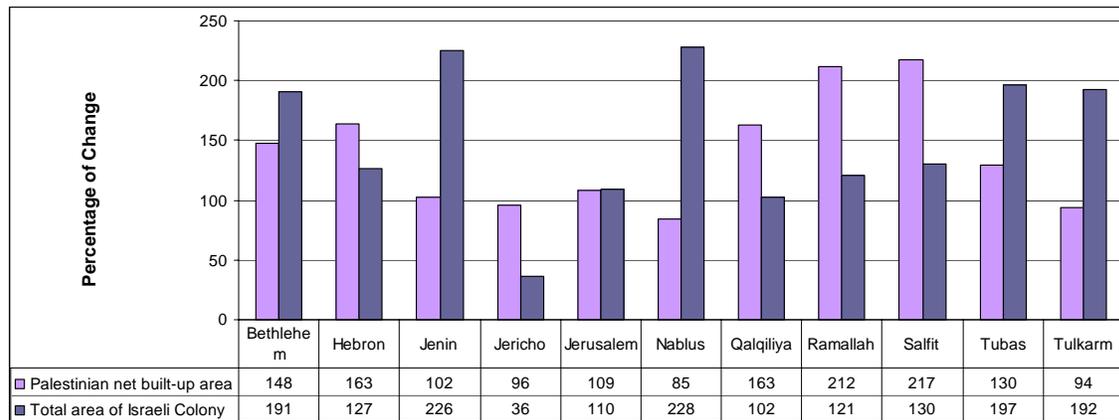


Figure 2-5: Percentage of change of Palestinian urban development vs. Israeli colonies urban expansion between years 1989-2000 by Governorate

It is worth mentioning that according to the analysis of the LANDSAT images, the West Bank has lost 5% of its forest area between years 1989 and 2000 that is almost 3281 dunums. This loss occurred in Bethlehem, Jerusalem, Nablus, Ramallah and Tubas Governorates with cumulated amount of 3582 dunums, see Figure 2-6. Most of this loss in those Governorates occurred

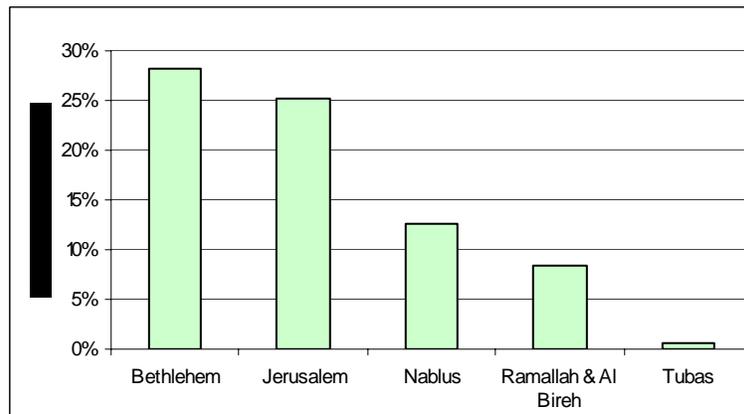


Figure 2-6: Percentage of lost forest as derived from the land cover analysis

due to the continuous Israeli aggressions including land confiscation and uprooting trees of cultivated and forested areas, in order to build new colony units or expand existing ones generating negative effects on the ecosystem of the area. For example, Jerusalem and Bethlehem Governorates are particularly affected where about a quarter of their forests (e.g. 25% and 28% respectively) was lost between the period 1989-2000. Within

the study area, of particular significance is the case of Har-Homa colony, established in 1997 on Abu Ghunaim Mountain in the north of Bethlehem Governorate. This mountain had previously been designated a forested nature reserve by the Israeli authorities. In order to accommodate the urban development, the whole mountain has been deforested, see Photo 2-1 and Photo 2-2.



Photo 2-1: Abu Ghunaim mountain, January 1997



Photo 2-2: Abu Ghunaim mountain, May 2004

2.2.3 Future projections

The future projection analysis showed that the total area of Israeli colonies in year 2020 will increase about four times as it was in 1989 comprising approximately 5.4% of the West Bank total area. While, the net Palestinian built-up area will increase by 4.5 folds comprising approximately 5% of the West Bank area for the same period, see Figure 2-7. Thus, the estimated annual increase in the total area of Israeli colonies and the Palestinian net built-up area from year 2005 till 2020 is 7364 and 7095 dunums/year respectively.

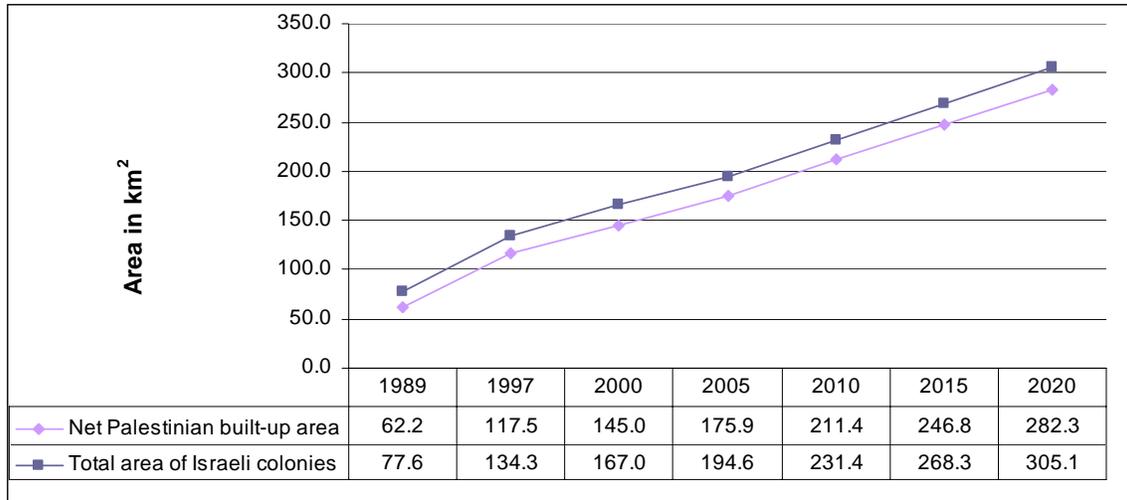
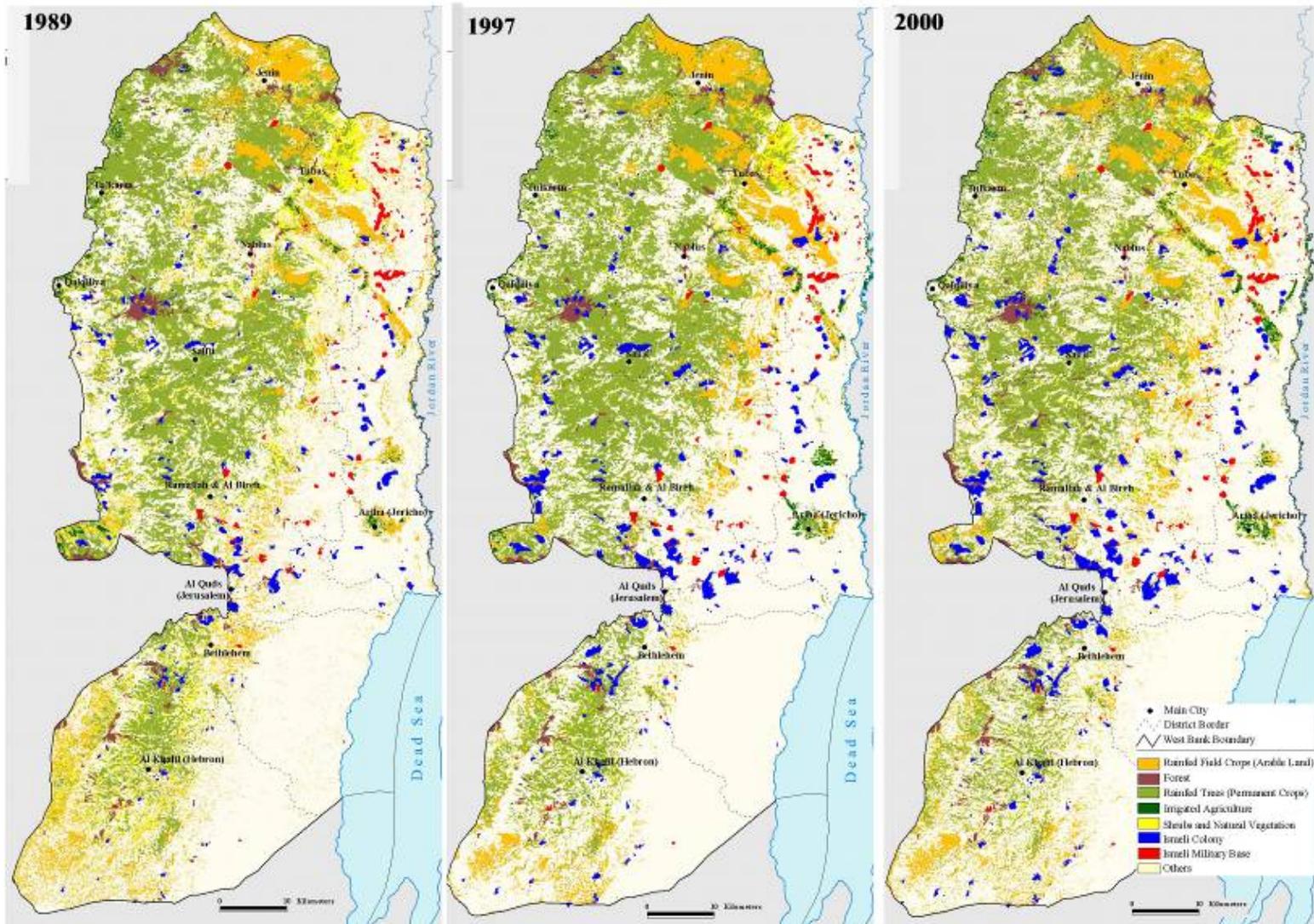


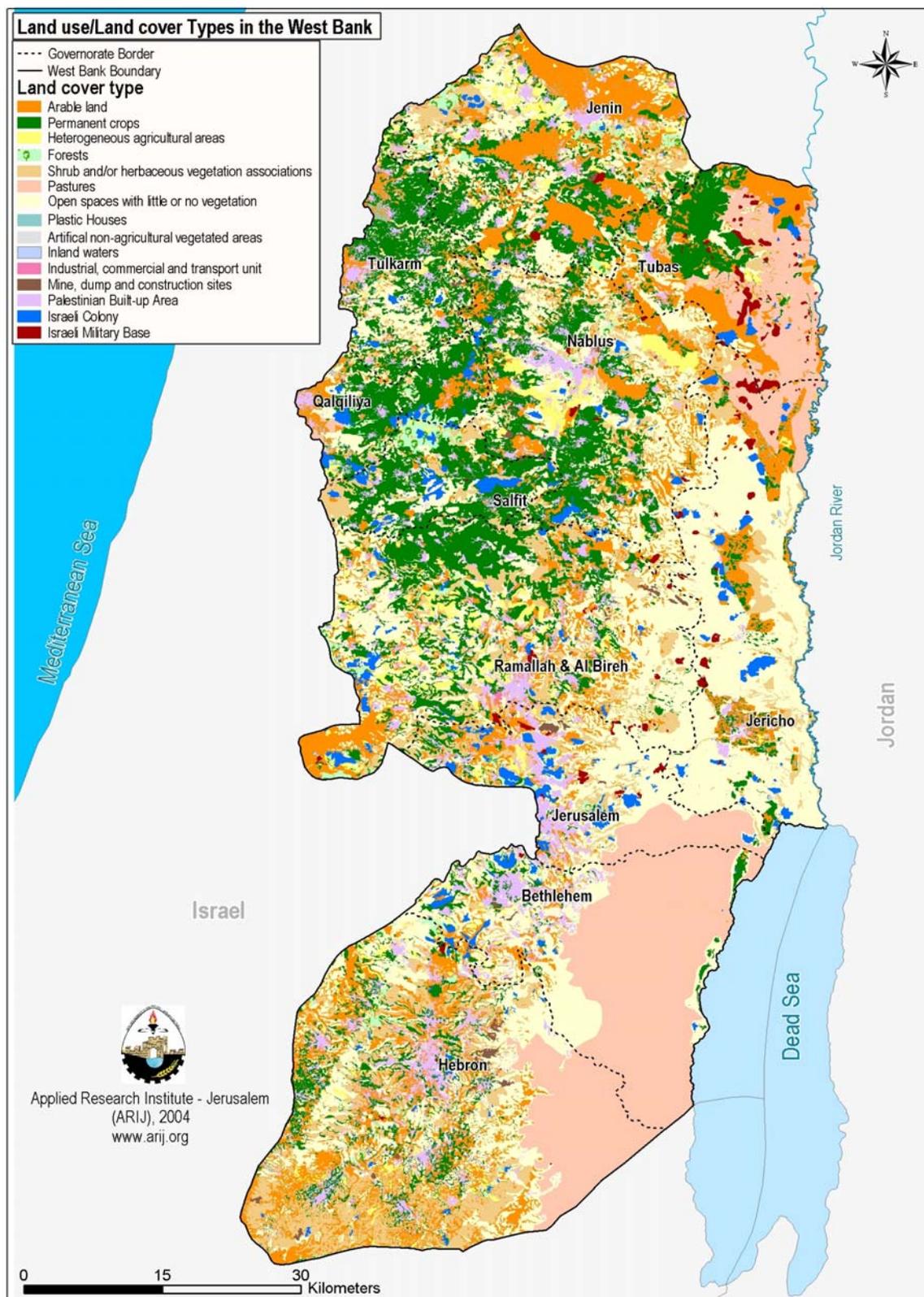
Figure 2-7: Total projected Palestinian built-up area and Israeli colony area in the West Bank

2.2.4 Land use / land cover analysis

As aforementioned the LANDSAT images for the years 1989, 1997 and 2000 were analysed in order to classify the agricultural cover in the West Bank, see Map 2-2. However, in order to obtain the land use and land cover inventories during the second Intifada, after September 2000, IKONOS satellite images acquired in year 2002 were analyzed and current land use data was generated and integrated with the socioeconomic analysis, see Map 2-3. Table 2-3 lists the total areas of the classified land use and land cover types, based on the classification system of CORINE level 2.



Map 2-2: Land cover changes in the West Bank from 1989 to 2000



Map 2-3: Land use / land cover as derived from 2002 IKONOS images

Table 2-3: Distribution of land use classes area in Dunums as classified from the IKONOS images

Class Type	Area in Dunums	% of Total West Bank Area
Arable land	944988	16.70
Heterogeneous agricultural areas	155713	2.75
Pastures	753605	13.32
Permanent crops	960729	16.97
Plastic houses	7304	0.13
Forests	80406	1.42
Artificial non-agricultural vegetated areas	96	0.00
Industrial, commercial and transport unit	1033	0.02
Mine, dump and construction sites	23376	0.41
Israeli colony	138648	2.45
Israeli military base	42289	0.75
Palestinian built-up area	354870	6.27
Open spaces with little or no vegetation	1637048	28.92
Shrubs and/or herbaceous vegetation associations	558699	9.87
Inland waters	912	0.02
Total	5659721	100

The analysis of the LANDSAT and the 2002 IKONOS Satellite images, showed variation in the total cultivated areas at the Governorate and the West Bank levels. It was found that the variation in the total cultivated lands within the period 1989 until the year 2000 was mainly for field crops cultivation while for the period from 2000 until 2002 was mainly for fruit trees due several reasons. The differences in the total cultivated areas for the years

Table 2-4: Total agricultural area in km² as obtained from the LANDSAT time series analysis by Governorate

Governorate	1989	1997	2000
Jenin	384.5	427.8	400.1
Tulkarm	156.4	170.4	149.5
Nablus	288.2	335.9	310.3
Qalqiliya	94.5	119.3	99
Tubas	90.7	108.7	113.8
Salfit	120.2	135.8	122.9
Ramallah & Al Bireh	370.4	394.9	381.3
Jerusalem	66.9	60.8	67.7
Jericho	54.9	46.6	58.9
Bethlehem	70.6	67.9	85.5
Hebron	335.3	332.6	358.4
Total	2032.8	2200.6	2147.4

1989, 1997 and 2000 ranged from 2.5 – 8% due to the cropping rotations, especially for the dryland field crops and vegetables (land cultivation for the first year with field crops, the second year with summer crops and third year as fallow land); changes in the cultivated areas of non-permanent crops; the accuracy of the analysis reached only up to 80%; and the Israeli aggressions on the agricultural lands. However, the decrease in total cultivated areas from year 2000 to 2002 reached up to 3.4%, which considered within the normal rate of change, but this time the reduction has mainly resulted from the Israeli aggressions on the Palestinian agricultural lands, as 1.44 million trees were uprooted from the West Bank (between 2000 and 2002) with total area of 138 thousand dunums, see Table 2-3 and Table 2-4.

2.3 Spatial analysis at Governorate level

The area, in dunums, of developed land in the West Bank was calculated in GIS from the different time series layers. The areas were calculated at Governorate level and according to the geopolitical divisions (i.e. Zones A, B and C) in the period between 1989 and 2000. The analysis showed that all Governorates have experienced a significant increase in their built-up area especially after the establishment of the PNA. This noticeable urban trend could be due to the following reasons:

- The implementation of vast projects which included massive infrastructure and construction investments after the establishment of the PNA. All types of buildings were constructed including commercial, residential, industrial, service and public buildings,
- New horizons were found for job opportunities which included professionals in different specialties as well as labour,
- During that period, the ongoing peace process and the improved economic situation have encouraged Palestinian returnees to settle in their homeland Palestine,
- New investments by international institutions and Palestinians residing outside the Palestinian Territories (PT).
- International organizations and Governmental institutions invested more in the PT by providing funds and grants for building the institutional and physical infrastructure of the Palestinian State. Such national projects included constructing road networks, installing water and sewer networks, in addition to rehabilitating electricity and communication networks.
- Moreover, some projects focused on supporting the agricultural, industrial and service sectors that improved the economic situation of Palestinians who consequently, invested in private and public constructions.

The urban trends obtained from the analysis in the period between year 1989 and 2000 are discussed in the following sections for each Governorate separately.

2.3.1 Bethlehem Governorate

Bethlehem Governorate is located in the southern part of the West Bank and extends from the Dead Sea in the east to the West Bank boundary in the west, and from Hebron in the south to Jerusalem in the north with a total area of approximately 607900 dunums.

Palestinian urbanization

The satellite images analysis showed that the Palestinian net built-up area increased from 6103 dunums in 1989 to 15128 dunums in 2000 with total increase of 148%, see Figure 2-8. At the same time, the population projections indicated an increase in the total population of Bethlehem Governorate from 95093 in year 1989 to 147121 in year 2000. Consequently, the net built-up area density in relation to population has increased from 64 m²/capita to 103 m²/capita in years 1989 and 2000 respectively.

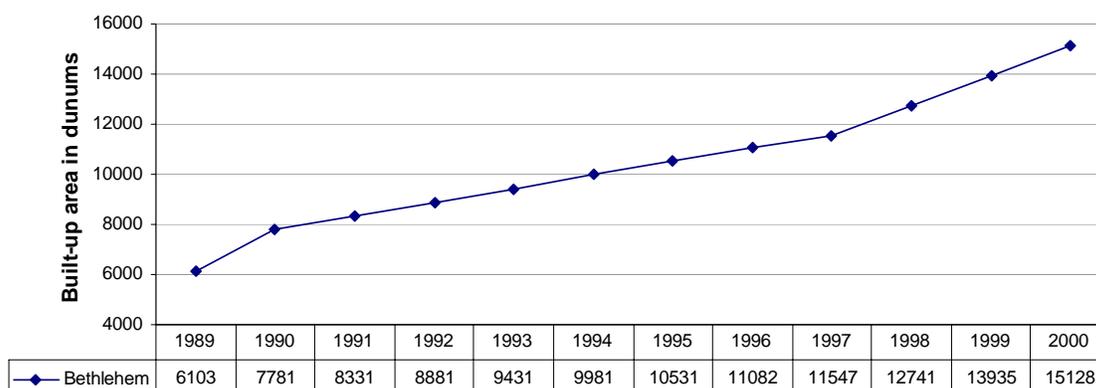


Figure 2-8: Actual and projected Palestinian net built-up area between years 1989-2000 in Bethlehem Governorate ($R^2 = 0.97$)

The analysis showed that the annual increase in built-up area in Bethlehem Governorate was 738 dunums/year in the period between 1989-1995, while it was 919 dunums/year during 1995-2000. This trend is clearly shown in Figure 2-8 distinguishing between the periods of time when the PNA had full control over the West Bank in year 1995. In addition, the

analysis revealed the fact that Areas A which are under the Palestinian control witnessed the highest annual expansion rate of built-up area compared with areas B and C with 436, 191 and 193 dunums/year respectively⁴, see Table 2-5 and Figure 2-9. Furthermore, Map 2-4 shows that the urban development occurred mostly within the designed master plans

Table 2-5: Percentage of area covered by Palestinian net built-up area according to Geopolitical classification in Bethlehem Governorate in years 1990, 1996 and 2000

Area	1990	1996	2000
Area A	11	15	19
Area B	4	6	9
Area C	0.3	0.5	0.7

⁴ The Oslo agreement divided the West Bank Governorates into three control zones:

Zone A (Area A): under full Palestinian control

Zone B (Area B): under Palestinian civil administration but under Israeli security control

Zone C (Area C): to stay under full Israeli control until further agreements are reached

of the Governorate localities but started to expand beyond their borders. In order to study the relationship between Palestinian urban development and its impact on agricultural areas, Beit Sahur town and Al Walaja village are selected and presented for this purpose in chapter four. However, the spatial distribution and areas of land use / land cover classes of the Governorate as derived from the 2002 IKONOS images are shown in Map 2-5 and Table 2-6. Nevertheless, the projections of future urban development would rely on future population scenarios and land suitability assumptions that will be presented and discussed in chapter five.

Table 2-6: Area of Land use / land cover types in Bethlehem Governorate in dunums

Land Cover Type	Area
Arable land	23644
Artificial non-agricultural vegetated areas	29
Forests	3302
Heterogeneous agricultural area	7739
Israeli military base	654
Jewish colony	11449
Mine, dump and construction sites	1097
Open spaces with little or no vegetation	137623
Palestinian built-up area	34683
Pastures	359997
Permanent crops	18546
Shrubs and/or herbaceous vegetation associations	9084
Total	607847

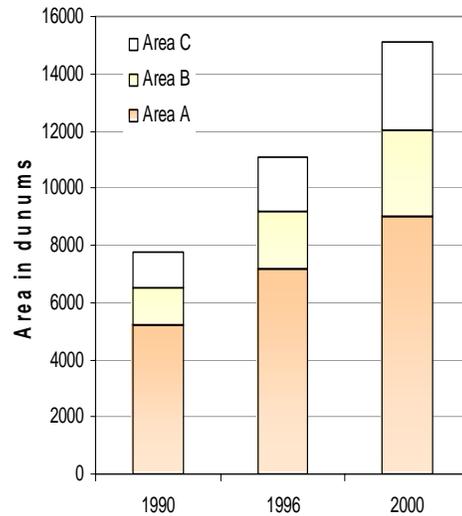


Figure 2-9: Palestinian built-up areas according to Geopolitical classification in Bethlehem Governorate

Israeli colonization activities

There are currently 21 Israeli colonies in Bethlehem Governorate. Due to its tourist appeal and its location near Jerusalem Governorate and the West Bank boundary, the Governorate has been subjected to massive Israeli colonization activities. This fact is reflected by the relative change for Israeli colony area in the Governorate. Having said that, the total area of the colonies has expanded from 5351 dunums in year 1989 to 15557 dunums in 2000 with an increase rate of 191% in this period. In year 2003, the area of the Governorate covered by Israeli colonies was 16720 dunums reaching a total percentage of increase of 212% from year 1989. Therefore, the area occupied by Israeli colonies has tripled in year 2003 to reach 2.8% of the Governorate total area. This continuous urban expansion was accompanied by an Israeli population growth which increased from 33912 to 60142 in years 1989 and 2000 respectively. Along with the expansion in the total area of Israeli colonies, the military bases within the Governorate border have also continued to expand on Bethlehem Governorate lands with an increase rate of 42.78% from year 1989 to 2000, see Figure 2-10.

Map 2-5: illustrates the spatial urban development of the Israeli colonies along with the expansion of Israeli military bases. It shows the strangulation of Bethlehem city and the surrounding towns by the Israeli colonies and the bypass roads serving them. This has constrained the new urban development of the city and caused fragmentation of the Governorate land. It is worth mentioning that the colonies erected in the northern and western parts of the Governorate are part of the Israeli so-called “Jerusalem Envelope”, Israel’s plan to adjust colonies to Israel and to enlarge the Jerusalem municipality boundaries. Because of this plan, colonies expanded significantly in Bethlehem Governorate during the nineties resulting in constructing more bypass roads which connect the colonies together.

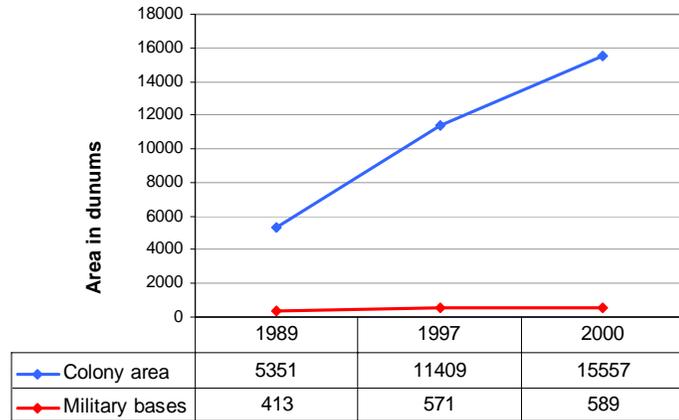


Figure 2-10: Israeli colonization activities in Bethlehem Governorate

Furthermore, the segregation plan of Bethlehem includes the construction of the segregation wall that encloses the Israeli colonies with the Israel-facing side of the wall. Accordingly, the whole Bethlehem area will be segregated, and villages near Bethlehem city will be disconnected from the main city. Map 2-5 shows the snaking of the segregation wall in Bethlehem Governorate with regard to the land use / land cover of the region. It is about 87% of the forest area (2888 dunums) situated near the West Bank Boundary is threatened by the segregation wall. Also, 35% (8313 dunums) of the arable land area and 57% (4425 dunums) of the heterogeneous agricultural land is segregated and threatened by the wall, see Figure 2-11. It is worth noting that about 17 springs with an average annual discharge of 172800 CM (Cubic Meter) are segregated by the eastern and western segregation zones threatening the water supplied to the domestic and agricultural sectors.

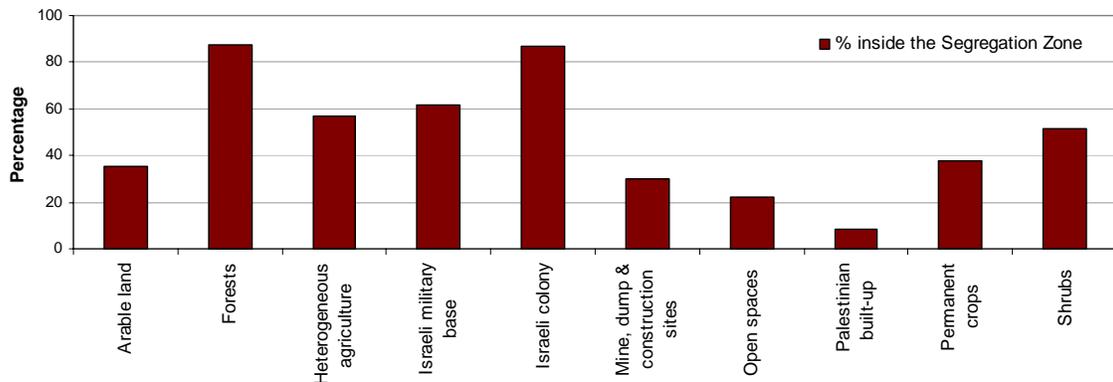
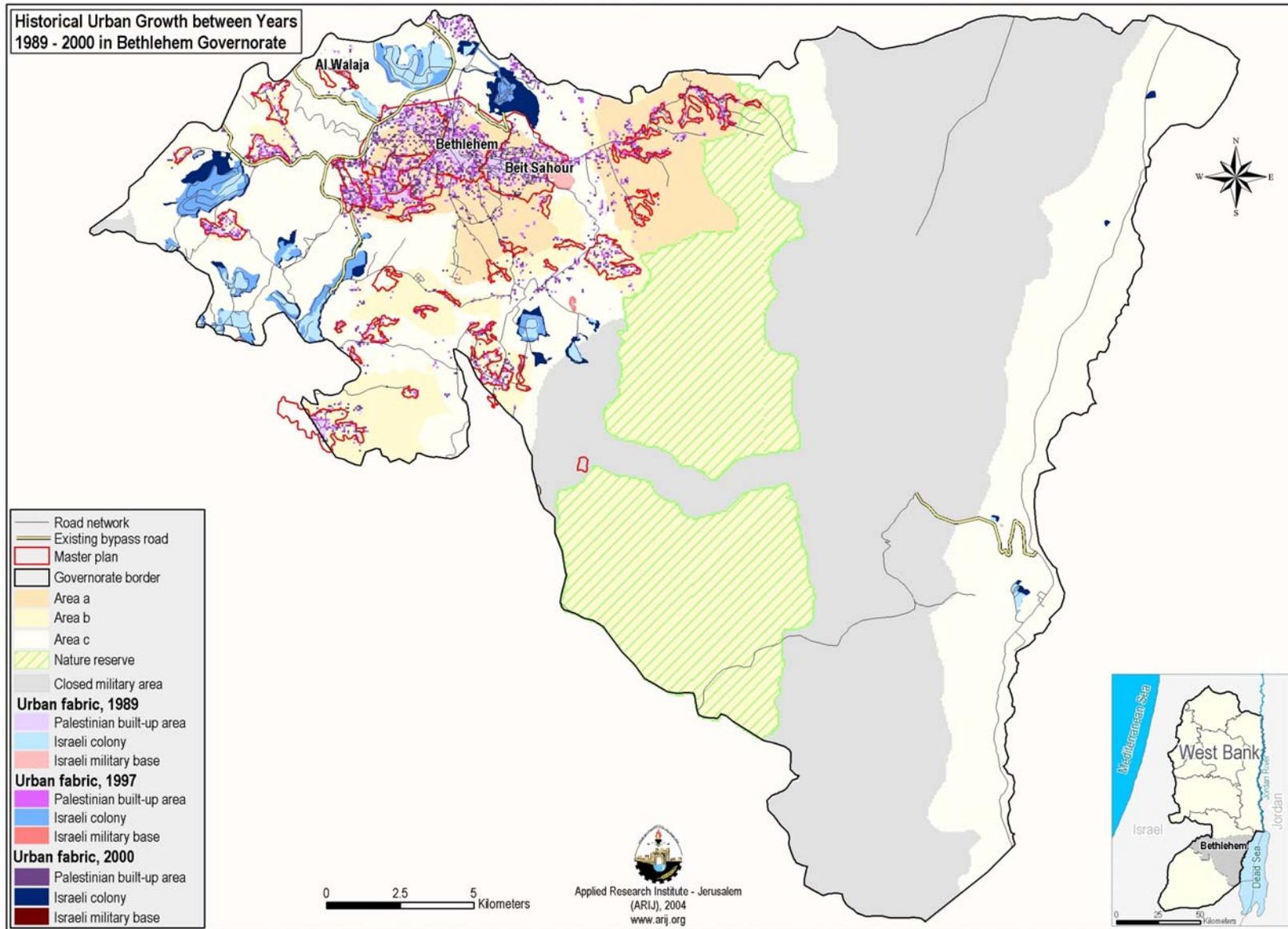
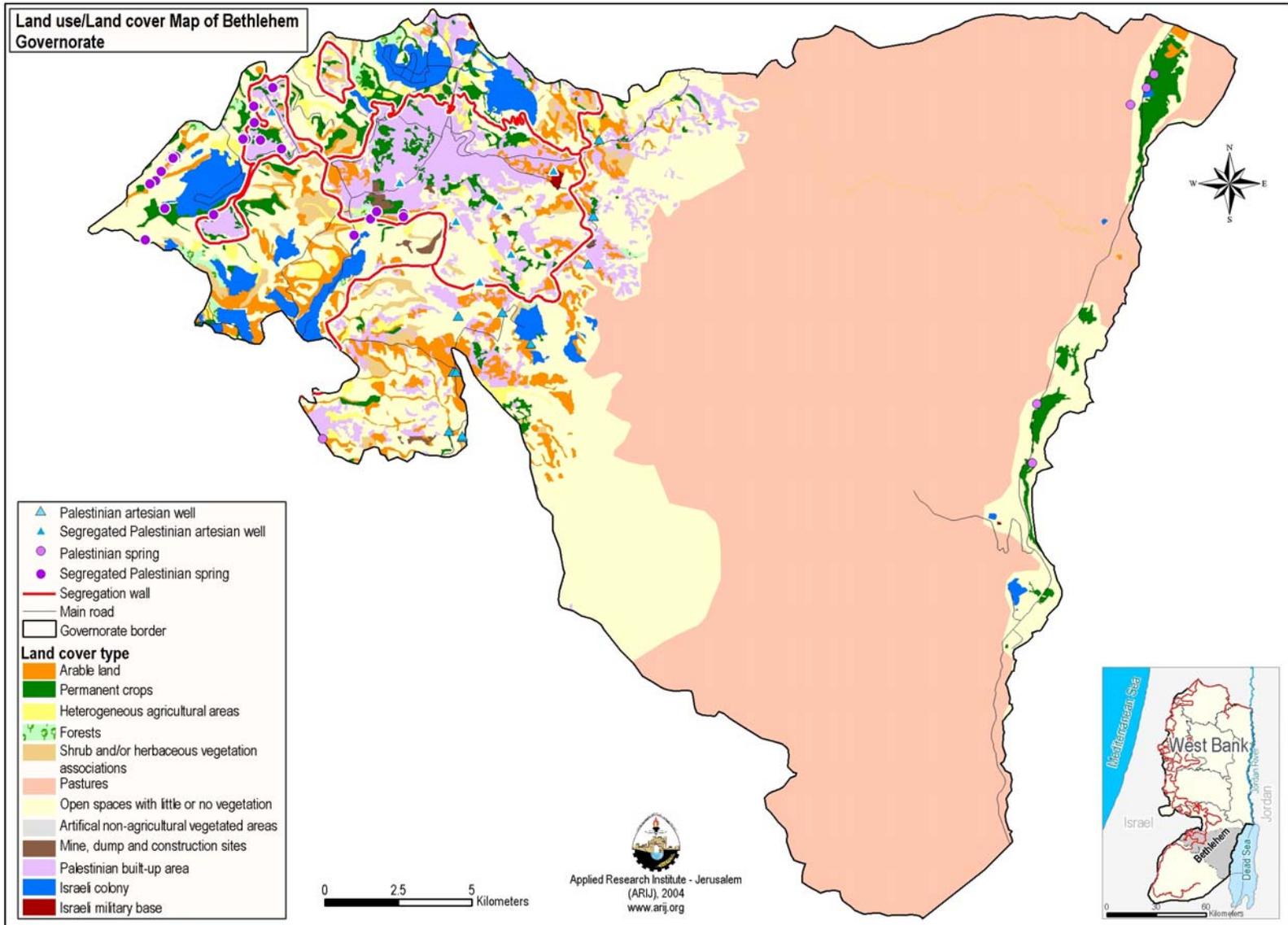


Figure 2-11: Percentage of land use/ land cover types inside the Segregation zone of its total area in Bethlehem Governorate



Map 2-4: Urban expansion between years 1989 – 2000 in Bethlehem Governorate



Map 2-5: Land use / land cover of Bethlehem Governorate

2.3.2 Hebron Governorate

Hebron Governorate is located in the southern part of the West Bank, bounded by Bethlehem from northeast and by the West Bank boundary from the other directions it comprises a total area of approximately 1067500 dunums.

Palestinian urbanization

The time series analysis showed that the Palestinian net built-up area increased from 13764 dunums in 1989 to 36254 dunums in 2000 with total increase of 163.4%, see Figure 2-12. This increase was accompanied by population growth from 278184 to 436637 in years 1989 and 2000 respectively, leading to a significant increase in the net built-up area density in relation to population from 49 m²/capita to 83 m²/capita in the same years.

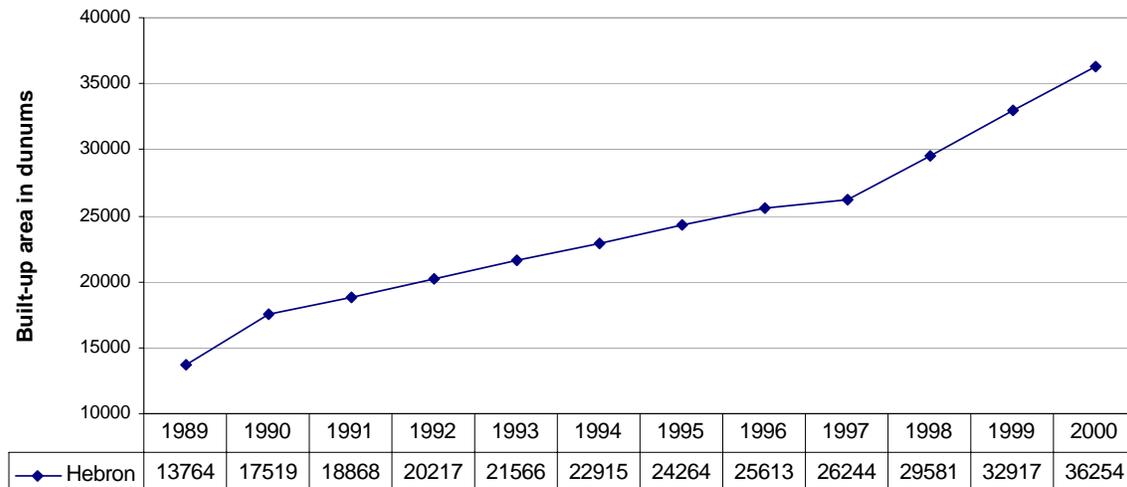


Figure 2-12: Actual and projected Palestinian net built-up area between years 1989-2000 in Hebron Governorate ($R^2 = 0.96$)

The analysis showed that the annual increase in built-up area in Hebron Governorate was 1750 dunums/year in the period between years 1989-1995, while it was 2398 dunums/year during 1995-2000. This trend is clearly shown in Figure 2-12 especially between the years 1997-2000 distinguishing between the periods of time when the PNA had full control over the West Bank in year 1995 where vast public and individual projects and investments took place.

However, the analysis revealed that the highest percent of this expansion occurred in Areas A to cover about 8% of the total Zone area in year 2000 with an annual increase in built-up area of 112 dunums/year, see Table 2-7 and Figure 2-13. Furthermore, Map 2-6

Table 2-7: Percentage of area covered by Palestinian net built-up area according to Geopolitical classification in Hebron Governorate in years 1990, 1996 and 2000

Area	1990	1996	2000
Area A	3.8	5.5	7.8
Area B	2.1	3.2	4.4
Area C	0.3	0.5	0.8
Area H2	32	38	48.5

shows that the urban development was concentrated in the available master plans of the Governorate localities and started to expand beyond their borders. On the other hand, the spatial distribution and areas of land use / land cover classes of the Governorate as derived from the 2002 IKONOS images are shown in Map 2-7 and Table 2-8.

Table 2-8: Area of Land use / land cover types in Hebron Governorate in dunums

Land Cover Type	Area
Arable land	229748
Forests	13951
Heterogeneous agricultural area	23333
Israeli military base	903
Jewish colony	6897
Mine, dump and construction sites	7061
Open spaces with little or no vegetation	259469
Palestinian built-up area	84538
Pastures	163944
Permanent crops	91788
Shrubs and/or herbaceous vegetation associations	185656
Total	1067288

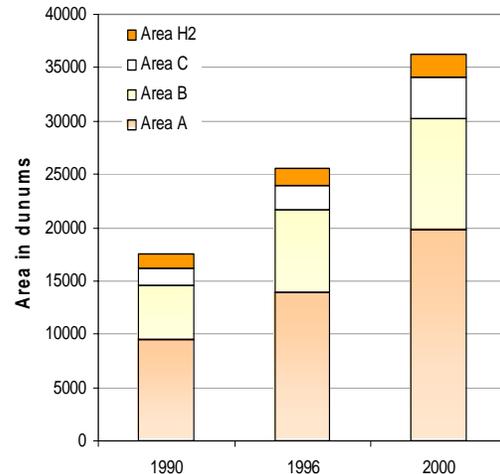


Figure 2-13: Palestinian built-up areas according to Geopolitical classification in Hebron Governorate

Israeli colonization activities

Map 2-6 shows the distribution of Israeli colonies in Hebron district from year 1989 to year 2000. It is clear that the colonies are more scattered in this region than they are in Bethlehem Governorate and concentrated in the city of Hebron. There are currently 44 Israeli colonies in Hebron Governorate which have been erected since 1967. Hebron Jewish Quarter that is located in the center of Hebron city is one of two colonies created during the first year of the Israeli occupation. This colony which is situated in the middle of a Palestinian city has provoked serious incidents since its establishment. According to the 1995 Taba Agreement, Hebron City is divided into areas H-1 and H-2, due to the presence of Israeli colonists within the city boundary. The Palestinian Authority exercises civil control over Palestinians in both areas, while Israel retains control over internal security and public order in H-2. There are 20000 Palestinians and 200 permanent Israeli colonists living in Area H-2. The Israeli numbers are supplemented by a further 200 Israeli colonist supporters who come in the daytime from other colonies in the West Bank.

The colonies in Hebron Governorate expanded during the nineties as illustrated in Map 2-6. The percentage of the total amount of the Governorate land occupied by the colonies increased from 0.50% in year 1989 to 1.12% in year 2000, see Figure 2-14, while the population in the colonies increased from 8044 to 13781. On the other hand, the Israeli military bases inside the Governorate of Hebron were increased by 55.28% in the period between years 1989-2000. Also after the second Intifada erupted in the year 2000, the

Israeli colonies have continued to expand dramatically. In 2003, the area of the Governorate covered by Israeli colonies was 13050 dunums reaching a total percentage of increase of 146% from year 1989.

Map 2-6 shows the distribution of bypass roads that are constructed around Hebron city and in the southern peripheries to connect Israeli colonies with each other. The path of the segregation wall is planned to enclose a large area of land in the southern and western peripheries to the Israel-facing side allowing the Israeli colonies to expand further on the Governorate lands, see

Map 2-7. However, the analysis revealed that about 43% (6019 dunums) of the forest area in the Governorate, as well as 40% (73824 dunums) of the area covered with shrubs and/or herbaceous vegetation associations are in the segregation zone, see Figure 2-15.

Halhul and the Beit Einun village were selected as local cases to study the relationship between Palestinian and Israeli urbanization and its impact on agricultural areas in chapter four.

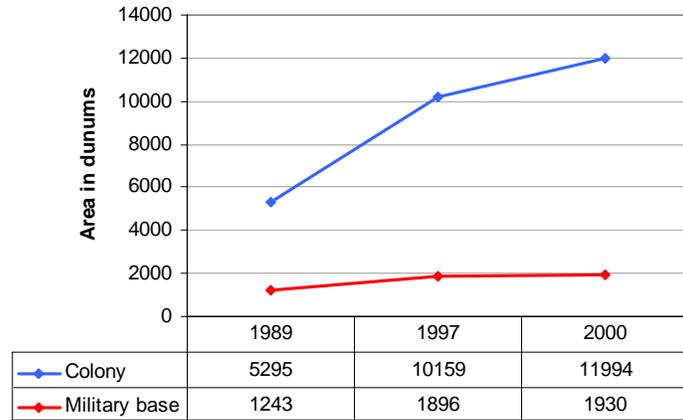


Figure 2-14: Israeli colonization activities in Hebron Governorate

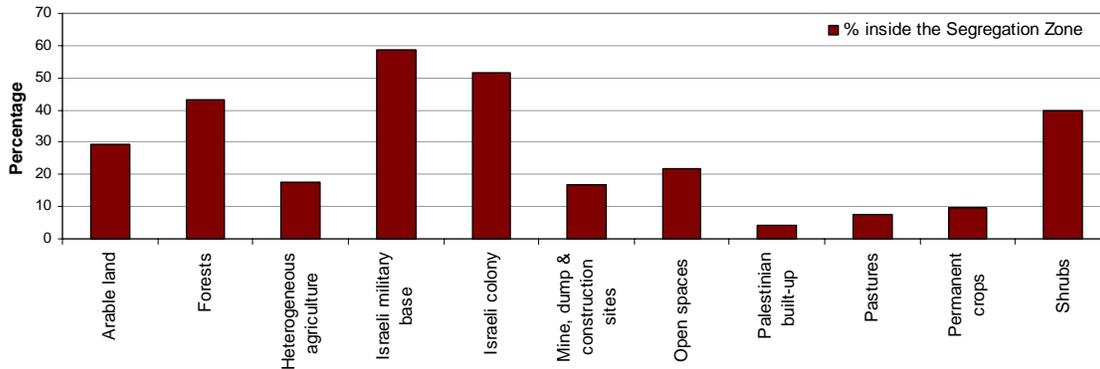
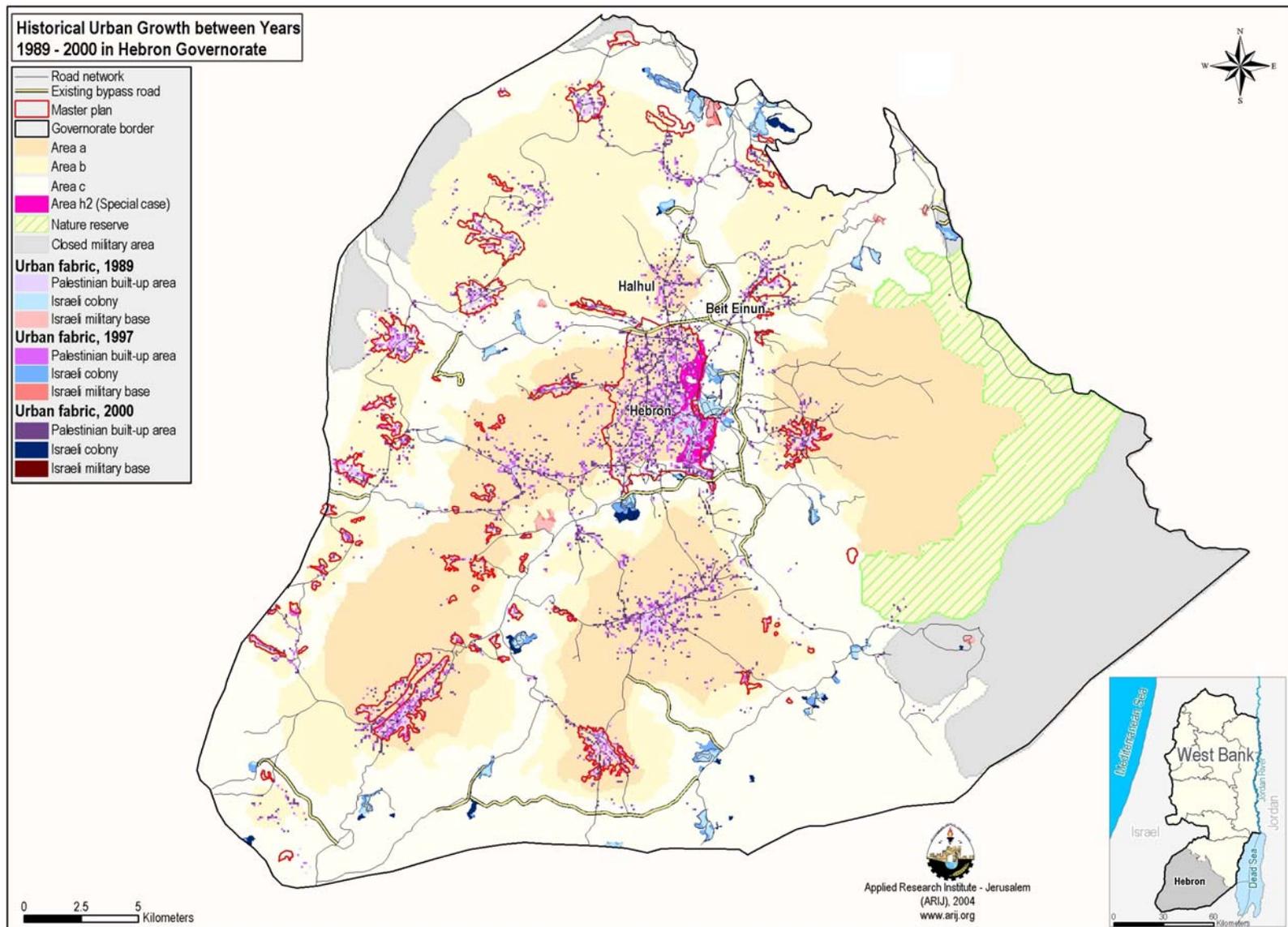
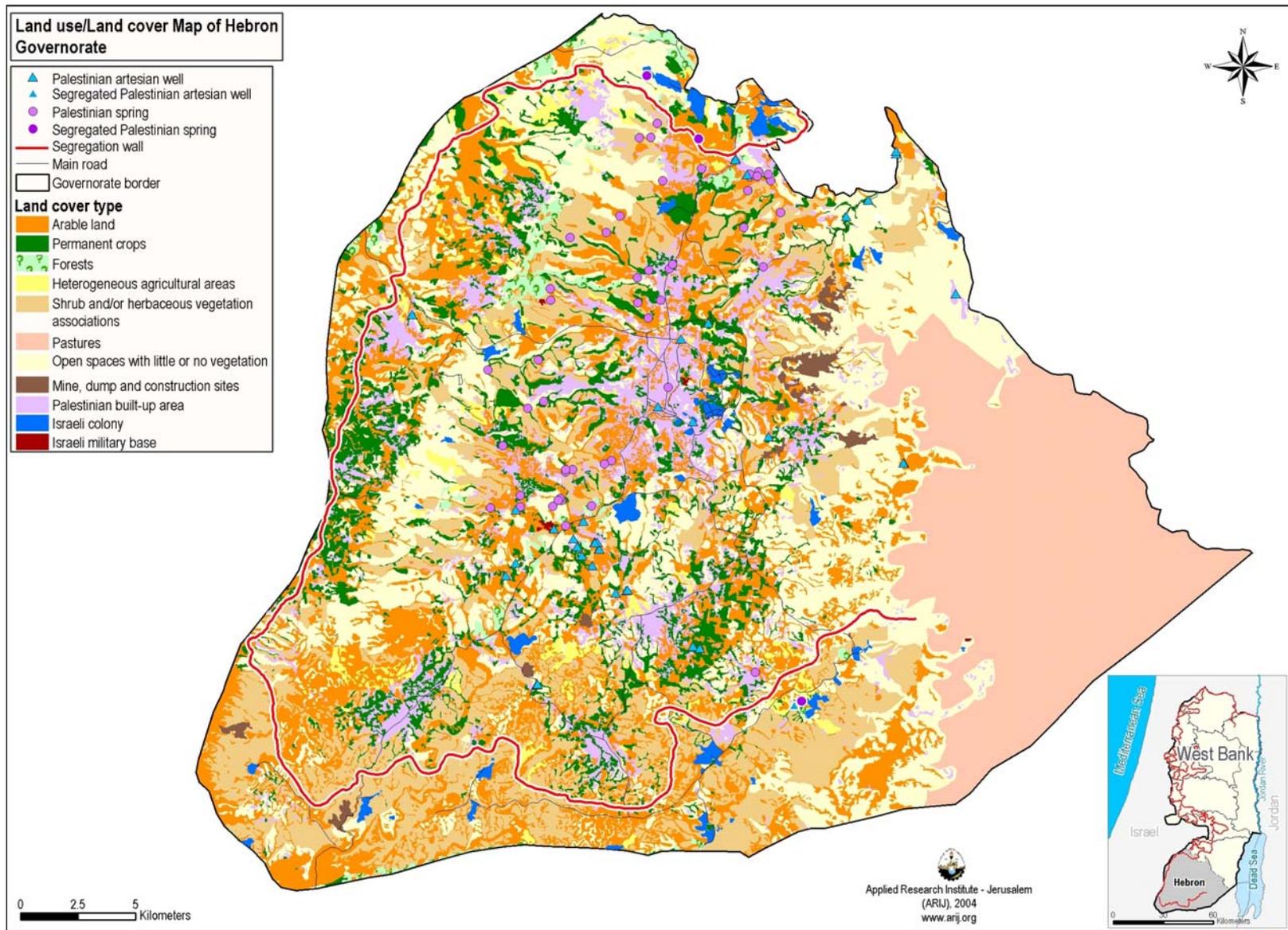


Figure 2-15: Percentage of land use/ land cover types inside the Segregation zone of its total area in Hebron Governorate



Map 2-6: Urban expansion between years 1989 – 2000 in Hebron Governorate



Map 2-7: Land use / land cover of Hebron Governorate

2.3.3 Jenin Governorate

Jenin Governorate is located in the northern part of the West Bank, bounded by Tulkarm, Nablus and Tubas Governorates from the southwest, south and southeast and by the West Bank boundary from the other directions, it comprises a total area of approximately 572700 dunums.

Palestinian urbanization

The satellite images analysis showed that the Palestinian built-up area expanded from 6500 dunums in year 1989 to 13146 dunums in year 2000 with total increase rate of 96%, see Figure 2-16. The population of Jenin Governorate has increased from 143171 in the year 1989 to reach 216126 in year 2000 to add a net built-up area density of 14 m²/capita in that year from the 47 m²/capita that was available in year 1989.

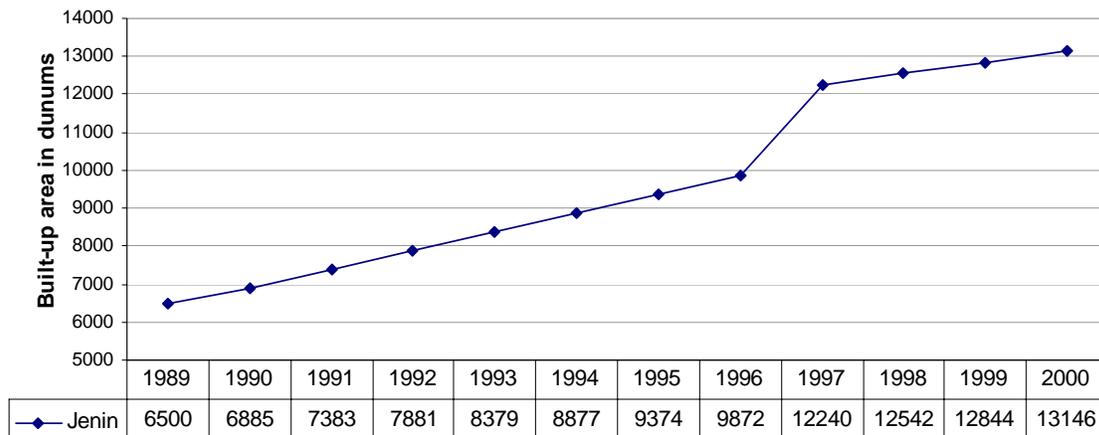


Figure 2-16: Actual and projected Palestinian net built-up area between years 1989-2000 in Jenin Governorate ($R^2 = 0.96$)

The analysis showed that the annual increase of Palestinian built-up area was 479 dunums/year in the period between 1989-1995, while it reached 754 dunums/year during 1995-2000. This trend is clearly shown in Figure 2-16 especially between the years 1997-2000 where a significant increase occurred after the PNA has controlled most of the Governorate lands as part of Wye River Memorandum that took place in 1998. It is noticed that this urban development is occurring within the borders of the Palestinian localities master plans as illustrated in Map 2-8. Furthermore, the analysis revealed that Areas A and B are covered by almost the same percent of built-up area (about 3%) with an annual increase of 39 and 12 dunums/year, respectively, in the period between 1989-year 2000, see Table 2-9 and Figure 2-17. The spatial distribution and

Table 2-9: Percentage of area covered by Palestinian net built-up area according to Geopolitical classification in Jenin Governorate in years 1990, 1996 and 2000

Area	1990	1996	2000
Area A	1.8	2.6	3.3
Area B	1.6	2.3	3
Area C	0.1	0.2	0.5

areas of land use / land cover classes of the Governorate as derived from the 2002 IKONOS images are shown in Map 2-9 and Table 2-10.

Table 2-10: Area of Land use / land cover types in Jenin Governorate in dunums

Land Cover Type	Area
Arable land	184154
Forests	18529
Heterogeneous agricultural area	26834
Israeli military base	2036
Jewish colony	3308
Mine, dump and construction sites	1602
Open spaces with little or no vegetation	131299
Palestinian built-up area	40436
Permanent crops	121400
Plastic houses	1649
Shrubs and/or herbaceous vegetation associations	41388
Total	572635

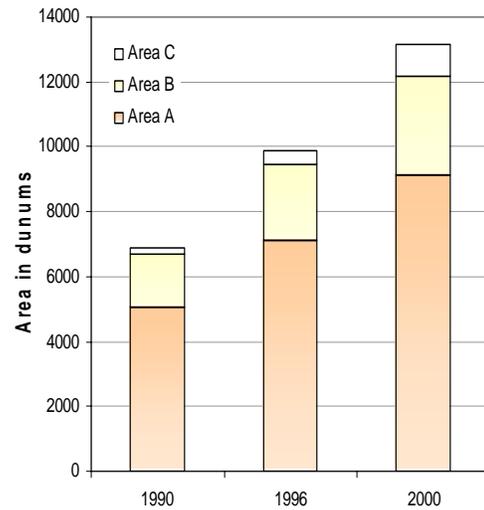


Figure 2-17: Palestinian built-up areas according to Geopolitical classification in Jenin Governorate

Israeli colonization activities

There are currently 12 Israeli colonies inside the Governorate borders. Map 2-9 shows that most of the colonies are situated in the north-western peripheries, and some are situated close to Jenin city. Figure 2-18 shows that the colonies continued to expand with an accelerating rate especially after the year 1997 with an annual increase of 434 dunums/year till year 2000. In addition, the percentage of the Governorate land occupied by Israeli colonies increased from 0.18% in year 1989 to 0.57% in year 2000, while the population increased from 862 colonists to 1770 colonists. On the other hand, the five scattered Israeli military bases in the southern part of Jenin Governorate, were also expanded with an increase rate of 12.41% during the period between 1989- 2000, see Map 2-8.

However, after the second Intifada erupted, the colonies have continued to expand to reach a total area of 3737 dunums in the year 2003 and record an increase of 269% between the years 1989 and 2003. The segregation wall was also constructed on Jenin lands along with the Governorate borders to surround it from its eastern, northern and western

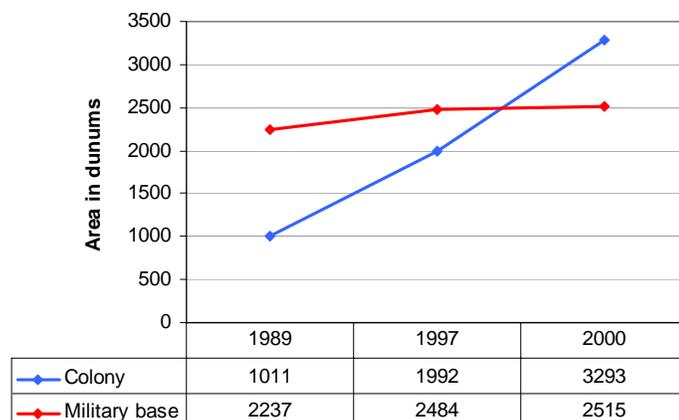


Figure 2-18: Israeli colonization activities in Jenin Governorate

peripheries as demonstrated in Map 2-9. This wall encloses 80% of the colonies and threatens 42% (7708 dunums) of the forest area in the Governorate which is in the segregation zone, see Figure 2-19. There is about 1 well and 5 springs in the eastern and western segregation zones with an average annual discharge of approximately 227400 CM that will be threatened of the Governorate water supplied for the use of domestic and agricultural sectors.

Al Yamun and Az Zababida were selected to study the relationship between Palestinian urban development and Israeli colonization and their impact on agricultural areas **at local** level and presented in chapter four. The in-depth analysis was applied using Az Zababida as a special case study.

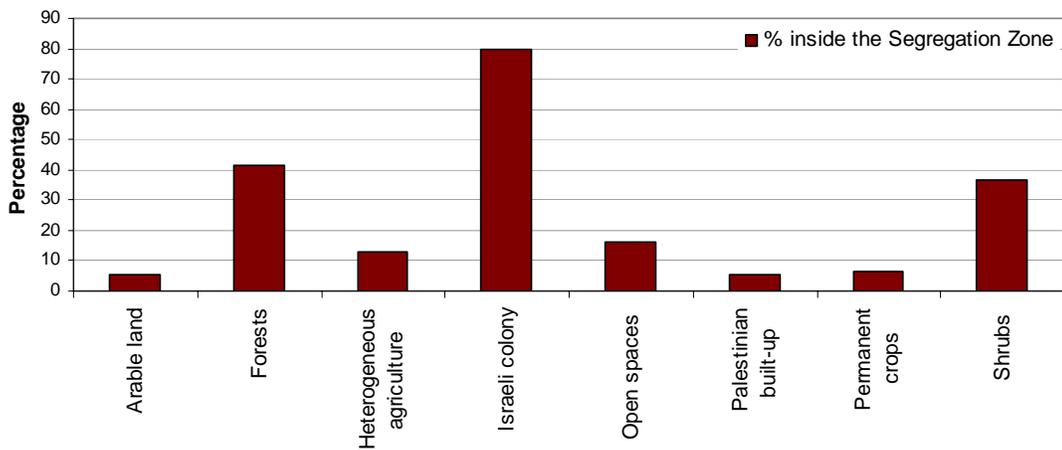
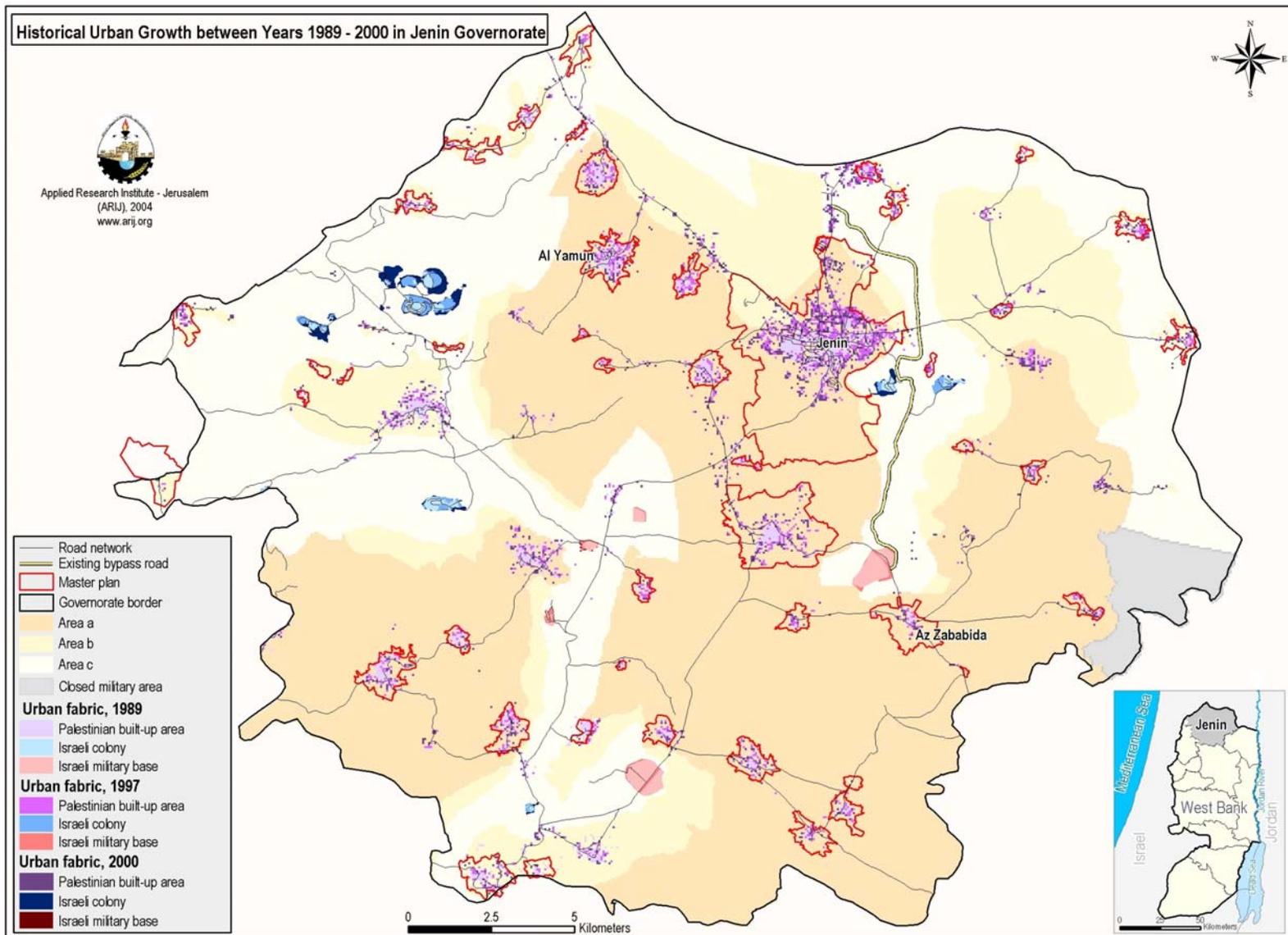
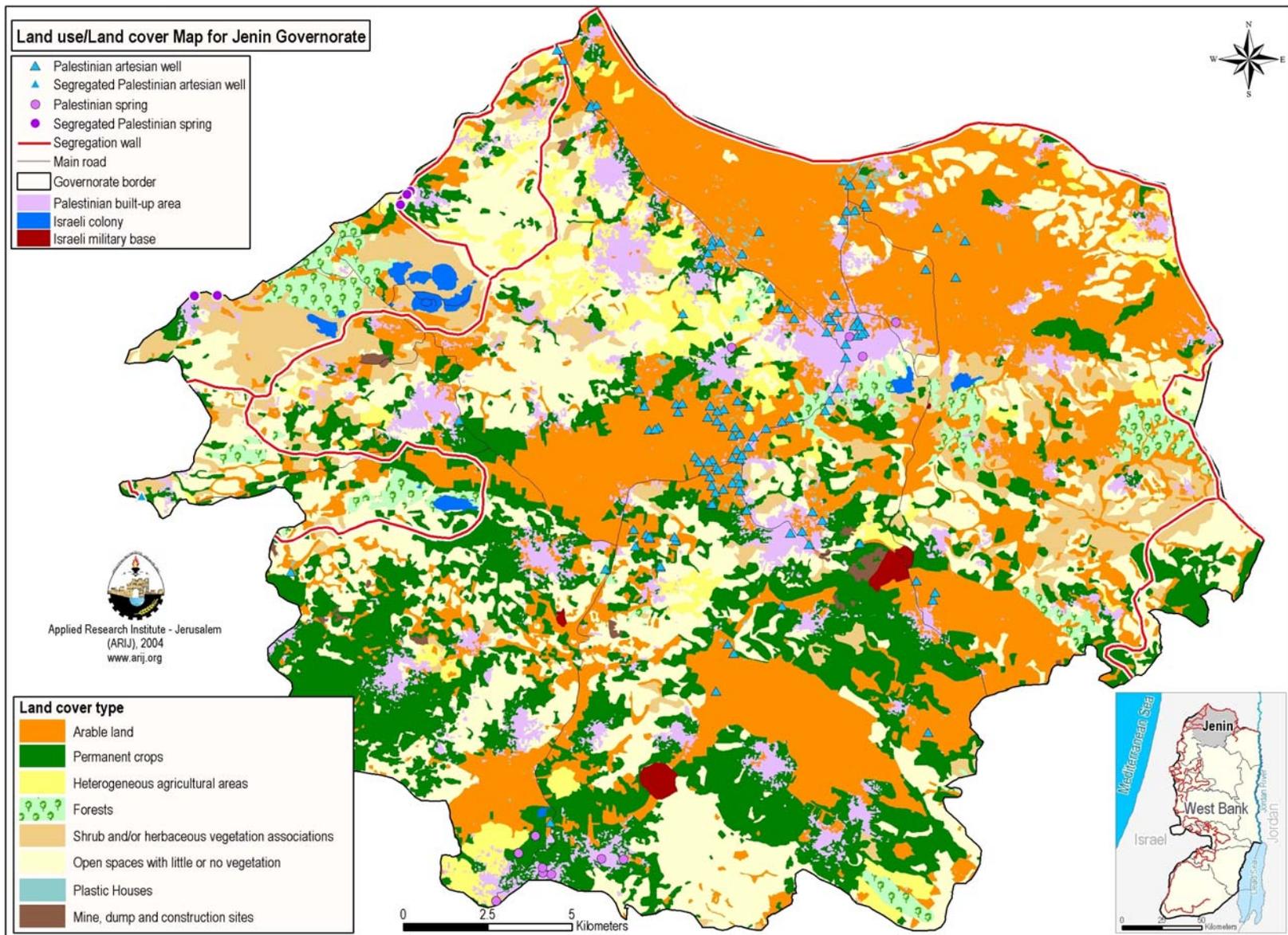


Figure 2-19: Percentage of land use/ land cover types inside the Segregation zone of its total area in Jenin Governorate



Map 2-8: Urban expansion between years 1989 – 2000 in Jenin Governorate



Map 2-9: Land use / land cover of Jenin Governorate

2.3.4 Jericho Governorate

Jericho Governorate is located at the eastern boundary of the West Bank and extends from the Dead Sea in the south to include the village Marj Na'aja to the north and from the eastern slopes of the Jerusalem and Ramallah mountains in the west to the Jordan River in the east. The Governorate total area is approximately 608790 dunums.

Palestinian urbanization

The satellite images analysis showed that the Palestinian built-up area expanded from 1378 to 2695 dunums in years 1989 and 2000 respectively, with total increase of 95.7%, see Figure 2-20. This increase was accompanied by growth in total population from 22187 to 35352 and an increase in the net built-up area density from 62 m²/capita to 76 m²/capita in the same years.

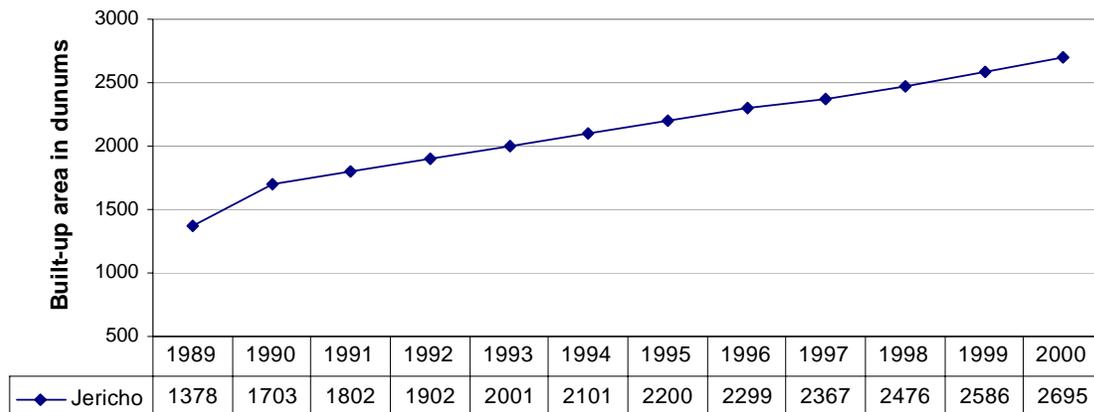


Figure 2-20: Actual and projected Palestinian net built-up area between years 1989-2000 in Jericho Governorate ($R^2 = 0.98$)

In contrast with the other Governorates and although the built-up area continued to increase, the annual change in Palestinian built-up area was 137 dunums/year in the period between 1989-1995, and decreased to 99 dunums/year during 1995-2000. However, the analysis showed that the urban expansion took place mostly in Area A (covering 3.7% of the Zone area), see Map 2-10, while the expansion in

Table 2-11: Percentage of area covered by Palestinian net built-up area according to Geopolitical classification in Jericho Governorate in years 1990, 1996 and 2000

Area	1990	1996	2000 ⁵
Area A	2.1	3	3.7
Area B	7.2	9.5	6.5
Area C	0.04	0.05	0.04

⁵ The sudden decrease observed in Area B in year 2000 is due to the low accuracy obtained for this analysis. The classification accuracy of Jericho Governorate was affected by the fact that built-up area was not easily distinguished from bare rock area as a mix occurred between their spectral values where the spectral reflectance of the rocky areas dominated the reflectance of the built-up areas.

Areas B and C have been very limited, see Table 2-11 and Figure 2-21. On the other hand, the spatial distribution and areas of land use / land cover classes of the Governorate as derived from the 2002 IKONOS images are shown in Map 2-11 and Table 2-12.

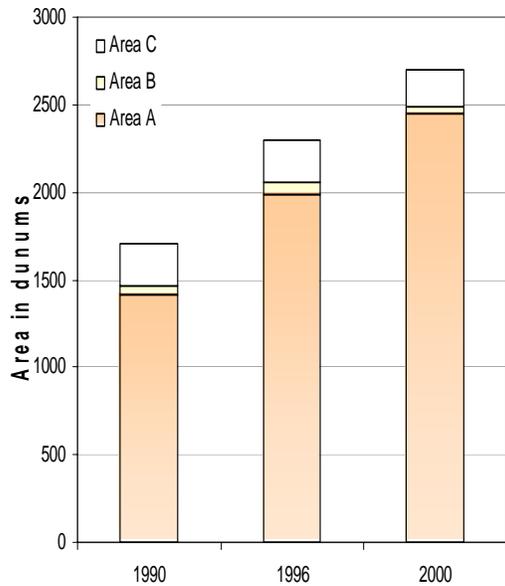


Figure 2-21: Palestinian built-up areas according to Geopolitical classification in Jericho Governorate

Table 2-12: Area of Land use / land cover types in Jericho Governorate in dunums

Land Cover Type	Area
Arable land	73623
Artificial non-agricultural vegetated areas	57
Heterogeneous agricultural area	1504
Inland waters	685
Israeli military base	10057
Jewish colony	22114
Mine, dump and construction sites	23
Open spaces with little or no vegetation	358051
Palestinian built-up area	8437
Pastures	42831
Permanent crops	25374
Plastic houses	1244
Shrubs and/or herbaceous vegetation associations	64626
Total	608626

Israeli colonization activities

Jericho Governorate has been subjected to massive Israeli colonization activities due to its location near the border and in the Jordan Valley with availability of water and fertile soil. Map 2-10 shows that most of the Governorate land is classified as Area C (part of it is an Israeli closed military area) and filled by Israeli colonies and military bases that is all under Israeli control and inaccessible for Palestinians. A bypass road has been constructed east of Jericho city to connect the Israeli colonies and military bases located in the southern and the northern parts of the Governorate.

The current number of Israeli colonies in the Governorate is 31, and most of them were erected during the seventies (ARIJ database). Figure 2-22 indicates that the colonies expansion accelerated during the nineties especially after year 1997. The Israeli colonies in Jericho Governorate occupied 2.6% of the its total area in 1989 and increased significantly by 943

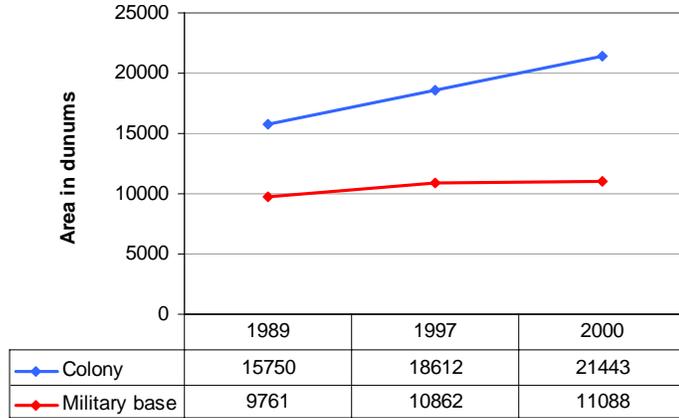
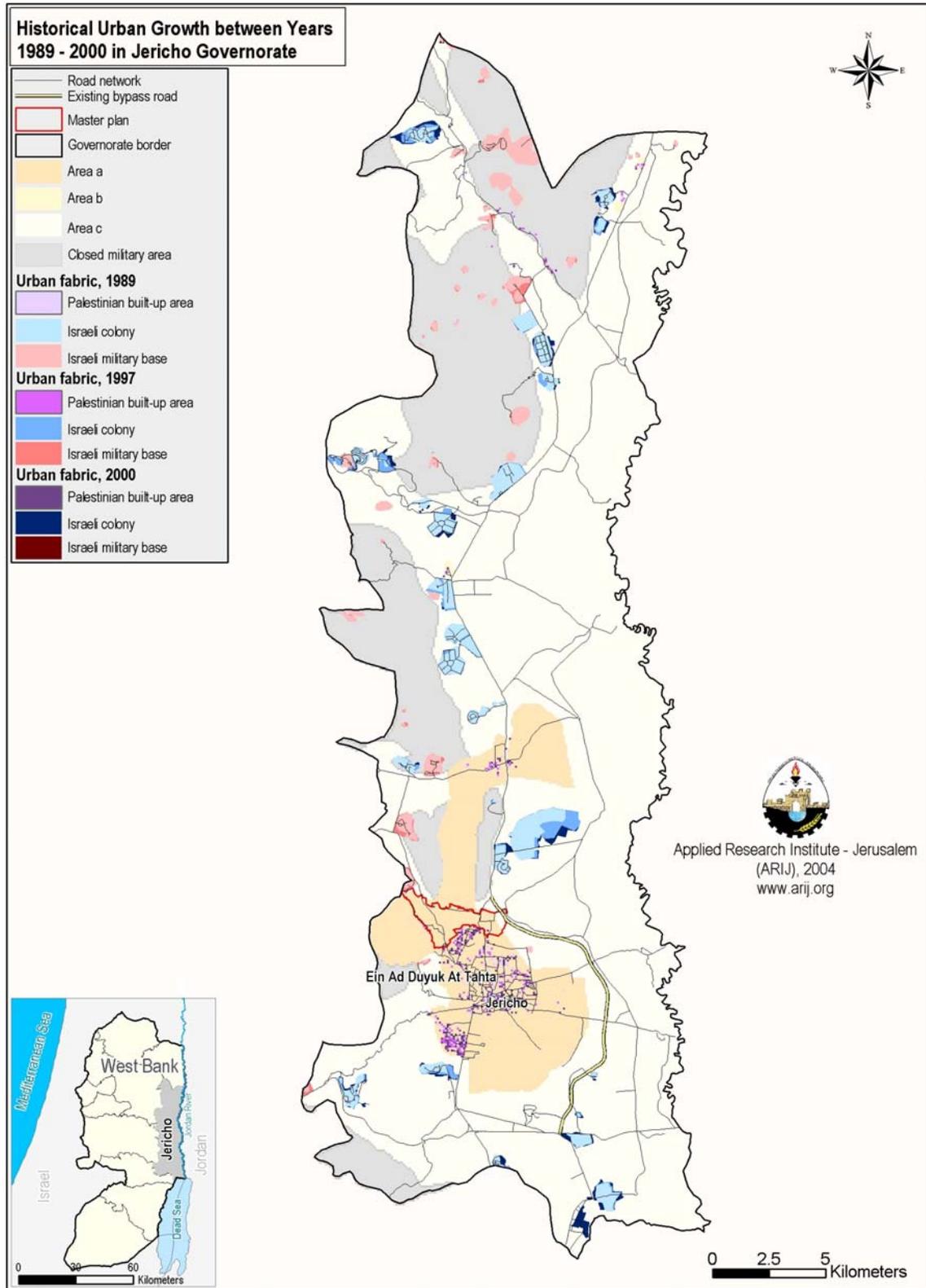


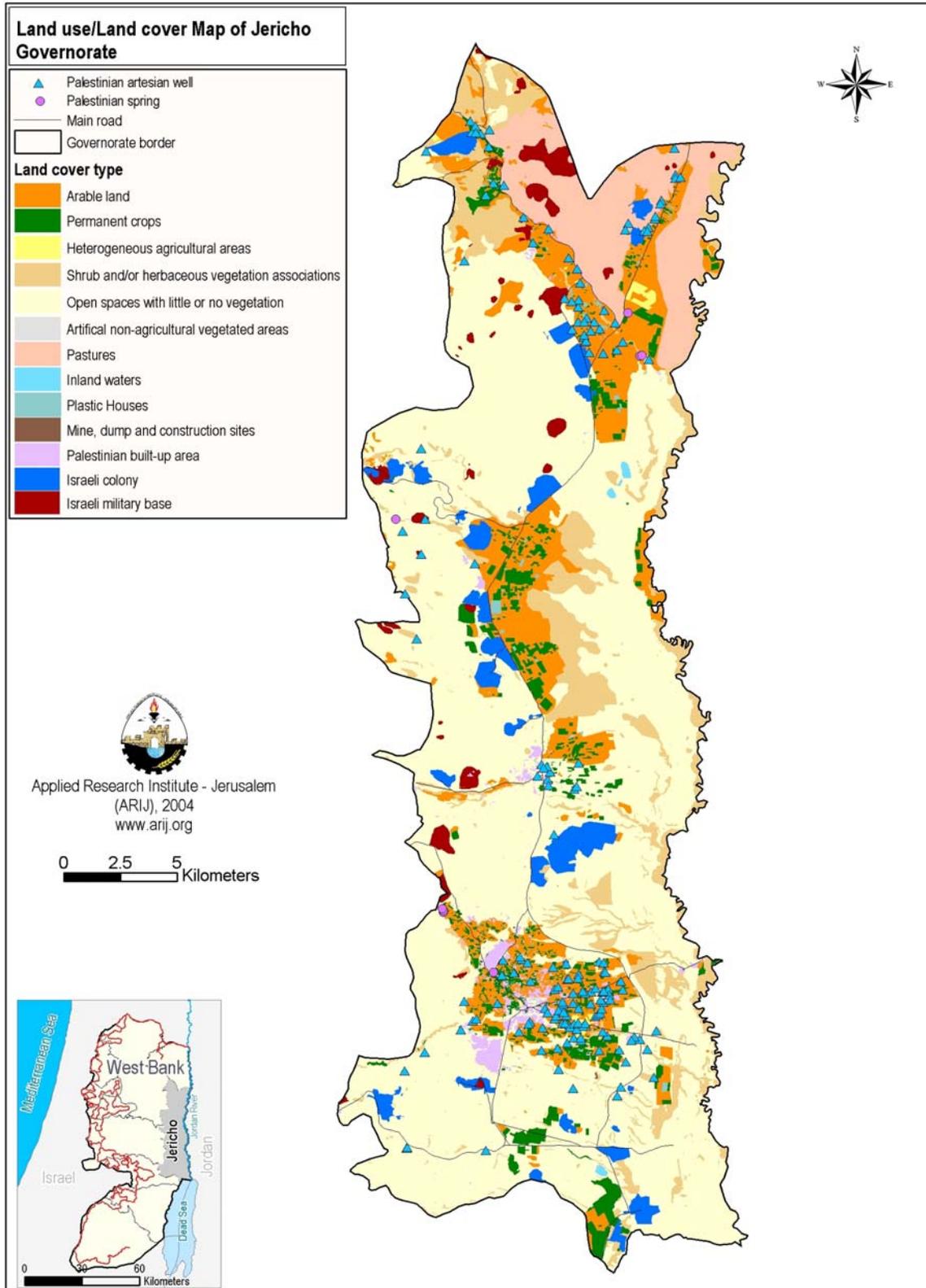
Figure 2-22: Israeli colonization activities in Jericho Governorate

dunums/year between years 1997-2000 to occupy 3.5% of the Governorate total area in year 2000. Moreover, the Israeli colonies population increased from 3564 colonists in year 1989 to 4886 colonists in year 2001. This was accompanied by an increase in Israeli military bases located within Jericho Governorate with an increase of 13.6% between the years 1989 and 2000. After the year 2000, the total area of colonies in Jericho Governorate has increased to 22230 dunums in year 2003 raising the increase rate to 41% and the percent of the Governorate area occupied by the colonies to 3.7%. It is worth mentioning that Jericho Governorate is included within the Israeli planned eastern segregation zone where the largest number of wells is located (i.e. 74 wells and 4 springs). The total tapping of the Governorate springs and wells is approximately 23 MCM (Million Cubic Meter) which is an amount that will be threatened by the Israeli plan of segregation, see Map 2-11.

Jericho city and Ein ad Duyuk at Tahta village were selected and presented in chapter four to study the relationship between Palestinian urban development and Israeli colonization activities and their impact on agricultural areas at local level.



Map 2-10: Urban expansion between years 1989 – 2000 in Jericho Governorate



Map 2-11: Land use / land cover of Jericho Governorate

2.3.5 Jerusalem Governorate

Jerusalem Governorate is located in the southern part of the West Bank and extends from the Dead Sea and Jericho Governorate in the east to the West Bank boundary in the west, and from Bethlehem Governorate in the south to Ramallah in the north with a total area of approximately 353680 dunums.

Palestinian Urbanization

The time series analysis showed that the Palestinian net built-up area increased from 12520 dunums in 1989 to 26110 dunums in 2000 with total increase of 108.54%, see Figure 2-23. This increase was accompanied by growth in total population from 246488 to 354417 in years 1989 and 2000 respectively, leading to a significant increase in the built-up to population density from 51 m²/capita to 74 m²/capita in the same years.

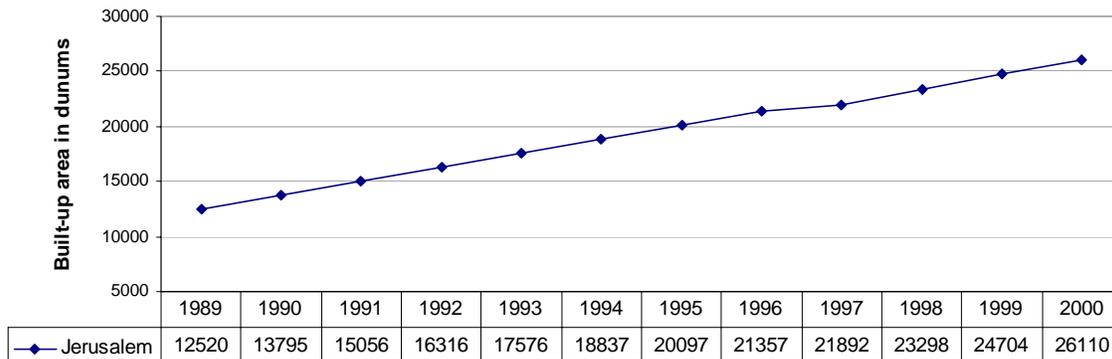


Figure 2-23: Actual and projected Palestinian net built-up area between years 1989-2000 in Jerusalem Governorate ($R^2 = 0.99$)

The analysis showed that the annual increase in built-up area in Jerusalem Governorate was 1263 dunums/year in the period between years 1989-1995, while it was 1203 dunums/year during 1995-2000. This decrease was in the period after the PNA establishment. It is worth mentioning that Jerusalem Governorate includes Areas B and C but has no Area A geopolitically classified, see Map 2-12. The analysis revealed that the highest percent of this expansion occurred in Areas B to cover about 28% of the total Zone area in year 2000, see Table 2-13 and Figure 2-24. However, the spatial distribution and areas of land use / land cover classes of the Governorate as derived from the 2002 IKONOS images are shown in Map 2-13 and Table 2-14.

Table 2-13: Percentage of area covered by Palestinian net built-up area according to Geopolitical classification in Jerusalem Governorate in years 1990, 1996 and 2000

Area	1990	1996	2000
Area B	14.2	24.7	27.6
Area C	3	4.4	5.6

Table 2-14: Area of Land use / land cover types in Jerusalem Governorate in dunums

Land Cover Type	Area
Arable land	36703
Forests	5463
Heterogeneous agricultural area	5686
Israeli military base	4217
Jewish colony	25364
Mine, dump and construction sites	2601
Open spaces with little or no vegetation	109115
Palestinian built-up area	40817
Pastures	61763
Permanent crops	12264
Shrubs and/or herbaceous vegetation associations	49654
Total	353647

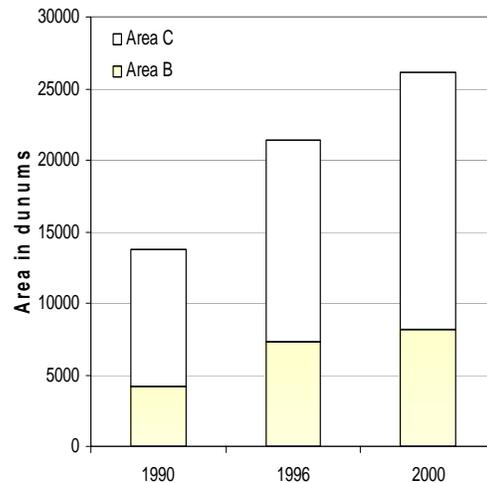


Figure 2-24: Palestinian built-up areas according to Geopolitical classification in Jerusalem Governorate

Israeli colonization activities

Jerusalem Governorate is illegally annexed by the Israeli occupation power and the expansion of Israeli colonies, which are seen as a part of the Israeli municipality boundaries of Jerusalem, is significant. Map 2-12 shows the distribution of the 36 Israeli colonies in Jerusalem Governorate and their expansion from year 1989 to year 2000. The population of colonies increased from 115140 colonists in 1989 to 190074 colonists in year 2000. Additionally, the percentage of the Governorate total area occupied by Israeli colonies increased from 5.16% to 10.81% during the same period. This significant increase in Israeli colonies population and total area reflects the Israeli strategy of settling the region of East Jerusalem. Figure 2-25 shows that the colonies continued to expand dramatically during the whole decade along with the Israeli military bases expansion. The military bases are situated in the north-eastern peripheries and were increased by 29.83% in the period between years 1989-2000.

In the year 2003 the total area of the Israeli colonies in Jerusalem Governorate reached approximately 37837 dunums with an increase rate of 107% from 1989 to 2003. Along with the expansion in Israeli colonies, Israel continued its plans by constructing the segregation wall which would have a serious impact on the Palestinian communities in

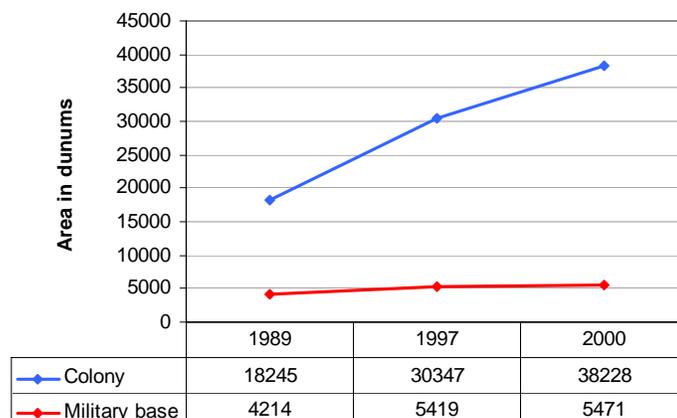


Figure 2-25: Israeli colonization activities in Jerusalem Governorate

Governorate. It acts as a physical barrier snaking from north to south in the middle of the Governorate, see Map 2-13. The analysis showed that the 82% of the Israeli colonies in the Governorate will be situated at the Israel-facing side or be surrounded by the wall, while the Palestinian villages and cities will be disconnected from each other. About 65% (26659 dunums) of the Palestinian built-up area in the Governorate is threatened by the segregation wall, as well as a significant amount of agricultural land and forest. 96% (5271 dunums) of the forest, 66% (24231 dunums) of the arable land, 93% (5314 dunums) of the heterogeneous agricultural land and 91% (11150 dunums) of the permanent crops area in the Governorate will be situated in the segregation zone, see Figure 2-26. Moreover, the wall segregates 2 wells and 7 springs with 68.3 CM of aquifers total tapping.

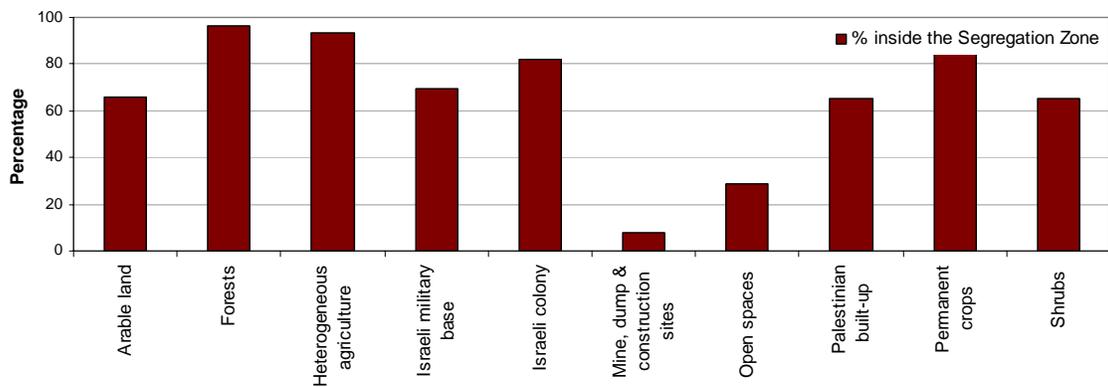
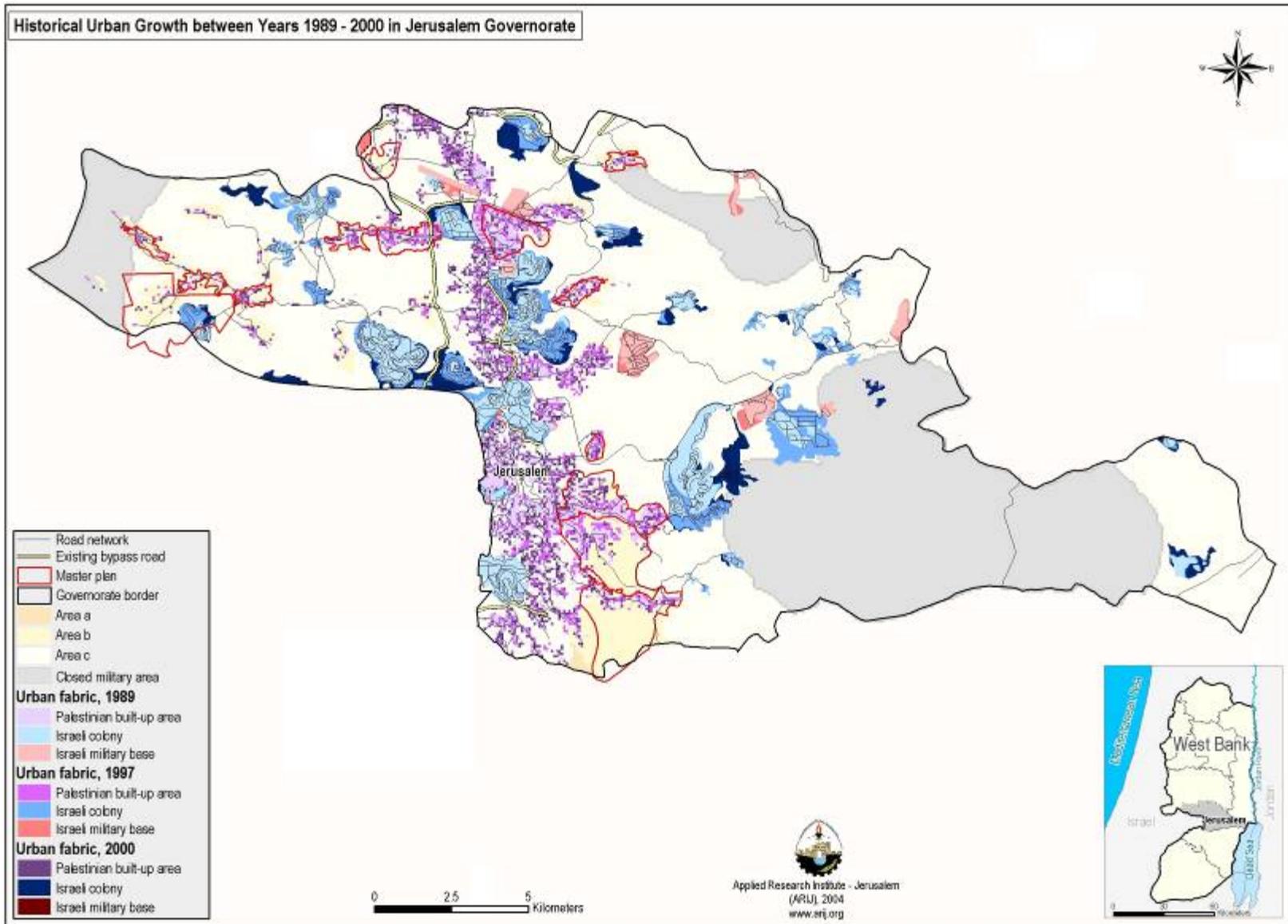
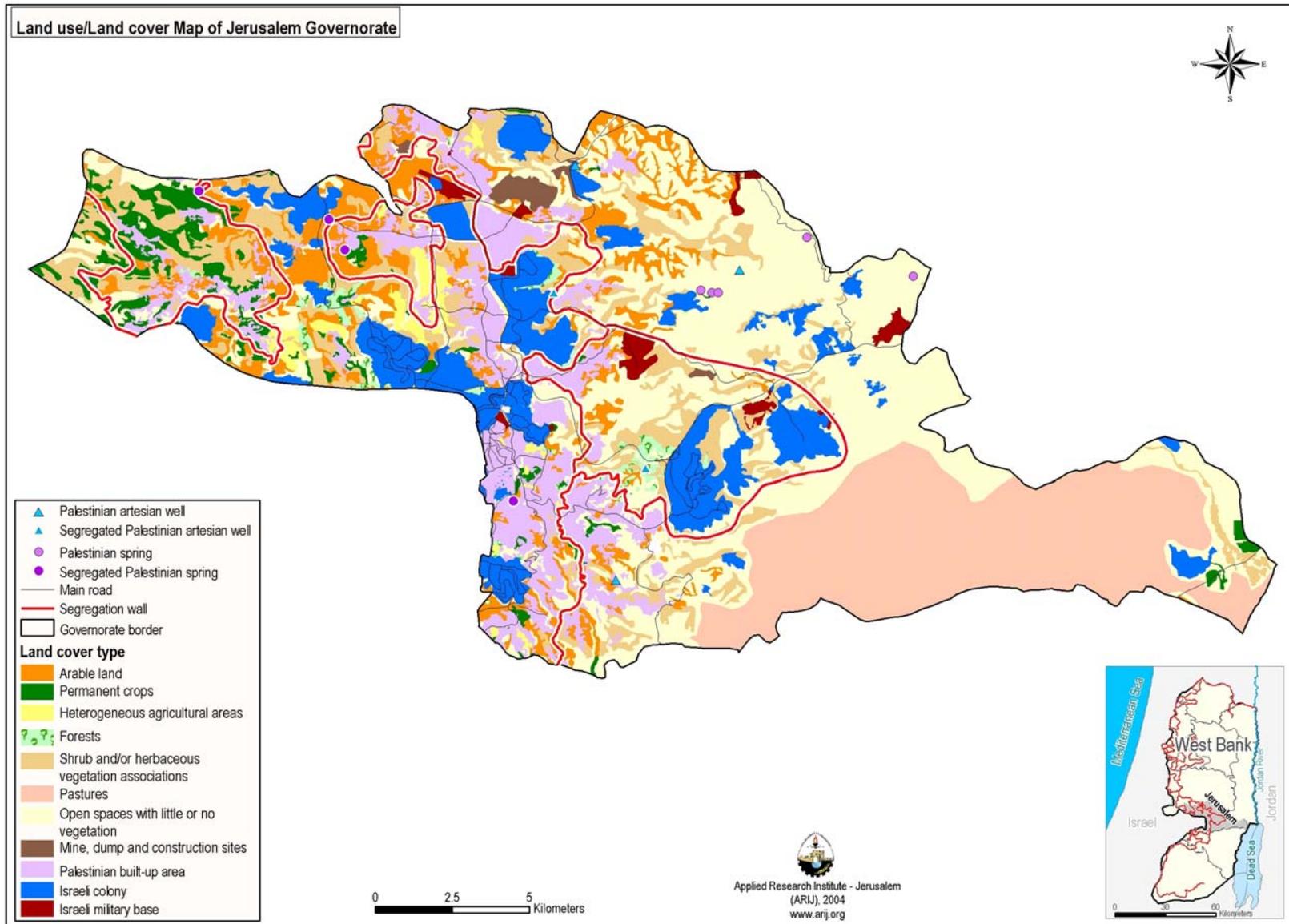


Figure 2-26: Percentage of land use/ land cover types inside the Segregation zone of its total area in Jerusalem Governorate



Map 2-12: Urban expansion between years 1989 – 2000 in Jerusalem Governorate



Map 2-13: Land use / land cover of Jerusalem Governorate

2.3.6 Nablus Governorate

Nablus Governorate is bounded by Jenin and Tubas from the north, Tulkarm, Qalqiliya and Salfit from the west, Ramallah from the south and Jericho from the east and comprises a total area of approximately 613600 dunums.

Palestinian Urbanization

The LANDSAT analysis showed that the Palestinian net built-up area increased from 7835 dunums in year 1989 to 14475 dunums in year 2000 with total increase of 84.75%, see Figure 2-27. This increase was accompanied by growth in total population from 183893 to 278317 in years 1989 and 2000 respectively, leading to an increase in the built-up density from 46 m²/capita to 52 m²/capita in the same period.

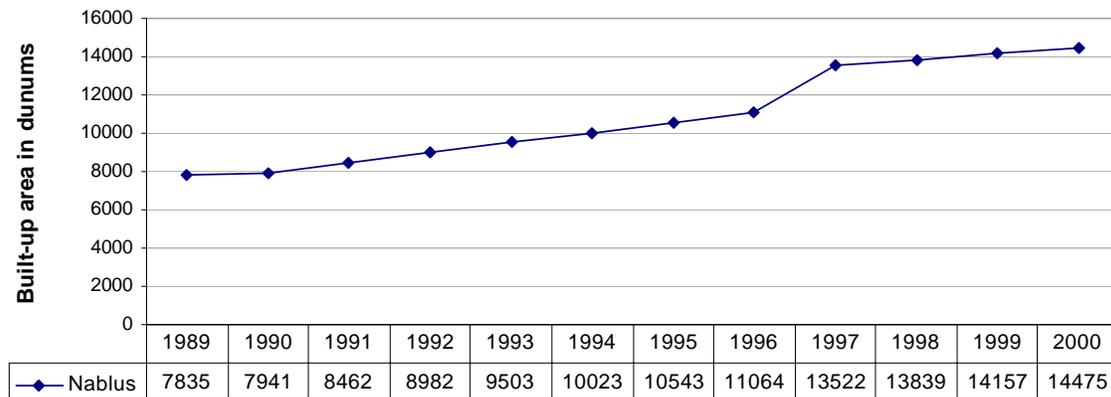


Figure 2-27: Actual and projected Palestinian net built-up area between years 1989-2000 in Nablus Governorate ($R^2 = 0.95$)

The analysis showed that the annual increase in built-up area in Nablus Governorate was 451 dunums/year in the period between years 1989-1995, while it was 786 dunums/year during 1995-2000. This trend is clearly shown in Figure 2-27 especially between the years 1996-1998. However, the analysis revealed that the highest percent of this expansion occurred in Areas A and B to cover about 6.5% and 2.5% of the total Zone area in year 2000 respectively, see Table 2-15, Figure 2-28 and Map 2-14. The spatial distribution and areas of land use / land cover classes of the Governorate as derived from the 2002 IKONOS images are shown in Map 2-15 and Table 2-16.

Table 2-15: Percentage of area covered by Palestinian net built-up area according to Geopolitical classification in Nablus Governorate in years 1990, 1996 and 2000

Area	1990	1996	2000
Area A	4.2	5.5	6.5
Area B	1.2	1.8	2.5
Area C	0.10	0.13	0.30

Table 2-16: Area of Land use / land cover types in Nablus Governorate in dunums

Land Cover Type	Area
Arable land	109225
Artificial non-agricultural vegetated areas	10
Forests	4358
Heterogeneous agricultural area	35908
Israeli military base	2984
Jewish colony	11883
Mine, dump and construction sites	4922
Open spaces with little or no vegetation	191101
Palestinian built-up area	43213
Permanent crops	164034
Plastic houses	15
Shrubs and/or herbaceous vegetation associations	45980
Total	613633

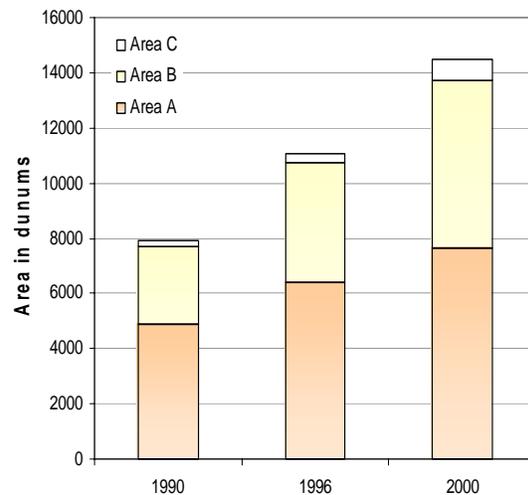


Figure 2-28: Palestinian built-up areas according to Geopolitical classification in Nablus Governorate

Israeli colonization activities

Map 2-14 shows the distribution of the 24 Israeli colonies in Nablus Governorate from year 1989 to year 2000. The colonies are scattered in the western, southern and eastern parts of the Governorate and situated close to Palestinian communities adding constraints to their consistent current and future urban development.

The colonies in Nablus Governorate expanded during the nineties as illustrated in Map 2-14. The percentage of the total amount of the Governorate land occupied by the colonies increased from 0.6% in year 1989 to 1.9% in year 2000, see Figure 2-29, along with an increase in colonies population from 3149 to 7852 colonists. On the other hand, the Governorate experienced an

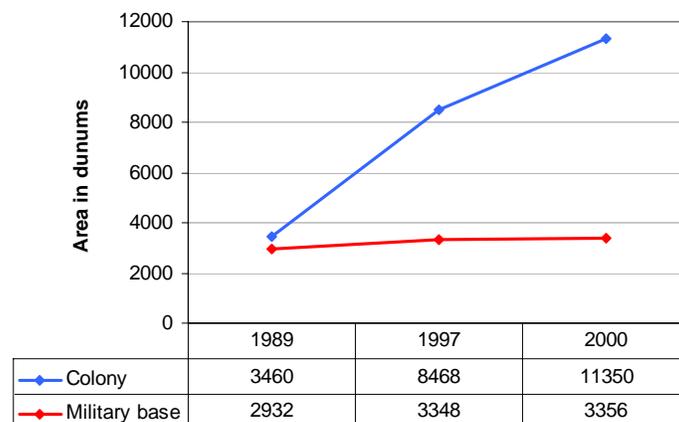
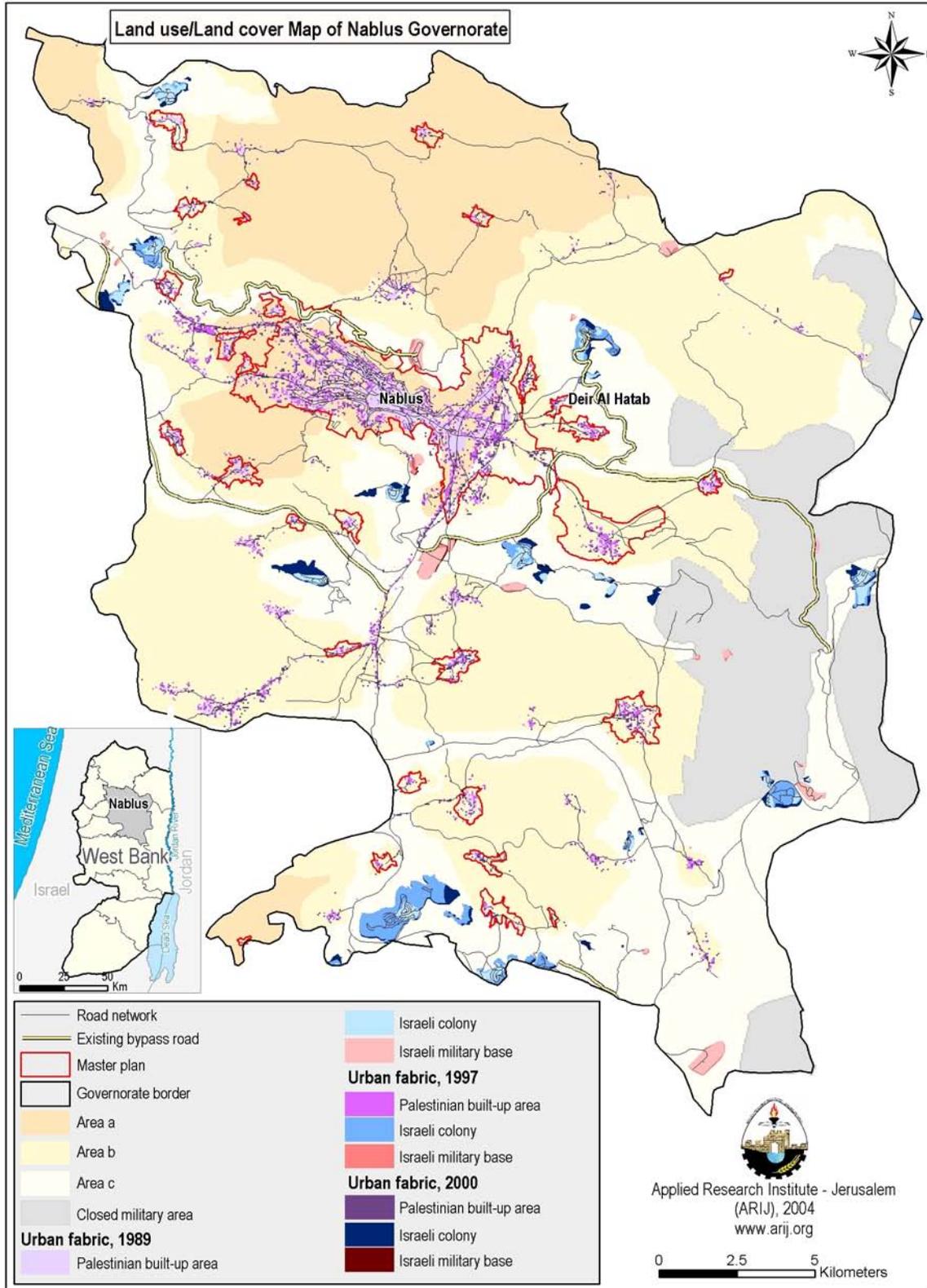


Figure 2-29: Israeli colonization activities in Nablus Governorate

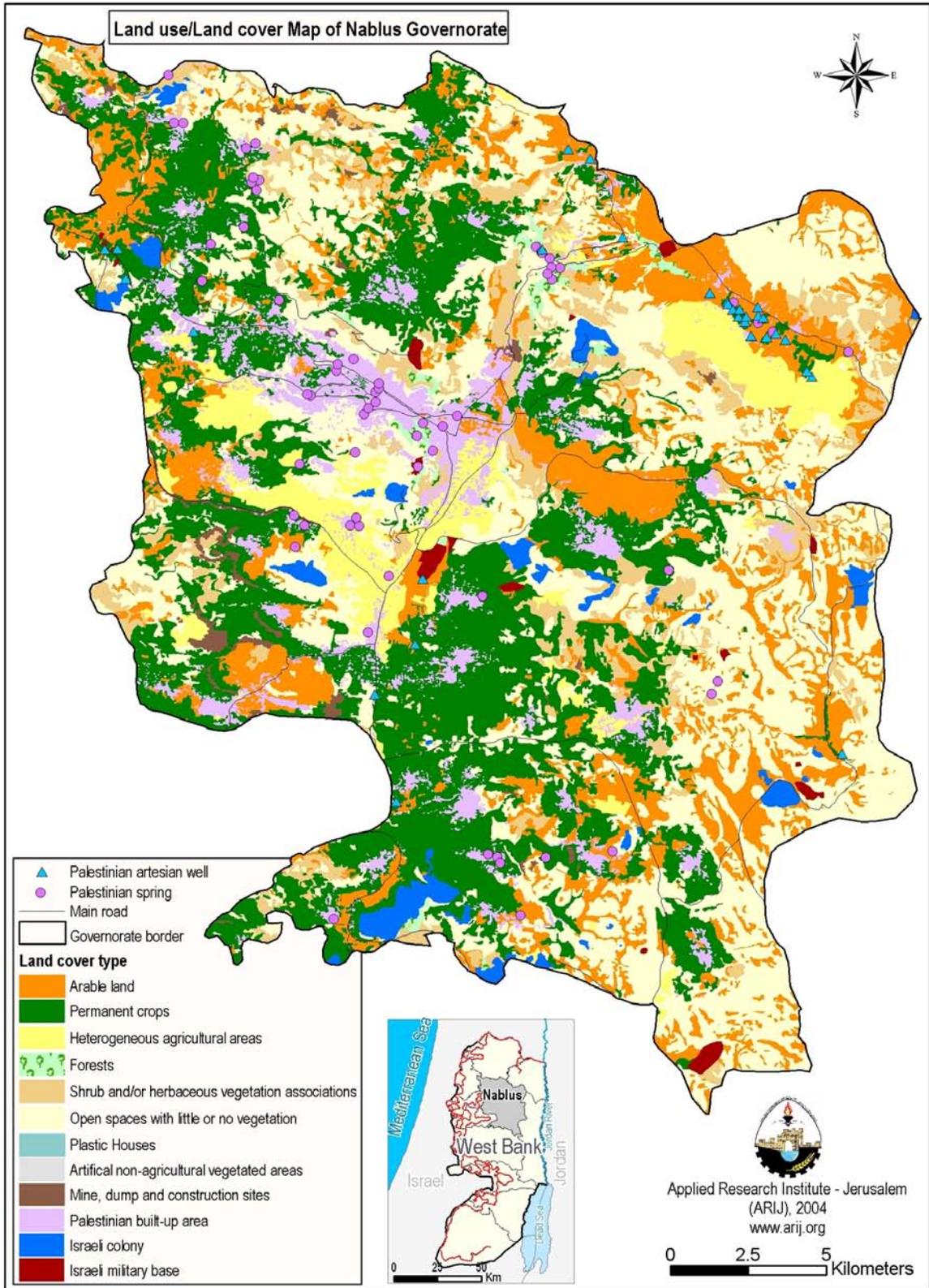
increase in the Israeli military bases areas which expanded by 14.5% in the period between years 1989-2000. Also, after the second Intifada erupted in year 2000, the Israeli colonies have continued to expand dramatically to occupy an area of 13740 dunums in Nablus Governorate reaching a total percentage of increase of 297% from year 1989. In addition, bypass roads are constructed from east to west surrounding the main city of

Nablus and neighbouring villages, Map 2-14. Nablus has one well located within the segregation zones with an annual withdrawal of 386725 CM and 2 springs with average annual discharge of 25400 CM.

Nablus city and Deir al Hatab village were selected as local cases in chapter four to study the relationship between Palestinian urban development and Israeli colonization activities and their impact on agricultural areas. The in-depth analysis was applied using Deir al Hatab as a special case study.



Map 2-14: Urban expansion between years 1989 – 2000 in Nablus Governorate



Map 2-15: Land use / land cover of Nablus Governorate

2.3.7 Qalqiliya Governorate

Qalqiliya is the smallest Governorate in the West Bank with a total area of approximately 174500 dunums. It is situated on the western boundary, bounded by Tulkarm in the north, Nablus in the east and Salfit in the south.

Palestinian urbanization

The time series analysis showed that the Palestinian net built-up area increased from 1996 dunums in year 1989 to 5245 dunums in year 2000 with total increase of 162.80%, see Figure 2-30. This increase was accompanied by growth in total population from 48353 to 78029 in years 1989 and 2000 respectively, leading to a significant increase in the built-up to population density from 41 to 67 m²/capita in the same years.

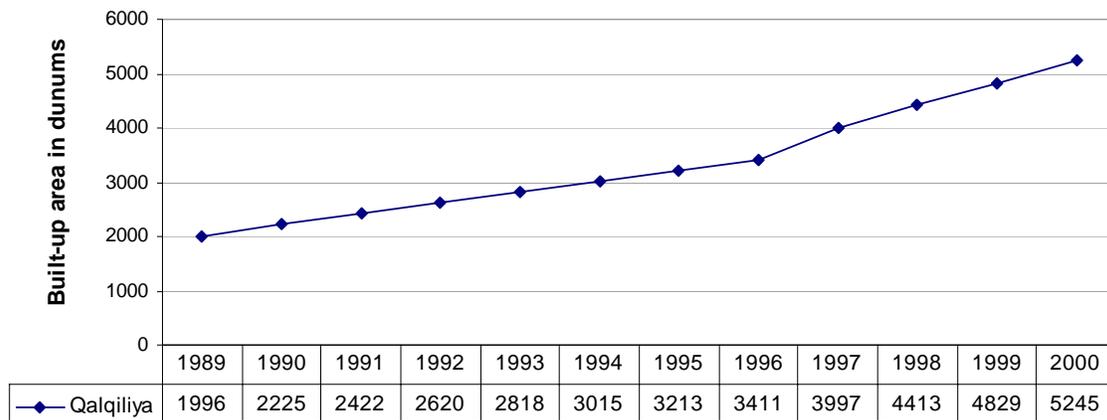


Figure 2-30: Actual and projected Palestinian net built-up area between years 1989-2000 in Qalqiliya Governorate ($R^2 = 0.96$)

The analysis showed that the annual increase in built-up area in Qalqiliya Governorate was 203 dunums/year in the period between years 1989-1995, while it became 406 dunums/year during 1995-2000. This trend is clearly shown in Figure 2-30 especially between the years 1996-2000 distinguishing between the periods of time when the PNA had full control over the West Bank in year 1995 where vast public and individual projects and investments took place. In addition, the analysis revealed that the highest percent of this expansion occurred in Areas A to cover about 57% of the total Zone area in year 2000, see Table 2-17, Figure 2-31 and Map 2-16. However, the spatial distribution and areas of land use / land cover classes of the Governorate as derived from the 2002 IKONOS images are shown in Map 2-17 and Table 2-18.

Table 2-17: Percentage of area covered by Palestinian net built-up area according to Geopolitical classification in Qalqiliya Governorate in years 1990, 1996 and 2000

Area	1990	1996	2000
Area A	27.2	41.4	56.8
Area B	2.1	3.2	4.9
Area C	0.1	0.4	0.8

Table 2-18: Area of Land use / land cover types in Qalqiliya Governorate in dunums

Land Cover Type	Area
Arable land	25914
Forests	7066
Heterogeneous agricultural area	1719
Jewish colony	11469
Mine, dump and construction sites	486
Open spaces with little or no vegetation	25618
Palestinian built-up area	10391
Pastures	4835
Permanent crops	79282
Plastic houses	1876
Shrubs and/or herbaceous vegetation associations	5717
Total	174373

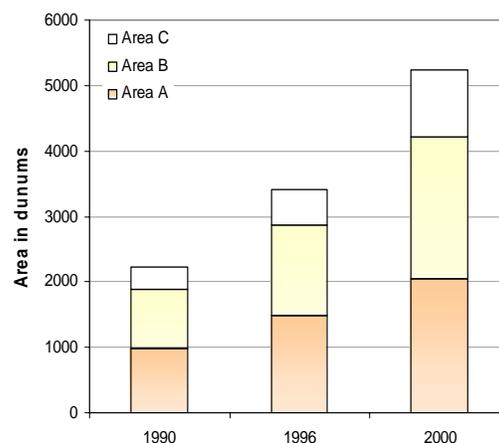


Figure 2-31: Palestinian built-up areas according to Geopolitical classification in Qalqiliya Governorate

Israeli colonization activities

Map 2-16 shows the distribution and expansion of the 23 Israeli colonies in Qalqiliya Governorate from year 1989 to year 2000. The colonies in the Governorate expanded during the nineties as illustrated in Map 2-16. The percentage of the total Governorate land occupied by the colonies increased from 3.22% in year 1989 to 6.53% in 2000, see Figure 2-32, while the population increased from 15620 to 27335 colonists in the same years. In year 2003, the area of the Governorate covered by Israeli colonies reached 12200 dunums with a total increase of 117% from year 1989.

Map 2-17 illustrates the serious impact that the Israeli segregation wall has on Palestinian communities in Qalqiliya Governorate. The Israeli colonies have directed the path of the wall where 96% of the colonies, excluding one in the north-eastern part of the Governorate, are situated in the Israel-facing side. As a result, the wall has isolated Palestinian villages and cities and disconnected them from each other and from the surrounding irrigated agricultural and forest areas causing fragmentation of the Palestinian land. About 38% (9733 dunums) of the arable land, 55% (949 dunums) of the heterogeneous agricultural land, 86% (4160 dunums) of the pastures and 56% (3935 dunums) of the forest are situated in the segregation zone, see Figure 2-33 and Map 2-17. Moreover, the

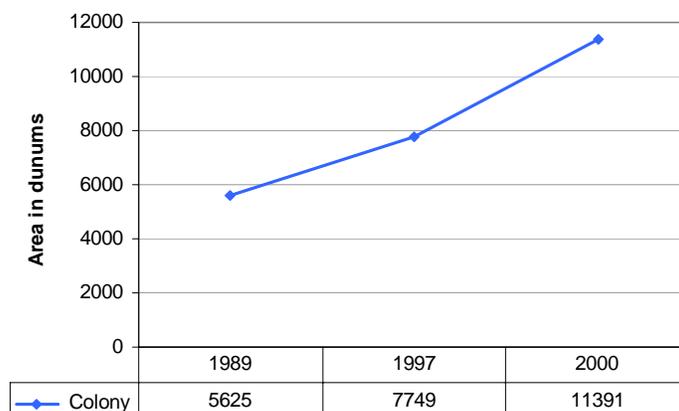


Figure 2-32: Israeli colonization activities in Qalqiliya Governorate

segregation zones threatens the water resources of the Governorate since about 48 wells with an annual withdrawal of 6433808 CM are situated in the seam zone.

Azzun and Jayyus were selected and presented in chapter four as local cases to study the relationship between Palestinian urban development and Israeli colonization activities and their impact on agricultural areas. The in-depth analysis was applied using Jayyus as a special case study.

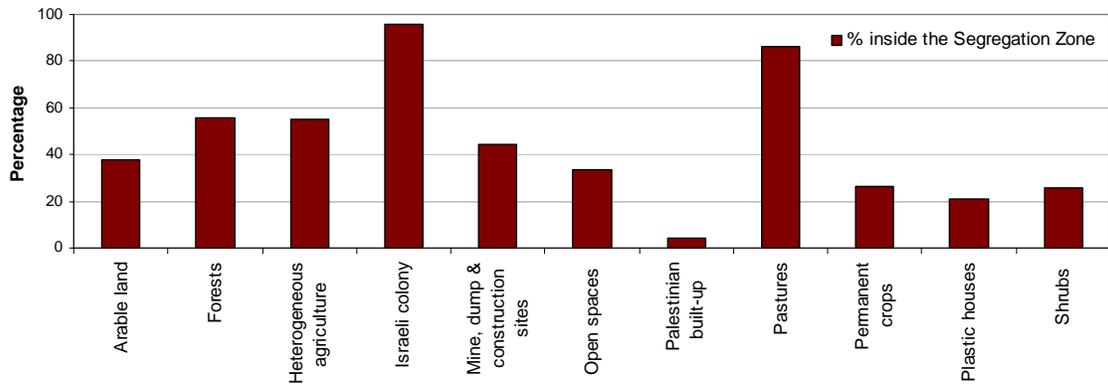
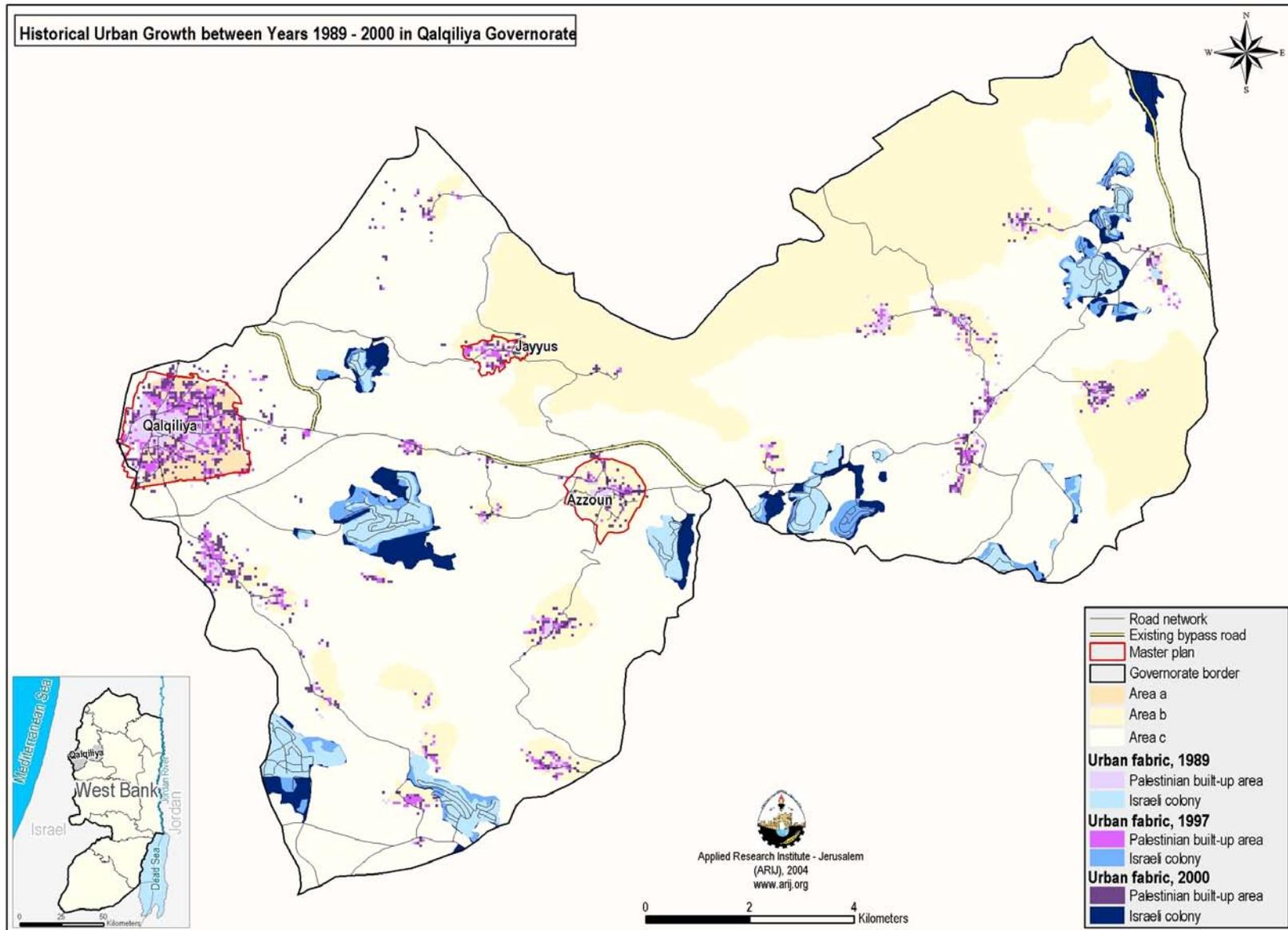
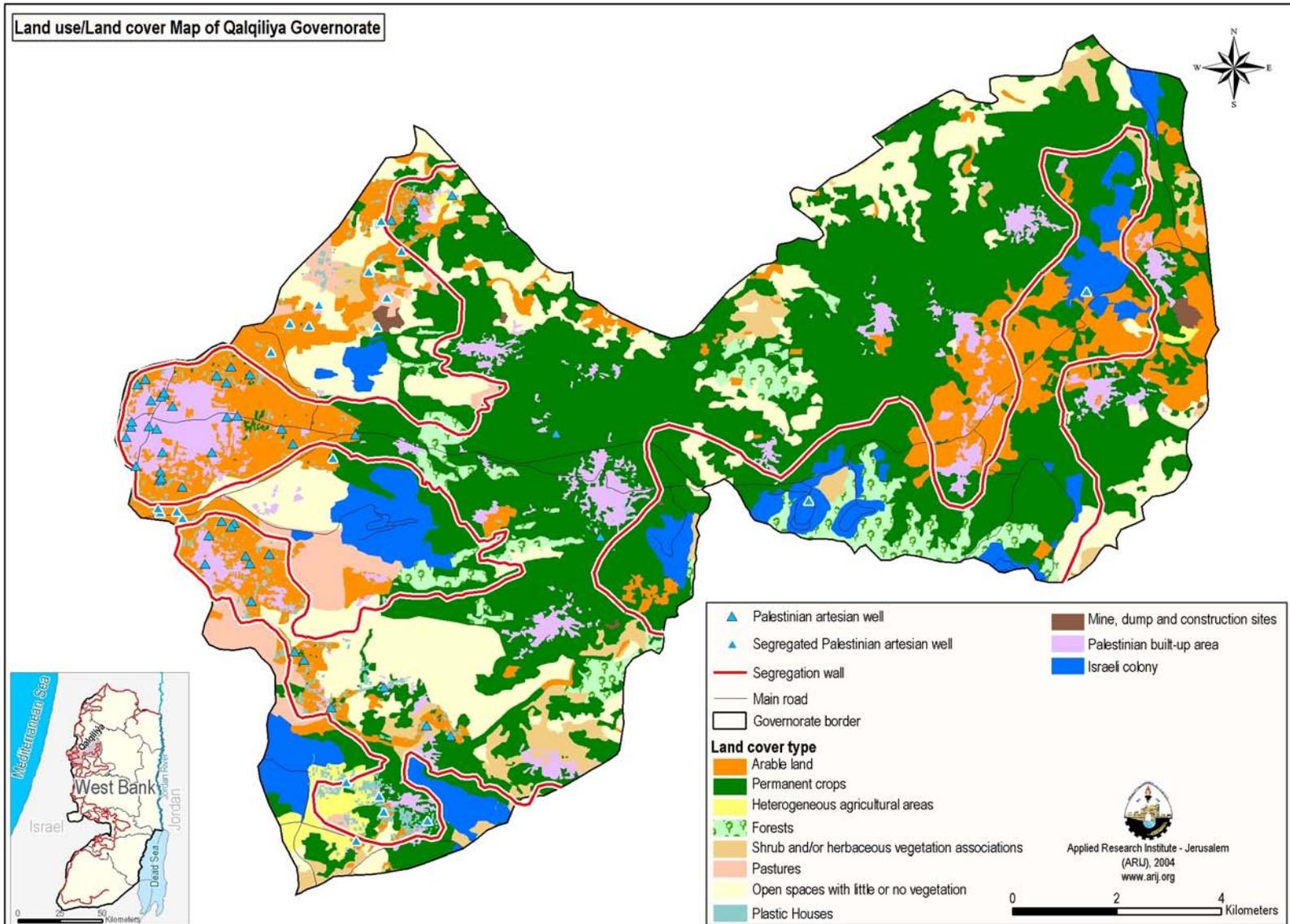


Figure 2-33: Percentage of land use/ land cover types inside the Segregation zone of its total area in Qalqiliya Governorate



Map 2-16: Urban expansion between years 1989 – 2000 in Qalqiliya Governorate



Map 2-17: Land use / land cover of Qalqiliya Governorate

2.3.8 Ramallah & Al Bireh Governorate

Ramallah and Al Bireh Governorate is located in the middle part of the West Bank and is bounded by Salfit and Nablus from the north, the West Bank boundary from the west, Jerusalem from the south and by Jericho from the east with a total area of approximately 848800 dunums.

Palestinian urbanization

The LANDSAT time series analysis showed that the Palestinian net built-up area increased from 5877 dunums in year 1989 to 18315 dunums in year 2000 with total increase of 211.65%, see Figure 2-34. This increase was accompanied by population growth from 143026 to 231690 in years 1989 and 2000 respectively, leading to a significant increase in the built-up density from 41 m²/capita to 79 m²/capita in the same years.

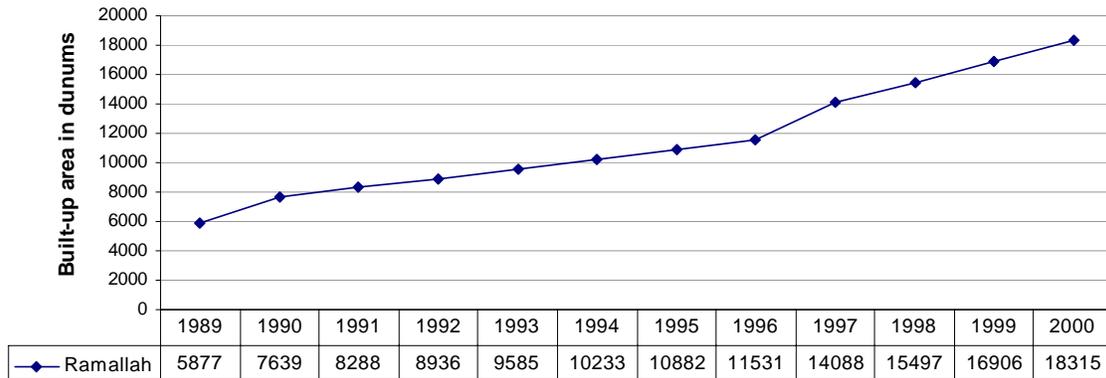


Figure 2-34: Actual and projected Palestinian net built-up area between years 1989-2000 in Ramallah & Al Bireh Governorate ($R^2 = 0.96$)

The analysis showed that the annual increase in built-up area in Ramallah Governorate was 834 dunums/year in the period between years 1989-1995, while it was 1487 dunums/year during 1995-2000. This trend is clearly shown in Figure 2-34 especially between the years 1996-2000. After the establishment of the PNA, Ramallah & Al Bireh became the central Governorate of the West Bank where the entire Governmental body of the PNA is located. This encouraged the implementation of vast projects which included massive infrastructure and construction investments. All types of buildings were constructed including commercial, residential, industrial, service and public buildings. Besides, the analysis revealed that the highest percent of this expansion occurred in Areas A and B to cover about 8% and 4% of the total Zone area in year 2000 respectively, see Table 2-19, Figure 2-35 and Map 2-18. On the other

Table 2-19: Percentage of area covered by Palestinian net built-up area according to Geopolitical classification in Ramallah & Al Bireh Governorate in years 1990, 1996 and 2000

Area	1990	1996	2000
Area A	3.47	5.20	7.89
Area B	1.70	2.57	4.06
Area C	0.10	0.16	0.32

hand, the spatial distribution and areas of land use / land cover classes of the Governorate as derived from the 2002 IKONOS images are shown in Map 2-19 and Table 2-20.

Table 2-20: Area of Land use / land cover types in Ramallah & Al Bireh Governorate in dunums

Land Cover Type	Area
Arable land	127499
Forests	10543
Heterogeneous agricultural area	45434
Industrial, commercial and transport unit	1033
Inland waters	226
Israeli military base	5610
Jewish colony	18241
Mine, dump and construction sites	3291
Open spaces with little or no vegetation	298545
Palestinian built-up area	53972
Permanent crops	178964
Shrubs and/or herbaceous vegetation associations	105438
Total	848796

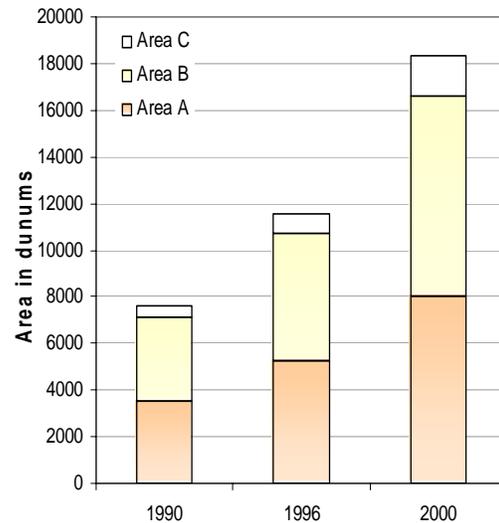


Figure 2-35: Palestinian built-up areas according to Geopolitical classification in Ramallah & Al Bireh Governorate

Israeli colonization activities

Map 2-18 illustrates the distribution and the continuous expansion of 35 Israeli colonies in Ramallah & Al Bireh Governorate from year 1989 to year 2000. The map shows that the Israeli colonies continued to expand during the nineties especially in the western part of the Governorate. Figure 2-36 shows that the colonies urban expansion occurred at a higher pace before year 1997 and continued to expand at slower rate after that year.

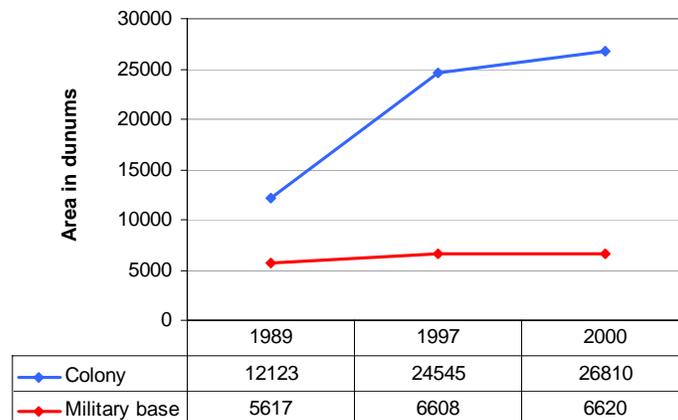


Figure 2-36: Israeli colonization activities in Ramallah Governorate

The percentage of the Governorate area occupied by Israeli colonies increased from 1.43% in year 1989 to 3.16% in year 2000, while their population increased from 6463 to 46259 colonists in the same years. After the second Intifada erupted in the year 2000, the Israeli colonies continued to expand to reach 28490 dunums in year 2003 with an increase rate from year 1989 of 135%. On the other hand, Ramallah city is surrounded, from the northeast and the south, by the two largest Israeli military bases while the others are scattered at the Governorate eastern peripheries. The Israeli

military bases experienced an increase by 17.86% in the period between years 1989-2000.

Map 2-18 also shows the distribution of bypass roads that are constructed around Ramallah city and at the Governorate north-western and north-eastern peripheries to link between the Israeli colonies and Israeli military bases. Map 2-19 shows the path of the Israeli segregation wall in the Governorate. It is shown that the wall will ensure the inclusion of the Israeli colonies situated in the western periphery of Ramallah Governorate at the Israel-facing side. As a result, villages in the region will be enclaved and isolated from the Palestinian community and agricultural lands will be fragmented causing mobility and accessibility restrictions to reach the neighbouring Palestinian localities or the main city of Ramallah and Al Bireh. About 70 % (7360 dunums) of the forest area and 42% (53172 dunums) of the arable land is threatened to be situated in the segregation zone, see Figure 2-37. In addition, about 22 wells and 7 springs with total tapping of 25 MCM will be situated in the segregation zones.

Ramallah city and Bir Zeit town were selected as local cases and presented in chapter four to study the relationship between Palestinian urban development and Israeli urban expansion and their impact on agricultural areas. The in-depth analysis was applied using Ramallah as a special case study.

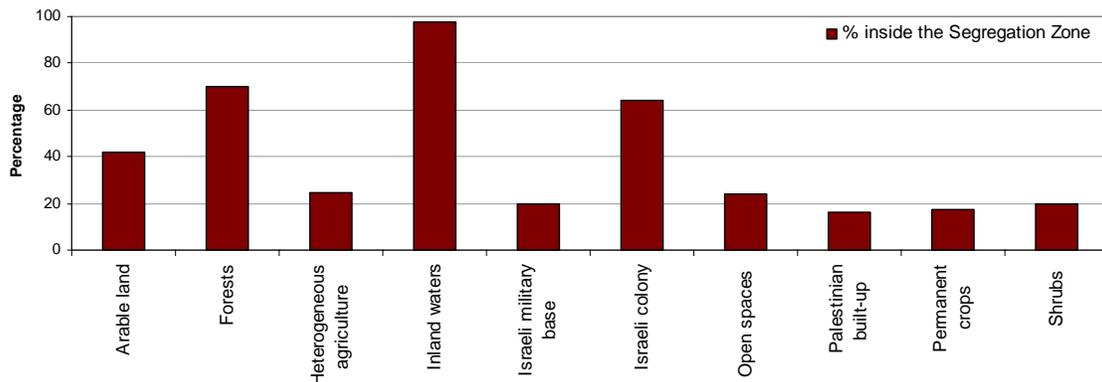
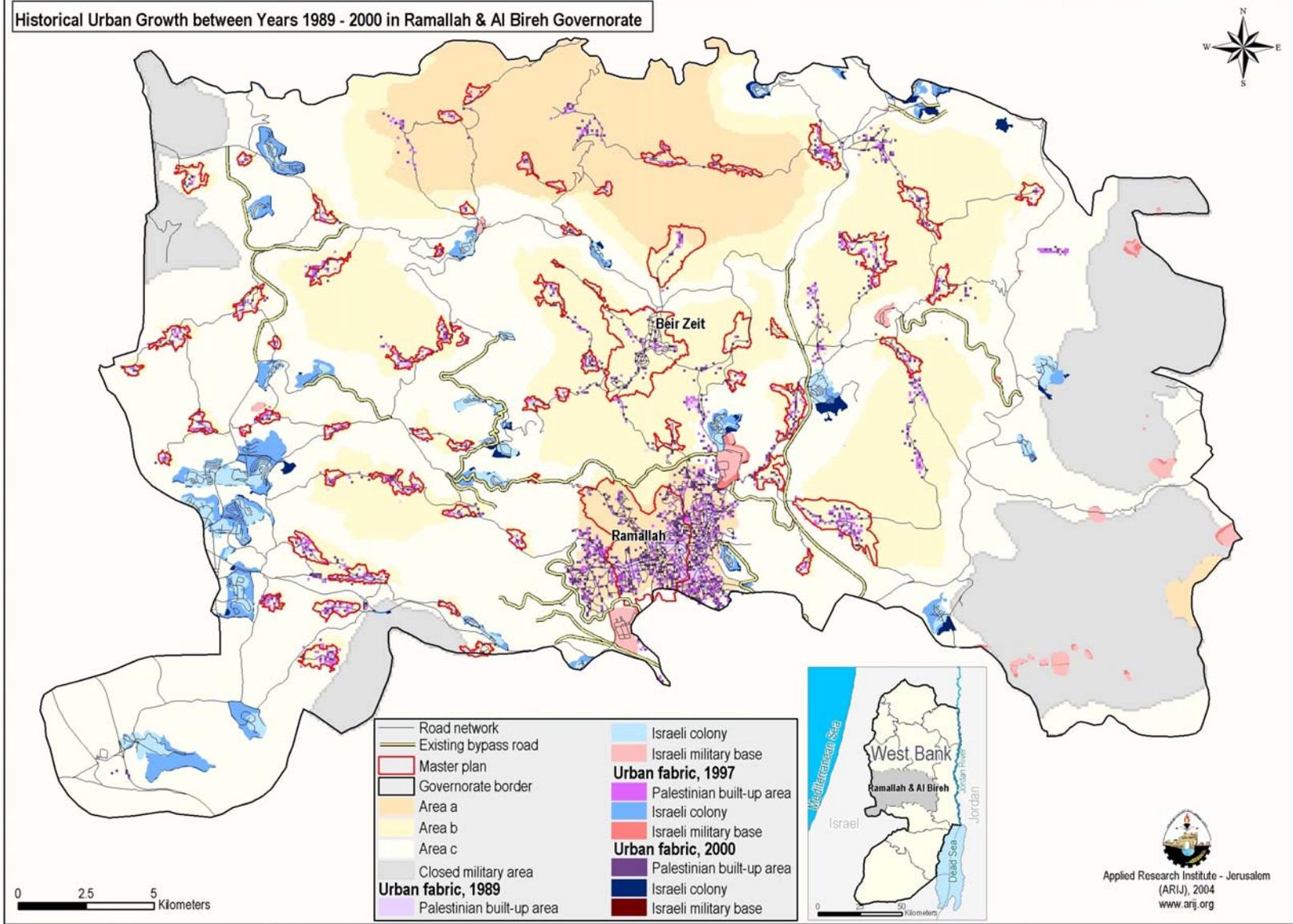
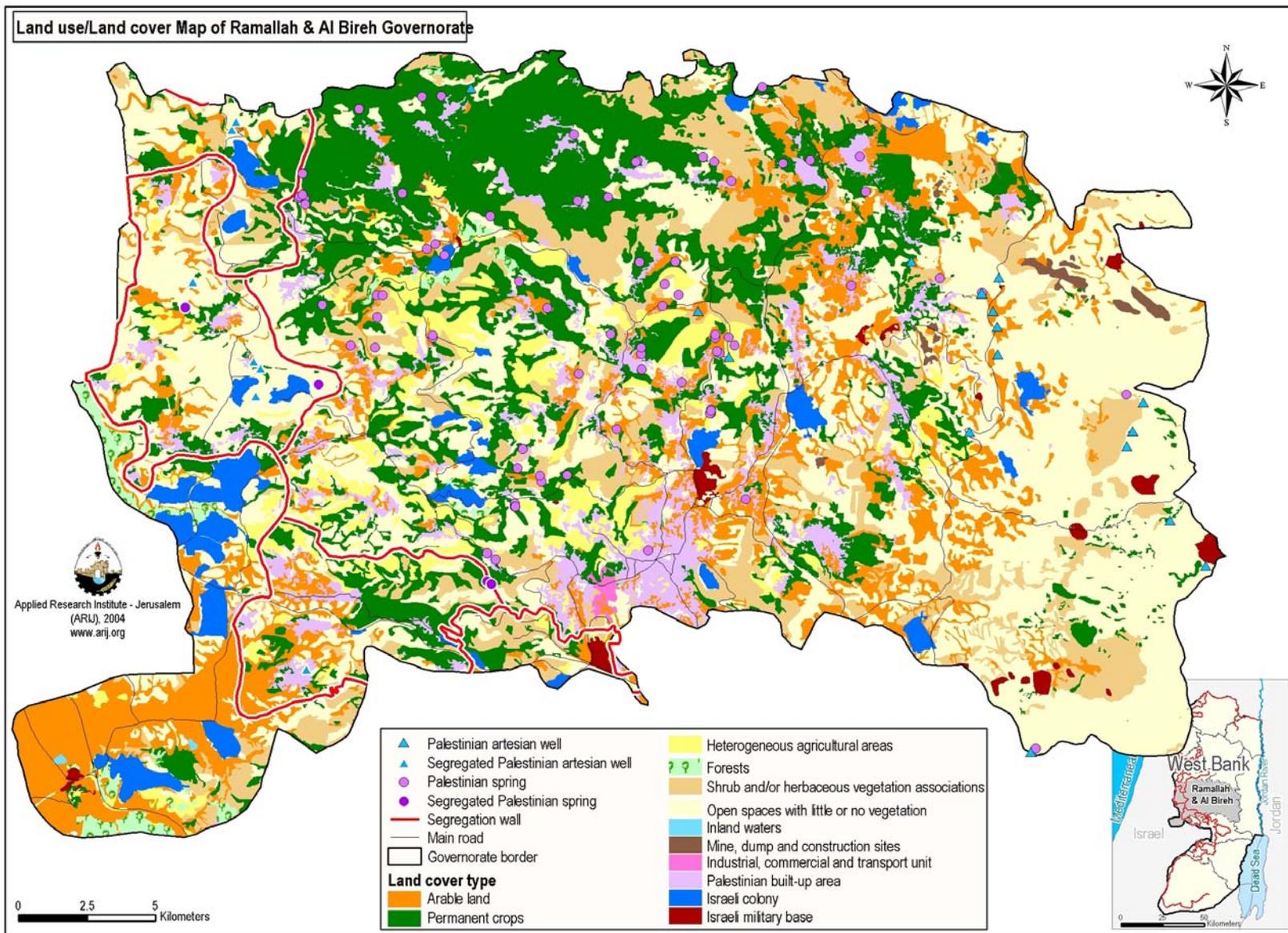


Figure 2-37: Percentage of land use/ land cover types inside the Segregation zone of its total area in Ramallah Governorate



Map 2-18: Urban expansion between years 1989 – 2000 in Ramallah Governorate



Map 2-19: Land use / land cover of Ramallah Governorate

2.3.9 Salfit Governorate

Salfit Governorate is located in the middle part of the West Bank and bounded by Qalqiliya from the north, Nablus from the east, Ramallah from the south and the West Bank boundary from the west. It comprises approximately 202000 dunums.

Palestinian urbanization

The time series analysis showed that the Palestinian net built-up area increased from 973 dunums in year 1989 to 3089 dunums in year 2000 with total increase of 217.50%, see Figure 2-38. This increase was accompanied by population growth from 33366 to 52137 in years 1989 and 2000 respectively, leading to a significant increase in the built-up density from 29 m²/capita to 59 m²/capita in the same years.

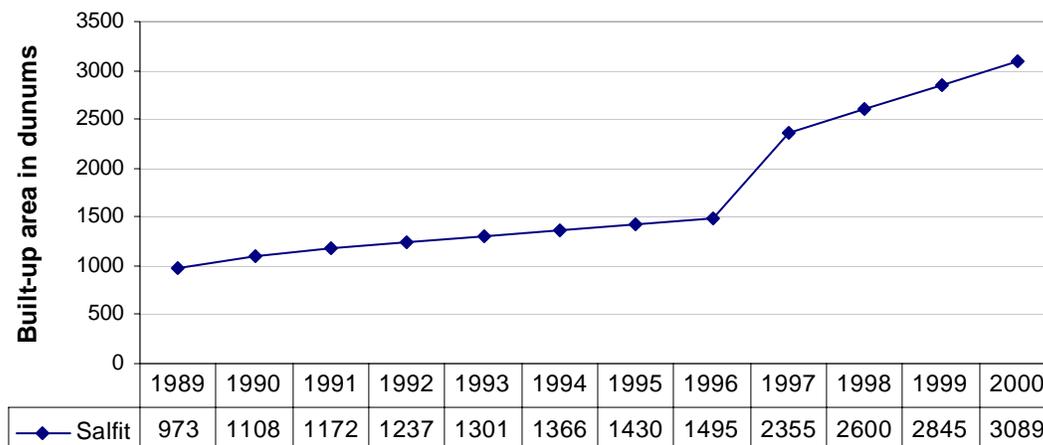


Figure 2-38: Actual and projected Palestinian net built-up area between years 1989-2000 in Salfit Governorate ($R^2 = 0.86$)

The analysis showed that the annual increase in built-up area in Salfit Governorate was 76 dunums/year in the period between years 1989-1995, while it became 332 dunums/year during 1995-2000. This trend is clearly shown in Figure 2-38 especially between the years 1996-2000 distinguishing between the periods of time when the PNA had full control over the West

Bank in year 1995 where vast public and personal projects and investments took place, see Map 2-20. Additionally, the analysis revealed that the Palestinian built-up in Areas B and C expanded considerably compared to the urban development in the same areas in other Governorates to cover 4.8% and 0.5% of the total Zone area in year 2000 respectively, see Table 2-21 and Figure 2-39. On the other hand, the spatial distribution and areas of land use / land cover classes of the Governorate as derived from the 2002 IKONOS images are shown in Map 2-21 and Table 2-22.

Table 2-21: Percentage of area covered by Palestinian net built-up area according to Geopolitical classification in Salfit Governorate in years 1990, 1996 and 2000

Area	1990	1996	2000
Area A	2.1	2	4
Area B	1.7	2.7	4.8
Area C	0.14	0.14	0.5

Table 2-22: Area of Land use / land cover types in Salfit Governorate in dunums

Land Cover Type	Area
Arable land	7728
Forests	13428
Heterogeneous agricultural area	773
Israeli military base	65
Jewish colony	17730
Mine, dump and construction sites	790
Open spaces with little or no vegetation	35046
Palestinian built-up area	8610
Pastures	250
Permanent crops	87904
Plastic houses	1
Shrubs and/or herbaceous vegetation associations	29697
Total	202022

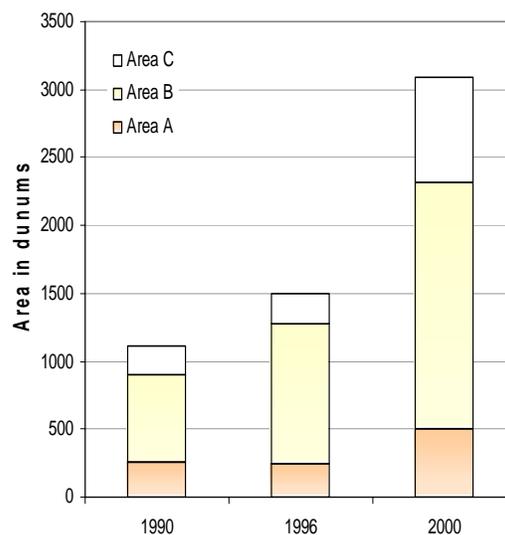


Figure 2-39: Palestinian built-up areas according to Geopolitical classification in Salfit Governorate

Israeli colonization activities

Map 2-20 shows the distribution and expansion of 22 Israeli colonies in Salfit Governorate from year 1989 to year 2000. The percentage of the total Governorate area occupied by the colonies increased from 3.6% in year 1989 to 8.4% in year 2000, see Figure 2-40. An increase in the population of the Israeli colonies was also observed which increased from 13341 to 24942 colonists in the years 1989 and 2000 respectively. Moreover, after the second Intifada erupted in the year 2000, the Israeli colonies have continued to expand noticeably to reach 19110 dunums in year 2003 with 160% of increase from year 1989. However, There is one Israeli military base inside the Governorate of Salfit, situated northwest of the Ariel colony, which expanded by 34.07% during the period 1989-2000.

Map 2-20 shows the distribution of bypass roads that are constructed from Ariel in the east to the West Bank Boundary in the west and to other colonies in southwest. Furthermore, Map 2-21 shows the path of the Israeli segregation wall in the Governorate. It illustrates that the Segregation Wall will snake its way from north to south to ensure that 94% of the colonies in the

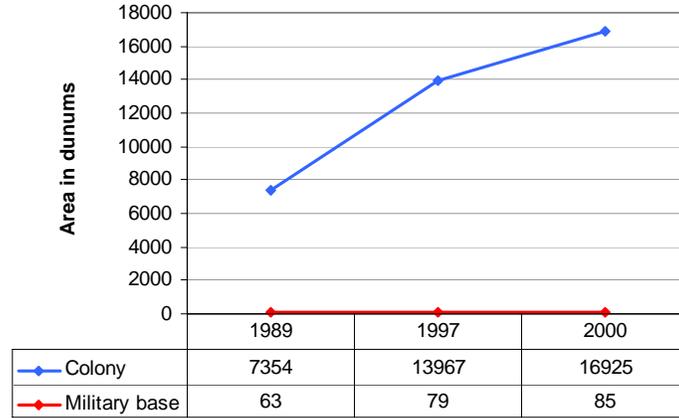


Figure 2-40: Israeli colonization activities in Salfit Governorate

Governorate, in addition to a large part of the forest and agricultural area will be within the segregation zone, see Figure 2-41. About 79% (10631 dunums) of the forest area, 80% (617 dunums) of the heterogeneous agriculture, 30% of the arable land (2332 dunums) and of the permanent crops area (26097 dunums) and all the pastures area is threatened to be fragmented by the segregation wall. 73% (21649 dunums) of the area covered with shrubs and/or herbaceous vegetation associations and four, with average annual discharge of 131100 CM, of the 11 springs in the Governorate will also be segregated inside the segregation zone.

Salfit city and Deir Ballut village were selected and presented in chapter four as special cases to analyze the relationship between Palestinian urban development and Israeli urban expansion and their impact on agricultural areas and socioeconomic conditions of the Governorate.

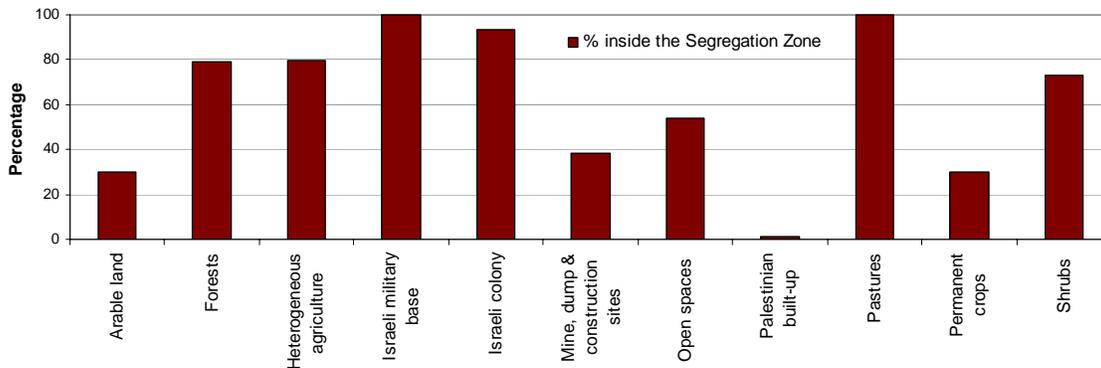
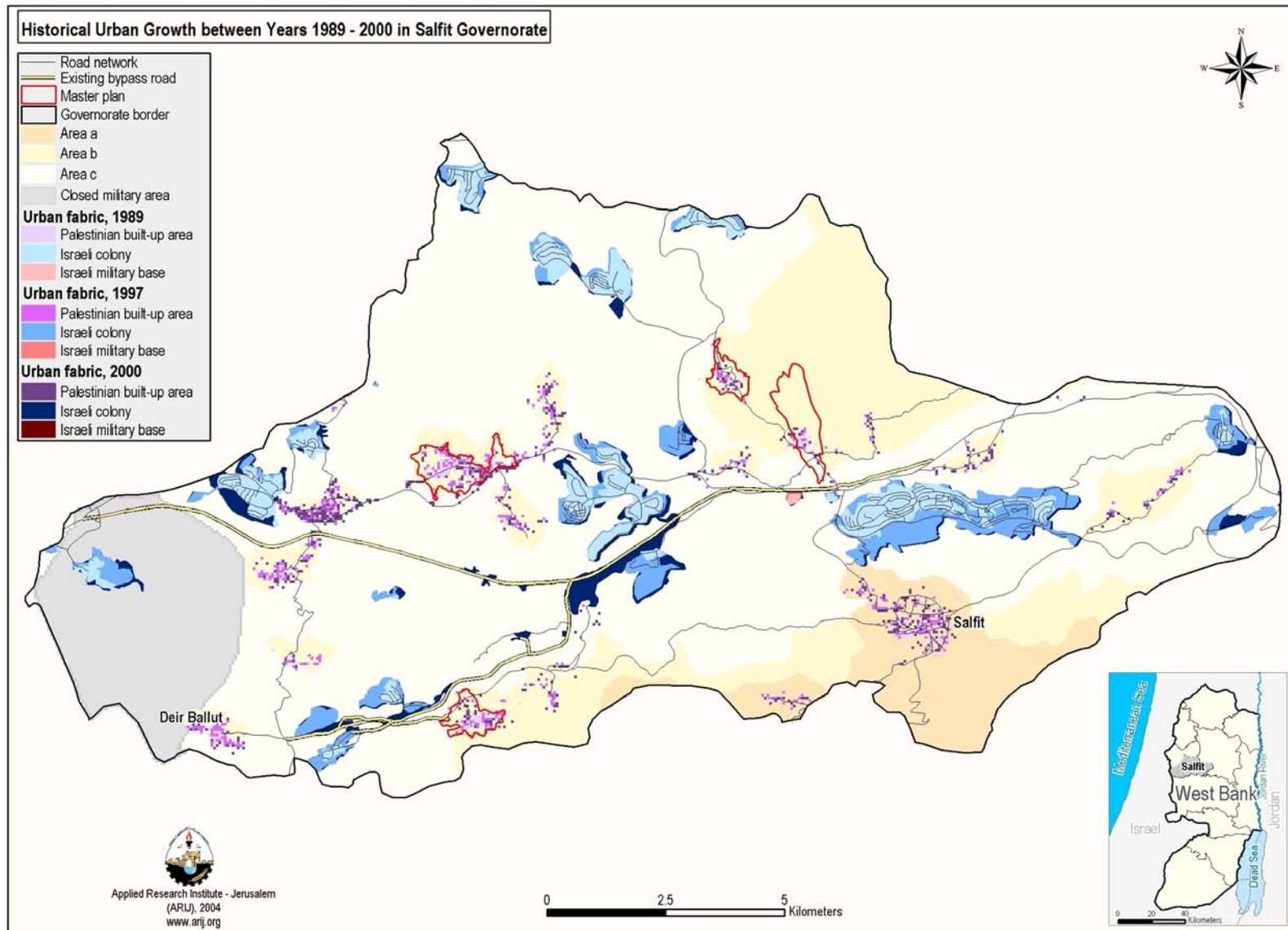
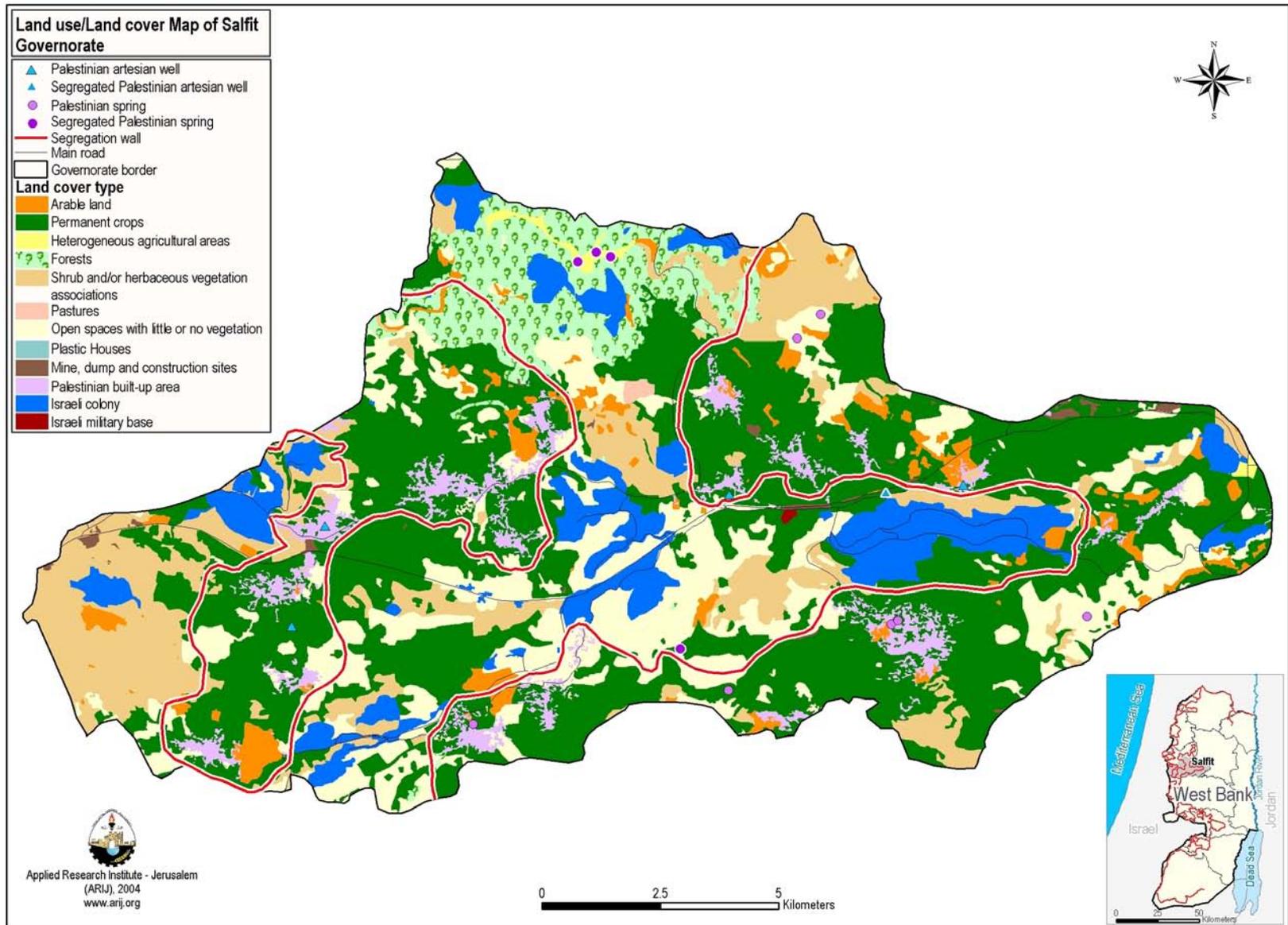


Figure 2-41: Percentage of land use/land cover types inside the Segregation zone of its total area in Salfit Governorate



Map 2-20: Urban expansion between years 1989 – 2000 in Salfit Governorate



Map 2-21: Land use / land cover of Salfit Governorate

2.3.10 Tubas Governorate

Tubas Governorate is located in the north-eastern part of the West Bank, bounded by Jericho in the south, Nablus and Jenin in the west, the West Bank boundary in the north, and by the Jordan River in the east it comprises approximately 366000 dunums.

Palestinian urbanization

The LANDSAT time series analysis showed that the Palestinian net built-up area increased from 839 dunums in 1989 to 1928 dunums in 2000 with total increase of 129.73%, see Figure 2-42. This increase was accompanied by population growth from 25323 to 39239 in years 1989 and 2000 respectively, leading to an increase in the built-up density from 33 m²/capita to 49 m²/capita in the same years.

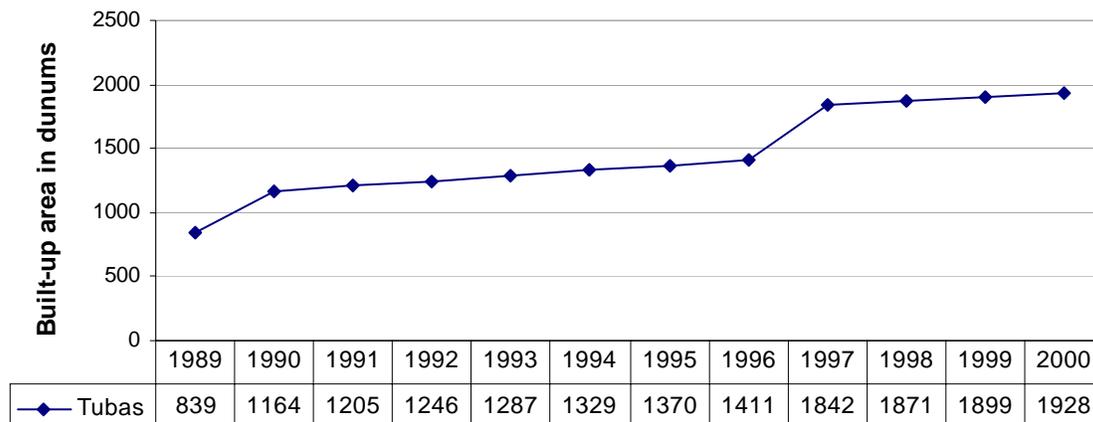


Figure 2-42: Actual and projected Palestinian net built-up area between years 1989-2000 in Tubas Governorate ($R^2 = 0.91$)

The analysis showed that the annual increase in built-up area in Tubas Governorate was 88 dunums/year in the period between years 1989-1995, while it was 112 dunums/year during 1995-2000. This trend is clearly shown in Figure 2-42 especially after the year 1996. The analysis revealed that the built-up area in Areas B and C covers an extremely small part of the total Zones areas where almost no Palestinian urban development occurred in Area C during the nineties, see Map 2-22. However, the highest percent of urban land use development occurred in Areas A to cover about 3% of the total Zone area in year 2000, see Table 2-23 and Figure 2-43. Furthermore, Map 2-22 shows that the urban development was concentrated in the available master plans of the Governorate localities and started to expand beyond their borders. On the other hand, the spatial distribution and

Table 2-23: Percentage of area covered by Palestinian net built-up area according to Geopolitical classification in Tubas Governorate in years 1990, 1996 and 2000

Area	1990	1996	2000
Area A	1.8	2.2	3
Area B	0.44	0.45	0.6
Area C	0.00	0.01	0.01

areas of land use / land cover classes of the Governorate as derived from the 2002 IKONOS images are shown in Map 2-23 and Table 2-24.

Table 2-24: Area of Land use / land cover types in Tubas Governorate in dunums

Land Cover Type	Area
Arable land	99246
Forests	2397
Heterogeneous agricultural area	1859
Israeli military base	15754
Jewish colony	7385
Mine, dump and construction sites	49
Open spaces with little or no vegetation	30232
Palestinian built-up area	6246
Pastures	119804
Permanent crops	70364
Plastic houses	94
Shrubs and/or herbaceous vegetation associations	12451
Total	365881

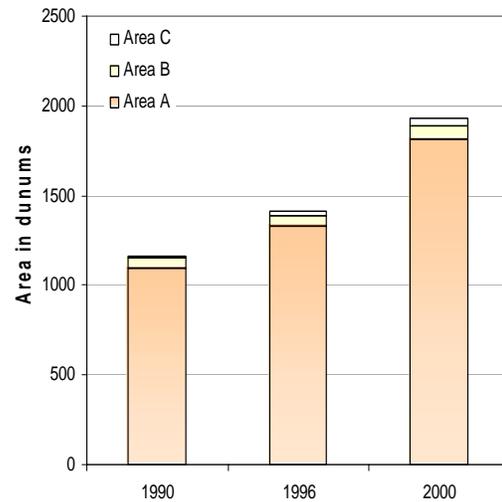


Figure 2-43: Palestinian built-up areas according to Geopolitical classification in Tubas Governorate

Israeli colonization activities

Map 2-22 shows the distribution and the expansion of the 14 Israeli colonies in Tubas Governorate from year 1989 to year 2000. All of the colonies are situated in the Jordan Valley, which is classified as Area C and closed military area and over which the occupation power exercise full control with a large number of Israeli military bases.

The colonies in Tubas Governorate expanded during the nineties occupying the percentage of 0.7% and 2% of Governorate area in years 1989 and 2000 respectively, see Figure 2-44. The population of the colonies also experienced an increase from 488 to 1039 colonists during the same period. However, after the second Intifada erupted in 2000, the Israeli colonies have

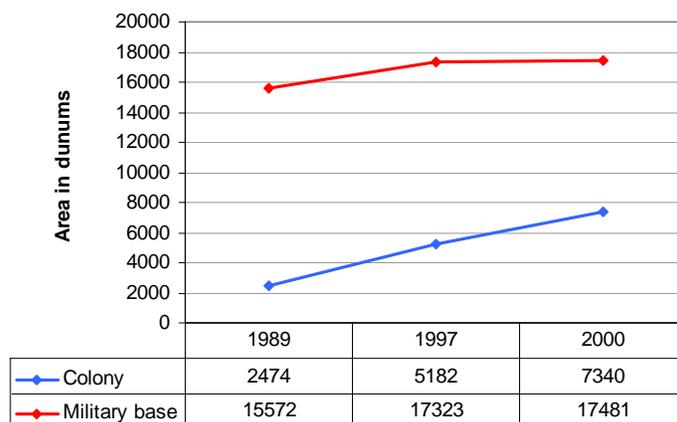


Figure 2-44: Israeli colonization activities in Tubas Governorate

continued to expand dramatically to occupy 7635 dunums of the Governorate area in year 2003 with an increase of 209% from year 1989. Moreover, the Israeli military bases

inside the Governorate of Tubas were expanded by 12.3% in the period between years 1989-2000, see Figure 2-44.

Map 2-23 shows the path of the Israeli segregation wall on the Governorate land. Figure 2-45 illustrates the percentage of a particular land use/ land cover type inside the segregation zone of its total area in Tubas Governorate. Besides, the Palestinian communities will be disconnected from 15 wells with annual withdrawal of 8.1 MCM.

Tubas city and Ein el Beida village situated in the Jordan Valley were selected as special cases and presented in chapter four to study the relationship between Palestinian urban development and Israeli colonization activities and their impact on agricultural areas. The in-depth analysis was applied using Tubas as a special case study.

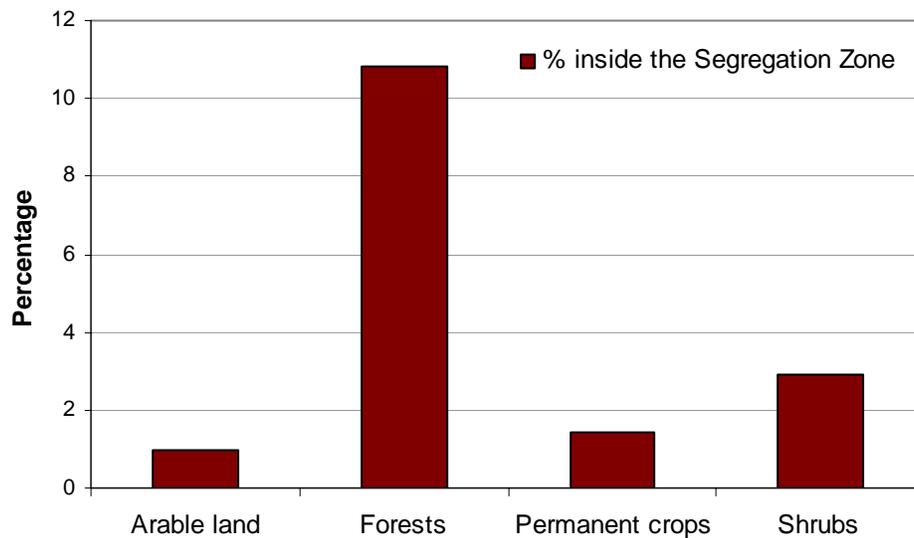
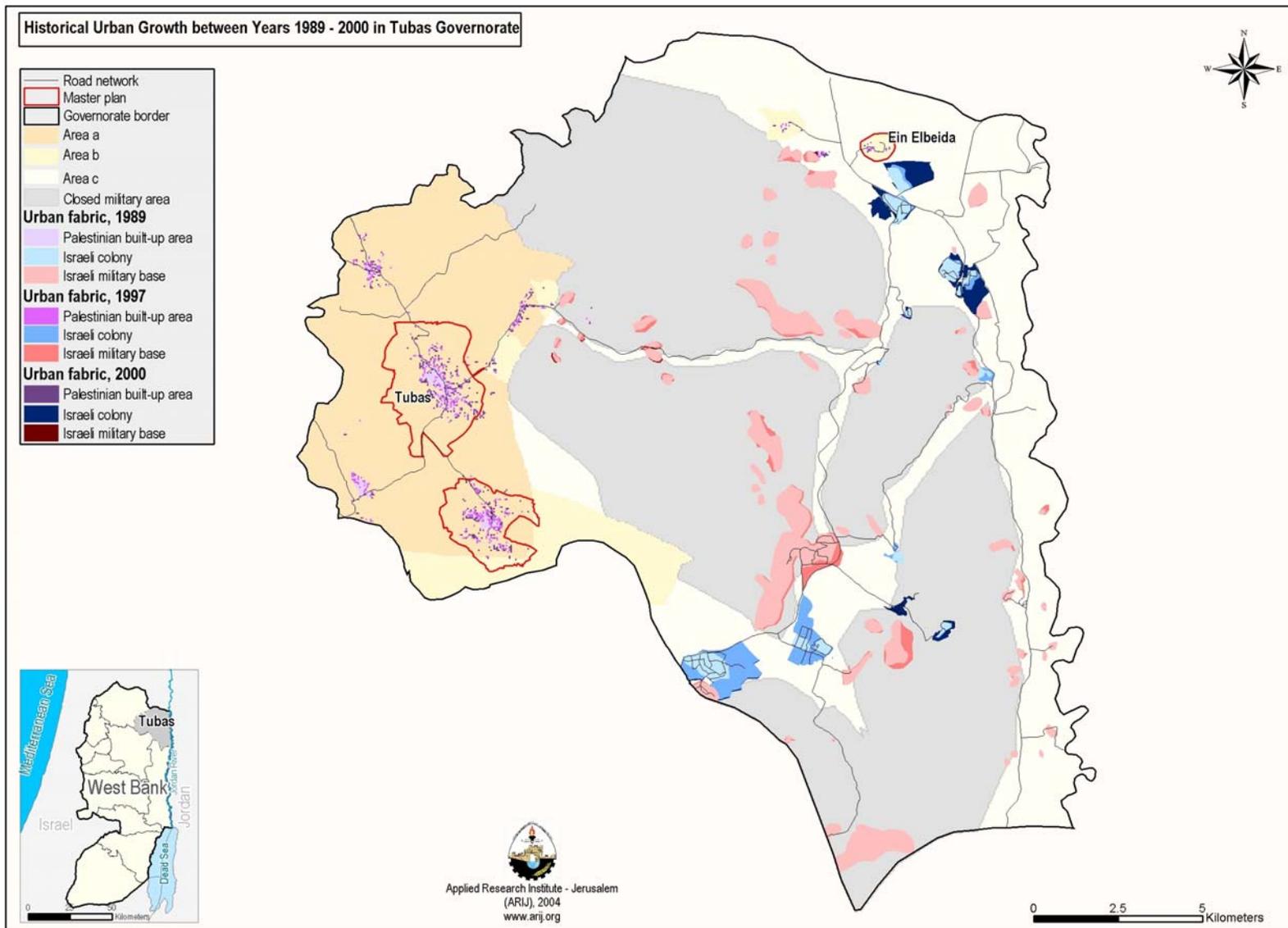
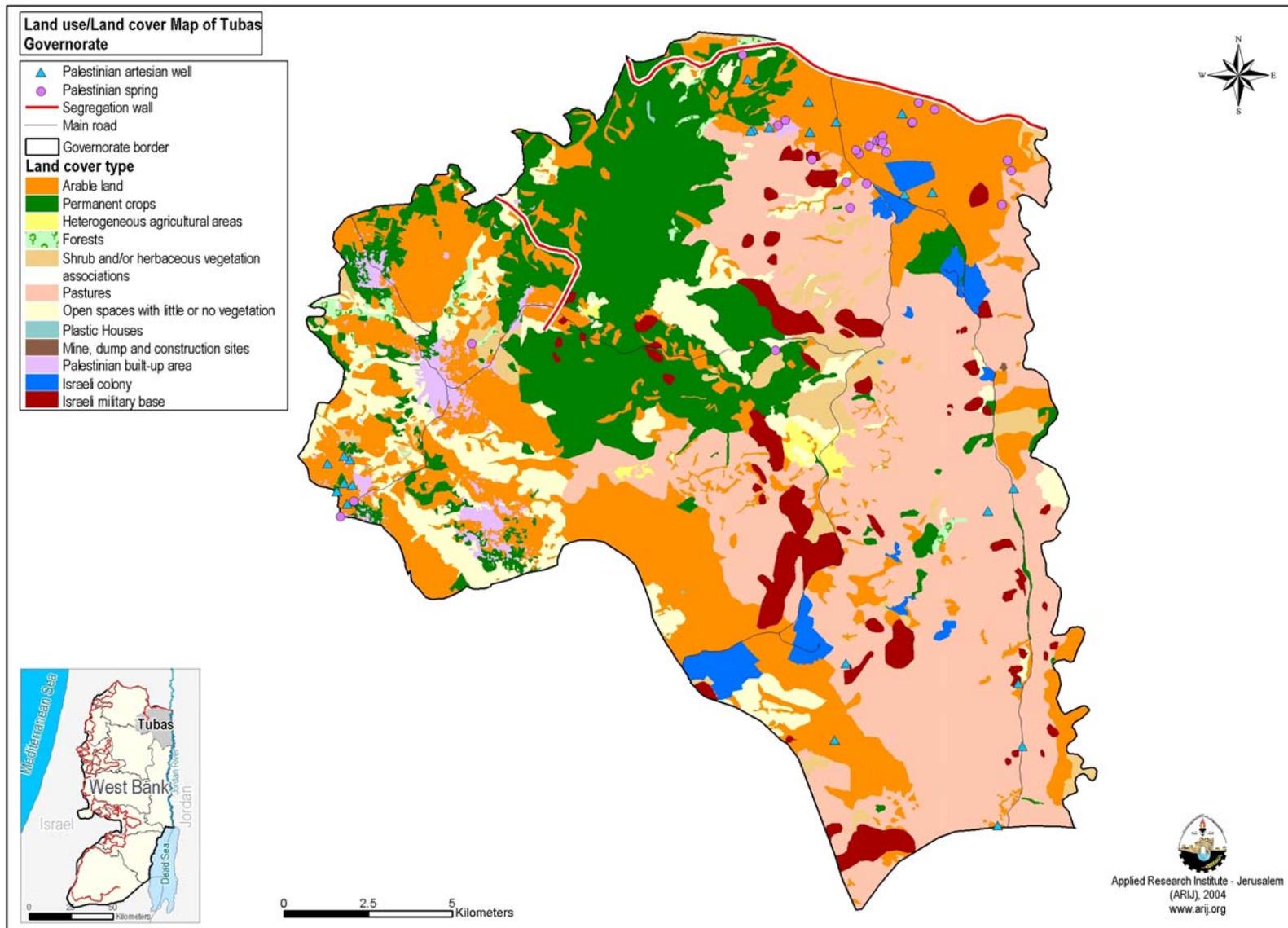


Figure 2-45: Percentage of land use/ land cover types inside the Segregation zone of its total area in Tubas Governorate



Map 2-22: Urban expansion between years 1989 – 2000 in Tubas Governorate



Map 2-23: Land use / land cover of Tubas Governorate

2.3.11 Tulkarm Governorate

Tulkarm Governorate is located in the north-western part of the West Bank and is bounded by Jenin in northeast, Nablus in southeast, Qalqiliya in south and the West Bank Boundary in west with a total area of approximately 245400 dunums.

Palestinian Urbanization

The time series analysis showed that the Palestinian net built-up area expanded from 4436 dunums in year 1989 to 8619 dunums in year 2000 with total increase of 94.32%, see Figure 2-46. This increase was accompanied by population growth which increased from 94325 to 142865 in years 1989 and 2000 respectively, leading to a significant increase in the built-up density from 49 m²/capita to 60 m²/capita in the same years.

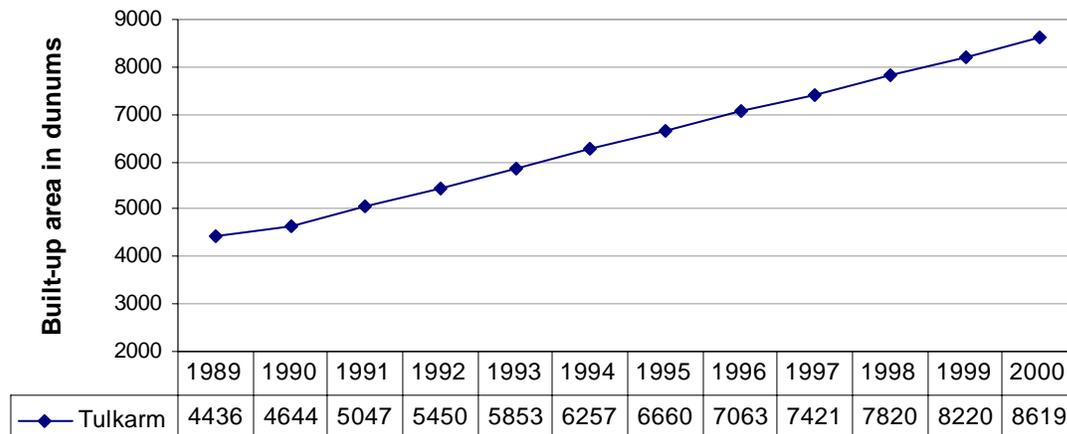


Figure 2-46: Actual and projected Palestinian net built-up area between years 1989-2000 in Tulkarm Governorate ($R^2 = 0.99$)

The analysis showed that the annual increase in built-up area in Tulkarm Governorate was 371 dunums/year in the period between years 1989-1995, while it was 392 dunums/year during 1995-2000. The built-up area continued to increase almost at the same pace after the establishment of the PNA in year 1995. Furthermore, the analysis revealed that the highest percentage of increase occurred in Areas A to cover about 7% of the total Zone area in year 2000, see Table 2-25 and Figure 2-47. The urban development in Area C showed roughly the same trend during the whole period reaching 1.1% in year 2000, see Map 2-24. On the other hand, the spatial distribution and areas of land use / land cover classes of the Governorate as derived from the 2002 IKONOS images are shown in Map 2-25 and Table 2-26.

Table 2-25: Percentage of area covered by Palestinian net built-up area according to Geopolitical classification in Tulkarm Governorate in years 1990, 1996 and 2000

Area	1990	1996	2000
Area A	3.9	5.9	7.1
Area B	2.02	3.3	3.8
Area C	0.3	0.6	1.1

Table 2-26: Area of Land use / land cover types in Tulkarm Governorate in dunums

Land Cover Type	Area
Arable land	27590
Forests	1464
Heterogeneous agricultural area	4925
Jewish colony	2801
Mine, dump and construction sites	1449
Open spaces with little or no vegetation	61028
Palestinian built-up area	23654
Permanent crops	110994
Plastic Houses	2409
Shrubs and/or herbaceous vegetation associations	8981
Total	245295

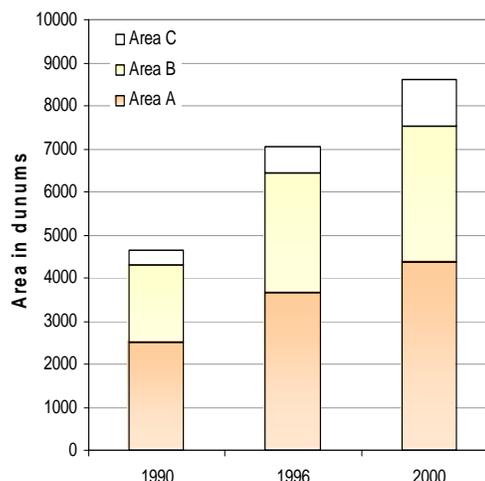


Figure 2-47: Palestinian built-up areas according to Geopolitical classification in Tulkarm Governorate

Israeli colonization activities

Map 2-24 shows the distribution and expansion the seven Israeli colonies which are mainly situated in the southern peripheries of Tulkarm Governorate from year 1989 to year 2000. The colonies in the Governorate expanded during the nineties to occupy 0.37% in year 1989 1.09% and in 2000 of the Governorate total area, see Figure 2-48. This expansion was accompanied by population escalation which increased by four folds from 536 to 2113 colonists during the same period. Furthermore, after the second Intifada erupted in 2000, the Israeli colonies have continued to expand dramatically in 2003 occupying 3011 dunums of the Governorate total area with an increase rate of 228% from year 1989.

There are no military bases inside the Governorate of Tulkarm, however, the Governorate is seriously affected by the construction of the Israeli Segregation Wall which is snaking around villages and cities deep into the West Bank Boundary. About 47% of the Palestinian built-up area in Tulkarm Governorate, including Tulkarm main city and several communities further north, is threatened to be enclosed by an eastern depth-wall. In addition, the analysis revealed that about 44% (12181 dunums) of the arable land and 55% of the forest (799 dunums) and

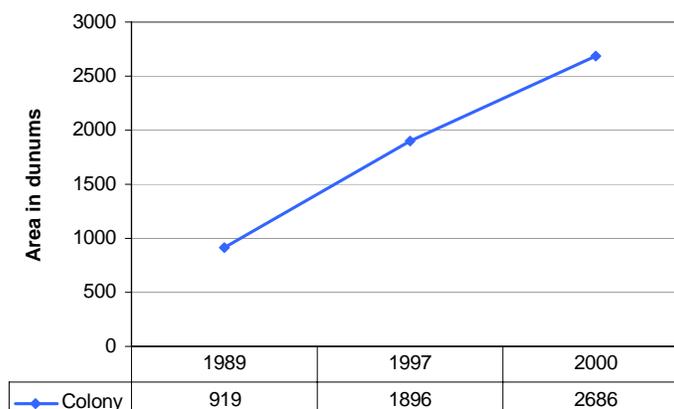


Figure 2-48: Israeli colonization activities in Tulkarm Governorate

heterogeneous agriculture (2705 dunums) land is threatened by the wall as it will be situated in the segregation zone, see Figure 2-49 and Map 2-25. Additionally, approximately 45 wells are located within the western segregation zone which would threaten about 8 MCM of the annual withdrawn amount of water to be used by Palestinians. Table 2-26 lists the total areas of the different land use / land cover types classified in Tulkarm Governorate using the 2002 IKONOS images.

Tulkarm city and Deir al Ghusun village were selected and presented in chapter four as local cases to study the relationship between Palestinian urban development and Israeli urban expansion and their impact on agricultural areas and socioeconomic conditions of the Governorate. The in-depth analysis was applied using Deir al Ghusun as a special case study.

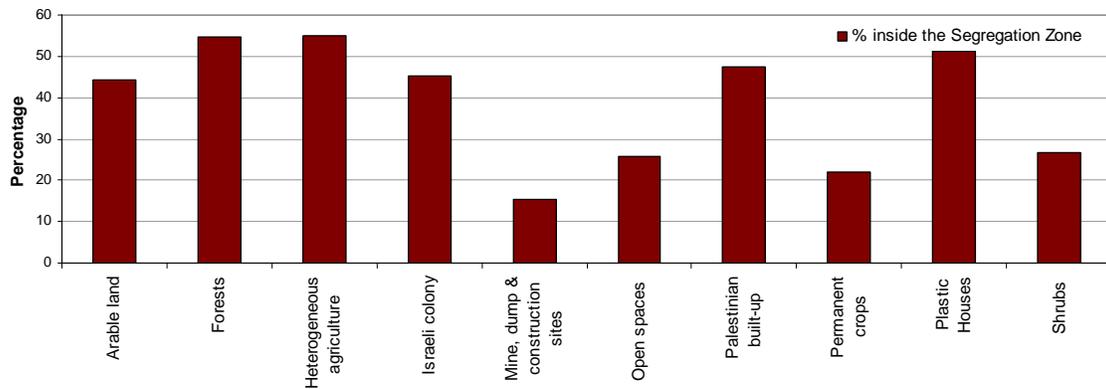
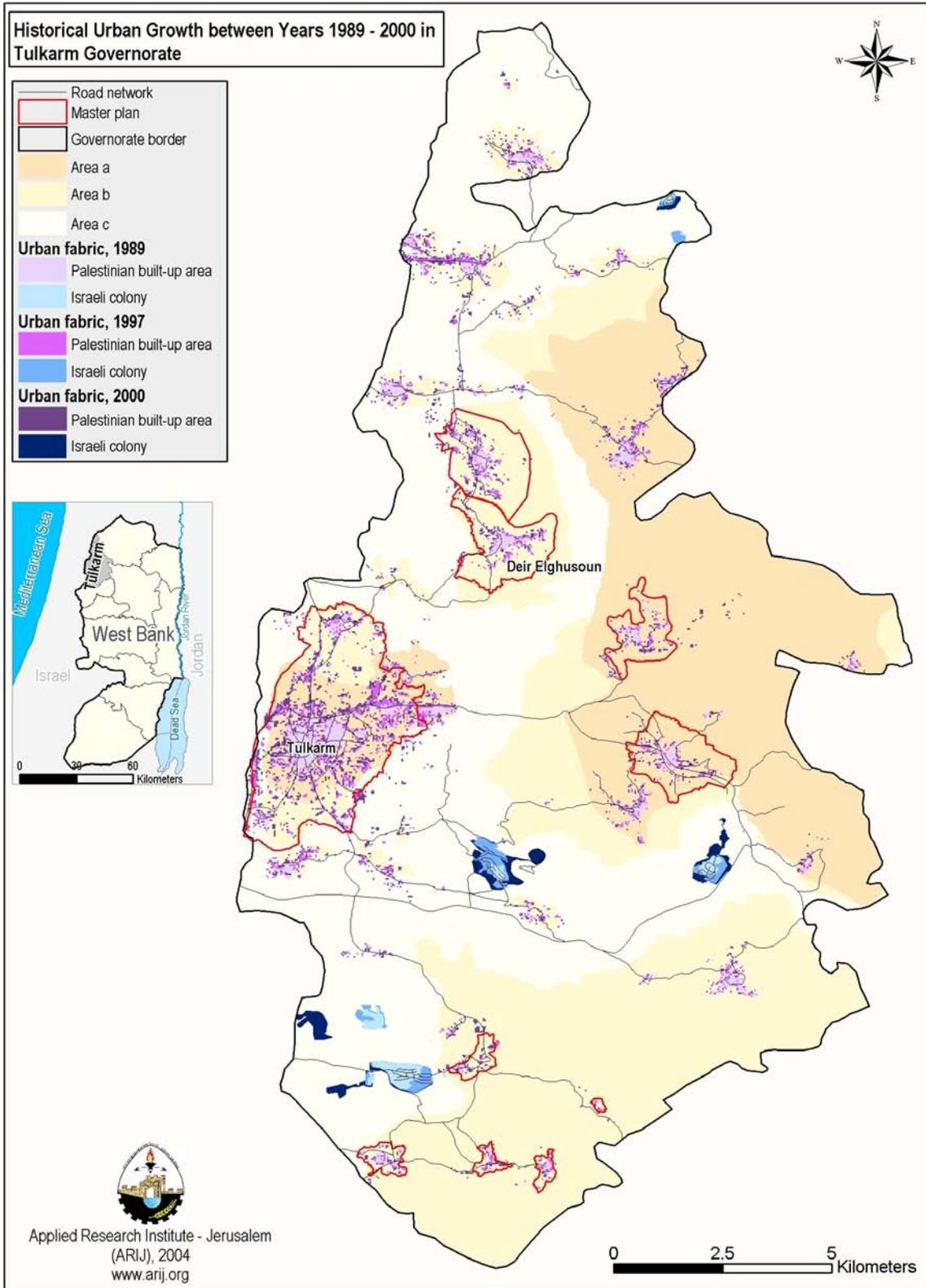
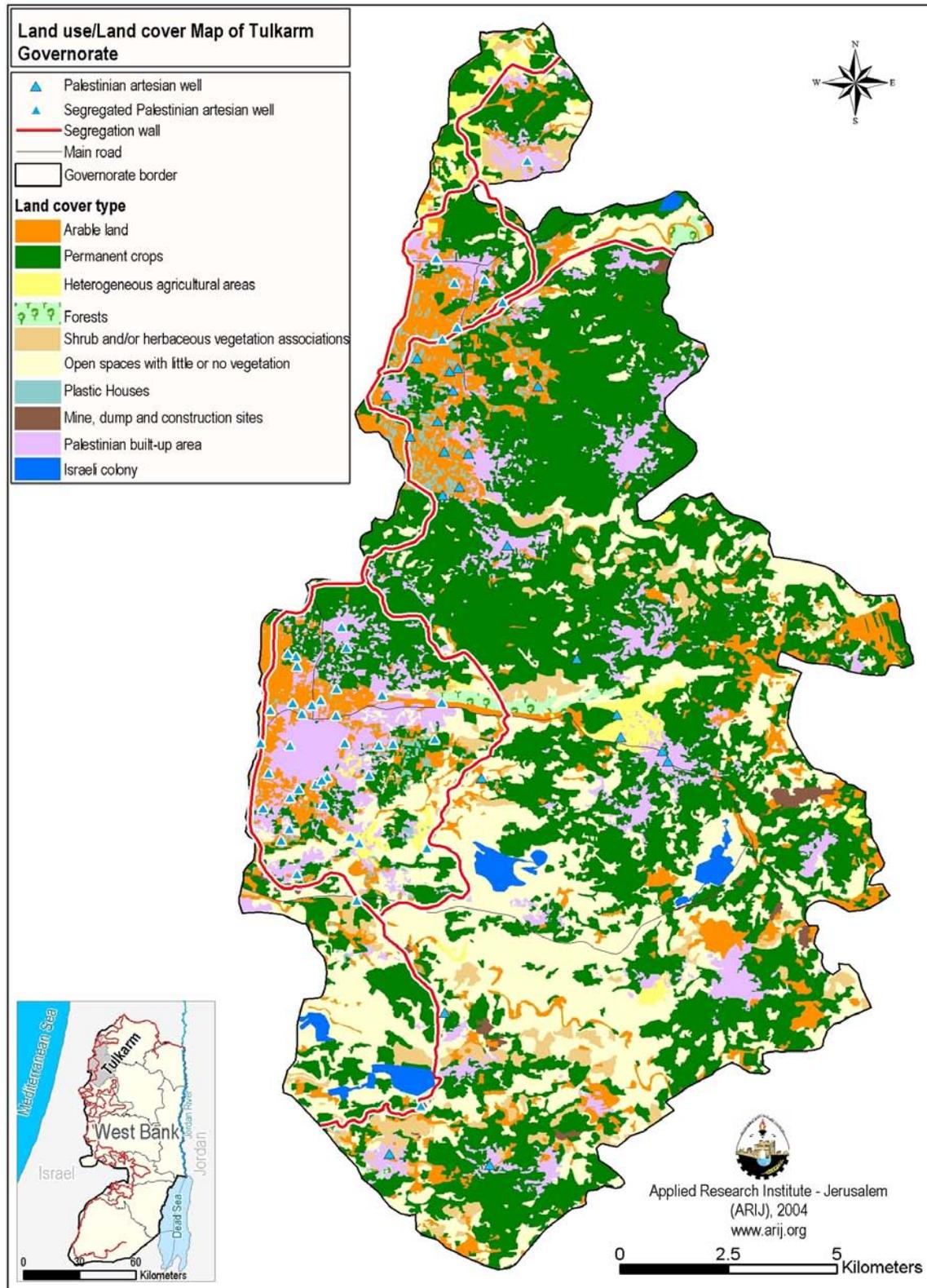


Figure 2-49: Percentage of land use/ land cover types inside the Segregation zone of its total area in Tulkarm Governorate



Map 2-24: Urban expansion between years 1989 – 2000 in Tulkarm Governorate



Map 2-25: Land use / land cover of Tulkarm Governorate

2.4 Conclusion

Over the past 14 years urban expansion in the West Bank Governorates has been significant. Within the defined target area of the West Bank the area of urban land use has more than doubled (an expansion of 133%), increasing from 1.1% of the total land coverage to 2.6%. Table 2-27 shows the percentages of the Governorates' lands covered by net built-up area in years 1989 and 2000. Such an observed phenomenon indicates that the demand for new urban development is high in the Palestinian Territories. Nevertheless, if not well managed, this growth is likely to cause many problems in the future given the upgrading of urban infrastructure needed to accommodate the new development. Therefore, more focus on the urban planning and management is needed to accommodate

Table 2-27: Percentages of the Governorates' areas covered by net built-up area in years 1989 and 2000

Governorate	Percentage of Governorate area	
	1989	2000
Jenin	1.1	2.3
Tulkarm	1.8	3.5
Nablus	1.3	2.4
Qalqiliya	1.1	3.0
Tubas	0.2	0.5
Salfit	0.5	1.5
Ramallah & Al Bireh	0.7	2.2
Jerusalem	3.5	7.4
Jericho	0.2	0.4
Bethlehem	1.0	2.5
Hebron	1.3	3.4
Total	1.1	2.6

the expected future development. The potential costs will be high if the existing absence of urban planning issues is not addressed soon enough.

The research findings, as analyzed from satellite LANDSAT and IKONOS images, indicate that there have been two phases of urban development in the West Bank Governorates, from 1990 to 1995 and from 1995 to 2000. The second phase was characterised by a boost in the rate of urban growth. The reason for this transition is believed to be the self-autonomy which the Palestinians have had since the start of the second phase, for the first time in more than 30 years, which has meant that they are able to control part of their own land. This would suggest that the major factor affecting the recent urban development in Palestine is the political situation.

The urban development has occurred as monocentric and concentrated pattern in which the main cities constitute the district's main urban center, decentralized pattern with a number of large urban centres and on the fringes of existing towns or cities, master plans and green belts. The research has indicated that a number of people breach planning regulations and build outside the master plan boundaries. However, the uncontrolled urban development that is leading to urban sprawl and a change in land use patterns that is not necessarily beneficial will be discussed in chapter four where a number of Palestinian localities are taken as special cases for this study.

The political situation has had, and continues to have, a major influence on urban development in the West Bank. Israeli actions of land confiscation, house demolition and tree uprooting for building colonies, by-pass roads and establishing closed military areas have been highly significant. Furthermore, Israeli control over large parts of the Occupied

Territories (Area C, and in certain matters, Area B) has limited integrated planning throughout the region, and the formulation and implementation of comprehensive developmental plans. The instability of political conditions and intermittent political crises has added to this lack of planning.

The research has depicted the trends of the Israeli colonizing activities in the West Bank Governorates. This colonization is continuing to utilize huge parts of the Palestinian open space and natural resources, without taking into consideration the effects of such actions on the Palestinian communities and the integrity of the Palestinian land. Moreover, the findings indicate that the growth rate in the colonizing activities especially in Israeli colonies and military bases has increased since the year 1995 to occupy about 4% of the total West Bank area in year 2003, suggesting that the Israeli Government is continuing its colonizing plans regardless of any future development in the Israeli-Palestinian peace process. In addition, the future projection analysis showed that the total area of Israeli colonies in year 2020 will quadrupled compared to what it was in 1989 to comprise approximately 5.4% of the West Bank total area. While, the net Palestinian built-up area will increase by 4.5 folds comprising approximately 5% of the West Bank area for the same period.

The socioeconomic analysis provided a valuable insight into the way in which Israeli colonization of the West Bank has affected Palestinian communities. This analysis is illustrated and discussed in chapter three where estimations of the number and areas of trees uprooted, houses demolished, and land confiscated are provided as obtained from the interviewed community leaders and Palestinian citizens. The questionnaire focusing on the impact of Israeli colonization revealed the reasons given for house demolition, the value of the houses demolished, the nature of the land confiscated and both the social and economic impact on families. The questionnaire gave an indication of how the Israeli control over Area C has affected Palestinian families living there particularly in obtaining building permits, accessing agricultural lands by farmers and restricting movement using transport services in that region. Furthermore, the impact of constructing the segregation wall by Israel on the socioeconomic conditions of Palestinian communities and their urban development is also discussed in chapter three.

Section 1: Impact of the Israeli colonization activities in the West Bank

During the 36 years of Israeli occupation, Israel has pursued a policy of colonizing Palestine through plans and activities in an attempt to control the land and change its demographic character. The Palestinian Territories has been a target to land confiscation for either building Israeli colonies or for installing military bases, thereby placing the confiscated areas out of Palestinian reach. At present, there are over 280 Israeli colonies and built up areas distributed all over in the West Bank including East Jerusalem with a population of more than 428 thousand Israeli colonists, half of whom reside in East Jerusalem. Different control measures were undertaken by the Israeli authorities to prohibit and limit the urban development and expansion of the Palestinian built-up areas through Israeli military orders that were issued to confiscate the Palestinian land such as: land confiscation orders for building Israeli colonies and outposts or expanding existing ones. To fulfill its objectives, the Israeli government prohibited thousands of Palestinian citizens to build on their land under the pretext of having no building permits, construction on a confiscated land or for security reasons.

The construction of Israeli colonies in the different parts of the West Bank affected most Palestinian communities, their surrounding agricultural lands and open spaces. It also affected the Palestinian environment as well. Today Israel controls most of the Palestinian Territories, yet most of the property and real estate still legally belongs to the indigenous Palestinians who have been living continuously in Palestine for centuries. Israel's intensive colonization program after 1967 has involved the construction of housing and associated infrastructure in the confiscated West Bank territory based on Israeli town planning schemes, which were eccentric to the Palestinian culture and urban development. Over the past thirty seven years, Israel has been able to gain control over many areas in the West Bank and created a system of colonies connected by Israeli bypass roads. In addition, the Israeli network of bypass roads is connected with Israeli military bases, closed military zones and the segregation wall recently being built inside the West Bank territory (*see Geopolitical map, map 1-2 in the Introduction*). The following section shows the impact of Israeli settlement activities on the West Bank Palestinian communities.

3.1 Methodology

In order to investigate the opinions of the Palestinian people, two types of questionnaires were designed to elicit a range of Palestinians viewpoints, see annex 2. The questionnaires were addressed to both community leaders and Palestinian households to investigate the overall impact of Palestinian urban growth and Israeli colonies expansion

on Palestinian communities, as perceived by the Palestinian people. The field survey was conducted by completing the allocated questionnaires in all the West Bank Governorates. The Table 3-1 below summarizes the total number of questionnaires completed and communities surveyed.

Table 3-1: Number of socioeconomic survey questionnaires and communities

Governorate	No. of community leader questionnaires	No. of citizen questionnaires	No. of surveyed communities
Jenin	9	167	11
Tulkarm	7	114	10
Qalqiliya	2	67	5
Nablus	9	109	8
Tubas	3	52	4
Salfit	5	65	5
Jericho	3	79	5
Ramallah & Al Bireh	3	122	12
Jerusalem	3	12	1
Bethlehem	8	36	6
Hebron	6	42	6
Total	58	865	73

A number of 73 targeted cities, towns, villages and refugee camps were selected for the socioeconomic analysis taking into consideration their classification according to MLG. The distribution of the questionnaires according to the population size of their community is shown in Table 3-2.

Table 3-2: Distribution of the questionnaires according to MLG.

Class (MLG)	Population	Questionnaires %
A	Main cities/ Municipalities	16.6
B	> 15,000	20.3
C	> 5,000 and < 15,000	25
D	< 5,000	15.6
E	Small villages/ Hamlets	13.2
RC	Refugee Camps	9.2
Total %		100

The data of the filled questionnaires was fed into the SPSS program based on the updated coding system that was developed with the aid of a socioeconomic consultant. Afterwards, the analysis using SPSS program including the techniques of gender analysis (i.e. sex-aggregated data) was carried out to study the questionnaires at Governorate and community levels. The socioeconomic analysis conducted during the project period supported the spatial analysis and the physical changes occurred in the West Bank Governorates.

Different control measures were undertaken by the Israeli authorities to prohibit and limit the urban development and expansion of the Palestinian built-up areas, to fulfill its objectives, the Israeli Government prohibited thousands of Palestinian citizens to build on their land under the pretext of having no building permits, construction on a confiscated land or for security reasons. Presently, there are over 280 Israeli colonies and built up areas distributed all over in the West Bank including East Jerusalem with a population of more than 428 thousand Israeli colonists, half of whom reside in East Jerusalem. Chapter three stresses on the brutal actions taken by the Israeli authorities towards the Palestinians

living in the Occupied Palestinian Territories (OPT) including house demolition, land confiscation, trees uprooting and land razing as well as discussing their impacts on the environment and the socioeconomic conditions of Palestinians.

3.1.1 Gender distribution

Gender: The estimated percentages of gender in the West Bank for the year 2004 show that 50.7% of the population consists of males while 49.3% consists of females (PCBS, 2003).

A balanced population distribution between males and females was taken into consideration in this research for filling the socio-economic questionnaires in all West Bank governorates. The interviewers were selected to be of equal gender and did their best to insure equal gender participation of the persons interviewed. 35% of the persons questioned in the West Bank were females, while 65% were males. The distribution varied in the different governorates, in Bethlehem e.g. 55.6% of the persons questions were females, in Jerusalem 58.3%, in Nablus 39.4%, while only the governorates of Tubas and Jericho, female involvement have the lowest percentages due to the engagement of a higher percentage of males who were available during filling the questionnaires. All other questionnaires have almost equal distribution percentages. Percentages are shown in Table 3-3.

Table 3-3: Gender Distribution Percentages of questionnaires in the West Bank Governorate

Governorate	Population	
	Female %	Male %
Bethlehem	55.6	44.4
Hebron	54.8	45.2
Jericho	3.8	96.2
Jenin	41.3	58.7
Jerusalem	58.3	41.7
Nablus	39.4	60.6
Qalqiliya	23.9	76.1
Ramallah	21.3	78.7
Salfit	49.2	50.8
Tubas	7.7	92.3
Tulkarm	52.6	47.4
Total %	35.0	65.0

3.1.2 Age and marital status

The population aged between 15-64 years old in the West Bank is 50.6% of the total population, 46.2% are children aged below 14 years old, while only 3.2% are elderly aged above 64 years old. For filling the questionnaires, the interviewed persons were selected randomly of mature persons aged over 18 years old. The highest percentages of the persons interviewed were 26.6% and 26.2% of persons aged between 38- 47 and 28- 37 years old. In Salfit Governorate e.g.

Table 3-4: Age groups of persons interviewed in the West Bank Governorates

Governorate	Age groups				
	18-27 %	28-37 %	38-47 %	48-57 %	≥ 58 %
Bethlehem	11.1	33.3	22.2	19.4	13.9
Hebron	33.3	21.4	28.6	9.5	7.1
Jericho	22.8	32.9	21.5	12.7	10.1
Jenin	19.8	32.9	29.3	11.4	6.6
Jerusalem	16.7	25.0	25.0	8.3	25.0
Nablus	12.8	32.1	30.3	15.6	9.2
Qalqiliya	7.5	25.4	17.9	20.9	28.4
Ramallah	11.5	18.0	20.5	18.0	32.0
Salfit	24.6	26.2	20.0	16.9	12.3
Tubas	5.8	11.5	30.8	25.0	26.9
Tulkarm	15.8	21.9	36.8	15.8	9.6
Total%	16.3	26.2	26.6	15.7	15.1

24.6% of the persons interviewed were aged between 18-27, 26.2% aged between 28-37, 20% aged between 38-47, 16.9% aged between 48-57, and 32% aged 57 years old or above. Similar percentages of age variations were encountered in the other West Bank

governorates, see Table 3-4. According to PCBS statistics of the year 2002, the percentage of married to unmarried population aged 15 years old and over was 55% (married) to 45% (unmarried). However, it was observed that from the persons who were randomly selected to fill the questionnaires almost 84% were unmarried while 16% were married.

3.1.3 Educational level and job classification

Educational level: Almost 80% of the persons who filled the questionnaires were educated and have at least finished their preparatory educational level. The percentage of persons who finished their secondary school education was 30%; the percentage of persons who obtained a diploma was 11.2 %, the percentage of persons who finished at least their first university degree was 13% of the interviewed persons.

Job classification: from the persons who filled the questionnaires 13.6% were merchants, farmers 11.7 %, Employees 9.1%, specialists 8.8% and 23.6% housewives see Table 3-5. From the housewives 17.6% finished their elementary education, 30.9% finished their preparatory school education, 28.9% finished their secondary school education, 6.4% have a diploma, and 3.4% have at least their first university degree.

Table 3-5: Job classification of persons interviewed in the West Bank

Job Classification	%
Student	1.8
Merchant	13.6
Worker	8.9
Housewife	23.6
Employee	9.1
Farmer	11.7
Professional	7.5
Specialist	8.8
Retired	2.5
Unemployed	12.4
Total %	100

3.1.4 Migration

Some of the persons surveyed originated from other places than their places of residence. Most of the people who changed their place of residence in the West Bank was either as a result of wars (the 1948 War 10.3%, the 1967 War 1.5%), for work 7.5 %, as a result of return to their homeland 1.3% or as a result of marriage 7.1%, the rest have changed their place of residence for other political, social and economical reasons.

In Bethlehem governorate e.g. 77.8% of the persons surveyed originated from the same governorate, while the rest 22.2% came from other governorates or from abroad. Around 2.8% lived previously outside Palestine, 11.1% came from Jerusalem, 5.6% came from Hebron, and 2.8% came from Jericho. 8.3% migrated due to the 1948 war that took place between the Arabs and Israel and resulted that Israel occupied their lands. Another 11.1% came for work or for economic reasons, while 22.2% came for social reasons and because they got married to a person living in Bethlehem Governorate.

In the governorate of Jericho, the percentage of persons originated from the same governorate was 58.2% while the rest came from other places such as Jerusalem 10.1%, from the Palestinian villages occupied by Israel in 1948 (13.9%), from Ramallah 5.1%, from abroad 6.3% and the rest from other governorates. For 25.3% the main reason of changing their place of residence was the 1948 war, the 1967 war was the reason for 7.6% , 2.5% came for work and the rest came for social or other reasons.

In Ramallah governorate, 63.9% of persons surveyed originated from the same governorate, 19.7% originated from cities or villages occupied by Israel in 1948, while 9.8% came from Jerusalem and Hebron and the rest came from other governorates. For 19.7% the reasons of changing their place of residence was the 1948 war, for 4.9% the reason was the 1967 war, while 16.4% came for work, and the rest came for family reunion or for other socio- economic reasons.

7.5% of the persons questioned in the West Bank have a second place of residence either in their governorate where they live, in other Palestinian governorates, in the Palestinian cities and villages inside Israel or abroad, see Table 3-6.

For example, in Ramallah governorate 18.9% of the persons questioned have a second place of residence. From this percentage 4.9% have a second residence in Ramallah Governorate, 7.3% in other West Bank governorates, 1.6% in the Gaza Strip, 0.8% inside Israel, 3.3% in the United States of America, and the rest in other places. Those percentages refer to some extent to the political situation or the economic situation of the persons questioned where their ownership to more than one place of residence is a result to the push and pull factors. However, 92.5% of the persons questioned have only one place of residence.

Table 3-6: Percentage of persons having or do not have a second place of residence

Governorate	Answer %	
	Yes	No
Bethlehem	11.1	88.9
Hebron	4.8	95.2
Jericho	13.9	86.1
Jenin	2.4	97.6
Jerusalem	8.3	91.7
Nablus	2.8	97.2
Qalqiliya	1.5	98.5
Ramallah	18.9	81.1
Salfit	9.2	90.8
Tubas	15.4	84.6
Tulkarm	1.8	98.2
Total %	7.5	92.5

3.2 Israeli colonization activities

3.2.1 House demolition

House demolition is one of the most brutal actions taken by the Israeli authorities towards the Palestinians living the Occupied Territories. These actions are linked directly to the Israeli settlement policies and plans. The Israeli objective of such policies and plans is to create strategic control areas inside the Palestinian land, limiting the urban expansion of the Palestinian cities, towns and villages and control the Palestinian agricultural lands and open spaces for its colonization activities. Based on Israeli plans and settlement planning schemes, the Israeli authorities prohibited the Palestinians to build on their land and denied their right for housing. The Palestinian houses existed on those lands and contradicted the Israeli plans were demolished. The limited area for Palestinian urban expansion, the high land prices and the difficulty to obtain a building license from the Israeli authorities especially in

Table 3-7: Percentage of house demolition in the West Bank Governorates during the period 1967-2003

Governorate*	%
Bethlehem	6.9
Hebron	5.0
Jericho	7.9
Jenin	12.9
Nablus	22.8
Qalqiliya	4.0
Ramallah	14.9
Salfit	3.0
Tubas	6.9
Tulkarm	15.8
Total	100.0
* <i>excluding east Jerusalem</i>	

the areas planned for colonization activities have forced many Palestinians to build on their own land without building licenses.

The analysis of house demolition in the West Bank by the Israeli authorities from 1967 until the end of 2003 shows that around 11.7% of the Palestinian citizens living in the West Bank were affected by the Israeli house demolition policy. The highest percentage (22.8%) of the people exposed to house demolition was from those living in Nablus Governorate. The distribution percentage among the west Bank Governorates is shown in Table 3-7.

Many justifications were given for house demolition in the West Bank by the Israeli authorities. The major justifications were for Israeli security reasons as indicated by 60.4% of the population, see Table 3-8.

Table 3-8: The justification given for house demolition in the West Bank

Reasons	%
Security reasons	60.4
Construction on confiscated land	3.0
Construction of Israeli bypass roads	4.0
No building License	11.9
Other Israeli colonization activities	4.0
No justification	16.7
Total %	100

Between the years 1993 and 2003, the number of Palestinian houses demolished in the OPT was 6835 houses (*ARIJ database 2003*). After the year 2000, an intensive Israeli house demolition campaign targeted the Palestinian built-up areas especially in East Jerusalem. This house demolition was harmonized with the Israeli Segregation Wall plan known as “The Jerusalem Envelope”.

The highest number of house demolition in the period between 1993 and 2000 took place in Hebron and Salfit Governorates. While after the year 2000 the Palestinian governorates of Nablus, Jenin and Hebron witnessed the highest number of house demolition.

In Nablus city, the municipality engineer stated that partial damages occurred in 4000 houses and 150 houses were completely demolished due to Israeli invasions since September 2000, while the camp leader in Balata camp in Nablus stated that 1985 houses were partially damaged and 86 houses were completely demolished in the camp.

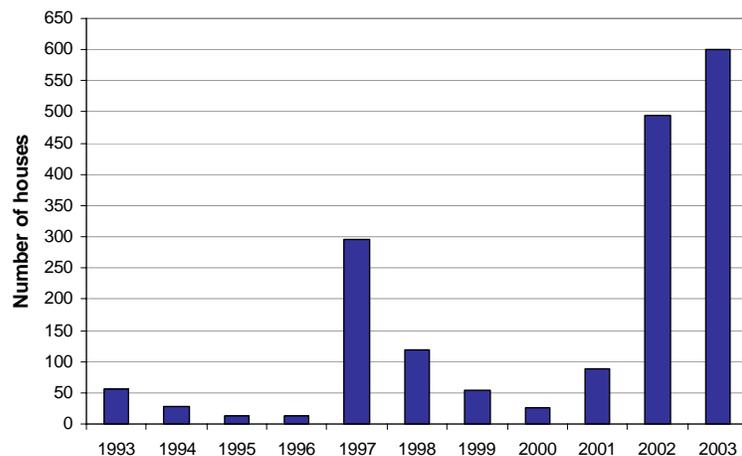


Figure 3-1: Number of Houses demolished in the West Bank between September 1993 and December 2003



Photo 3-1: A demolished house in Hebron city

In Jenin camp, the community leader stated that 1600 houses were partially damaged and 202 houses were completely demolished after the outbreak of the second Intifada. In Hebron city, the community leader stated that 3000 houses were partially and 250 houses were completely demolished.

3.2.2 Land confiscation

Since the occupation of the Palestinian Territories in 1967, confiscation of Palestinian land has enabled Israel to proceed with the construction of Israeli colonies and related structures, military bases, and Israeli bypass roads in various areas of the West Bank. The primary Military Order used to legitimate the confiscation of Palestinian land is Military Order 58 of 1967z, known as the Absentee Property Law. The Military Order transferred lands and properties of absentee¹ Palestinians to the Israeli Civil Administration. As a result, 340 km² of Palestinian lands were confiscated in favor of Military order number 58 and defined as abandoned property. In 1969, the Civil Administration issued Military Order number 321, which gave the Israeli military the power to confiscate Palestinian land for public services, Israeli Public works in the Palestinian Territory are inevitably those that benefit the Jewish colonies and bypass roads.

Land confiscation increased during the last two years to construct the Israeli Segregation Wall that creeps into the West Bank lands to depths that reach 23 kilometers from the 1949 Armistice line². Most of the confiscated lands are agricultural, arable and grazing lands. The analysis shows that almost 27% of the Palestinians living in the West Bank were exposed to this Israeli activity. The most affected were from the population living in Tubas Governorate, where the land was totally or partially confiscated from 65% of the Governorate inhabitants.

¹ An absentee is defined as any Palestinian who left the West Bank before or after June 7, 1967.

² The Armistice Line is the border between the West Bank and Israel, also known as the Green Line.

Figure 3-2 shows that land confiscation accelerated rapidly during the years 1967-1987 (*directly after the Israeli occupation to the West Bank in 1967*), where the percentage of people exposed to land confiscation reached 35.9% of the total West Bank population.

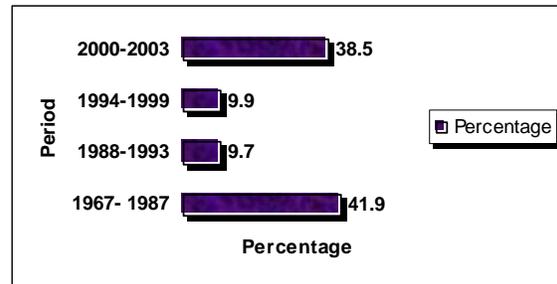


Figure 3-2: Percentage of people exposed to land confiscation in the West Bank

After the start of the second Intifada in September 2000, Israel started another wave of land confiscation and the percentage rose to 38.5% of the total confiscation, especially when Israel started to implement its unilateral separation plans and the erection of the Segregation Wall attempting to annex more lands to Israel.

The analysis shows that 80% of the persons interviewed in Qalqiliya Governorate stated that their land was confiscated after the year 2000, see Table 3-9. In Hebron and Bethlehem on the other hand, the highest percentage of land confiscation (60%) was encountered during the period 1994-1999, where the land was confiscated for the expansion of Israeli colonies. While almost 100% of the inhabitants in East Jerusalem their land was confiscated between the years 1967 and 1987.

Table 3-9: Percentages of persons exposed to land confiscation in the West Bank and the confiscation period

Governorate	1967-1987 %	1988-1993 %	1994-1999 %	2000-2003 %
Bethlehem	14.3	--	28.6	57.1
Hebron	20.0	--	60.0	20.0
Jericho	52.2	39.1	8.7	--
Jenin	31.3	8.3	8.3	50.0
Jerusalem	100.0	--	--	--
Nablus	28.6	14.3	14.3	42.9
Qalqiliya	2.9	5.7	11.4	80.0
Ramallah	68.6	11.4	11.4	8.6
Salfit	48.5	15.2	12.1	24.2
Tubas	94.1		2.9	2.9
Tulkarm	--	--	--	100

In the West Bank, more than 347100 dunums of land were confiscated between the years 1993 and 2003, see Figure 3-3.

The largest areas of land confiscated during the peace process were found in Ash Shuyukh village in Hebron Governorate, where around 3500 dunums of land were confiscated. In Tubas Governorate more than

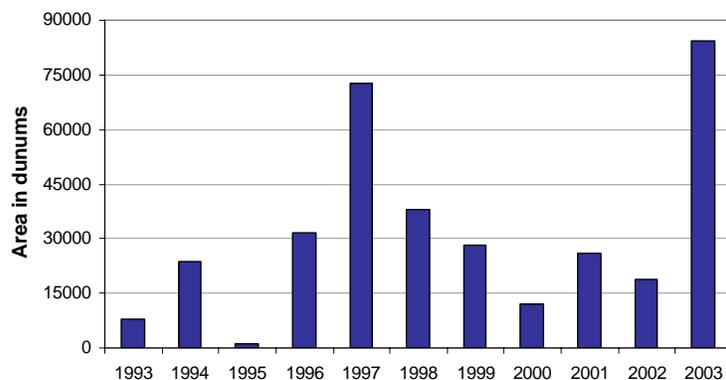


Figure 3-3: Land confiscated in the West Bank between September 1993 and December 2003

10000 dunums of land were confiscated by the Israeli authorities during the period 1994 and 2000. Most of the confiscated lands were used for irrigated agriculture. In Salfit and Tulkarm Governorates a large part of the confiscated lands were forest areas, in addition that in Jerusalem, Nablus, Salfit and Tubas Governorates a lot of grazing areas were confiscated in favor of the Israeli colonization activities. In many Palestinian villages such as Halhul and Beit Kahil located in Hebron Governorate, the analysis showed that 70% of the people exposed to land confiscation worked in agriculture and therefore have lost their only source of income.

Furthermore, the analysis shows that after the year 2000, land confiscation accelerated rapidly by the Israeli authorities. It was observed that the largest magnitude of land confiscation in the localities surveyed took place in Nuweima village located north of Jericho city and in Ar Ras village southeast of Tulkarm. The community leader of Nuweima village revealed that over 3000 dunums of land were confiscated from the village lands during the year 2002. An Israeli colony called Noomi located is to the east of the village. Between the colony and the village four new outposts were erected during the year 2002 (ARIJ database). In Ar Ras village, almost 5000 dunums were confiscated in the year 2002 for constructing the Israeli segregation wall. Furthermore, in Qalqiliya Governorate vast areas of land were confiscated for the purpose of building the Israeli segregation wall. Many villages such Azzun Atma and Ras Atiya located south of Qalqiliya city became surrounded by the Wall, and their 6,700 residents are now living in an enclave.



Photo 3-2: Part of the segregation wall surrounding the Israeli colony Alfei' Menche



Photo 3-3: A gate between the Palestinian villages Habla and Ras Atiya on one side and Ras Tireh and Ad Dab'a on the other side



Photo 3-4: An elderly couple crossing the gate



Photo 3-5: A boy crossing the gate

Almost all reasons given for land confiscation by the Israeli authorities were for Israeli colonization activities. More than 35.5% of the Palestinians whose land was confiscated referred that their land was confiscated for Israeli security claims, and 19.7% stated that their land was confiscated for the construction or expansion of Israeli colonies. On the other hand, 15.8% stated that the justification was for the construction of Israeli bypass roads and 10% stated that their land was confiscated for constructing the Israeli Segregation Wall, see Table 3-10.

Table 3-10: Percentages of persons exposed to land confiscation the West Bank per reason of confiscation

Confiscation Reasons	%
Security reasons	35.5
Colony construction or expansion	19.7
Israeli bypass roads construction	15.8
Segregation Wall	10.0
Nature reserve	7.7
Area between Palestinian and Israeli borders	3.5
No justification	3.1
Military area	1.9
Absentee Ownership	2.8
Total %	100

With regard to land use, the analysis shows that 69.6% of the confiscated lands were arable land used for seasonal agriculture. Lands used for irrigated agriculture 19.8%, and lands used for a mix between arable and irrigated agriculture 8.8%. Confiscated lands used for grazing were 0.4%, while 1.4% was bare.

Before the confiscation, most of the lands contained a variation of cultivation types. The lands cultivated with field crops were 31.7% of the total cultivated types. Lands planted with olive trees were 22% and lands planted with heterogeneous vegetation were 18.9%. While the lands which were planted with fruit trees such as citrus, figs, bananas, apples and apricots were 8.8% of the total cultivation types. The percentages of those types in the West Bank Governorates are shown in Table 3-11.

Table 3-11: Percentages of cultivation types before land confiscation in the West Bank Governorates

Governorate	Olive trees %	Fruit Trees %	Field crops %	Vegetables %	Uncultivated land %	Heterogeneous %	Fruits, vegetables, & field cultivation %
Bethlehem		33.3				66.7	
Hebron		60.0				40.0	
Jericho		18.2	31.8	31.8	4.5		13.6
Jenin	30.0		40.0		10.0	20.0	
Jerusalem			100.0				
Nablus	42.9	7.1	21.4		7.1	21.4	
Qalqiliya	29.4	14.7	5.9	8.8		38.2	2.9
Ramallah	14.3	5.7	51.4	8.6	2.9	5.7	11.4
Salfit	28.1	3.1	40.6			28.1	
Tubas		2.9	61.8	32.4			2.9
Tulkarm	56.3	3.1	3.1	3.1	3.1	25.0	6.3
Total %	22.5	8.8	31.7	11	2.2	18.9	4.8

3.2.3 Land razing

After the confiscation of land, the Israeli authorities used to raze the Palestinian lands for its colonization activities. In the West Bank, the percentage of Palestinian population affected through land razing or leveling is estimated at 16.5% of the total population. The most affected are from the population living in Qalqiliya Governorate (40.3% of the Governorate population). The analysis shows that the highest percentage (62.4%) of land razing took place after the year 2000. This clearly shows the massive Israeli leveling of lands for the construction of the Segregation Wall, expansion of colonies, and constructing Israeli bypass roads, see Figure 3-4.

During the first Intifada (1988-1993), almost 50% of the people exposed to leveling of their land by the Israeli bulldozers were from those living in Jericho Governorate. In Hebron most of the land razing took place during the peace negotiations, where Israel accelerated the expansion of Israeli settlements.

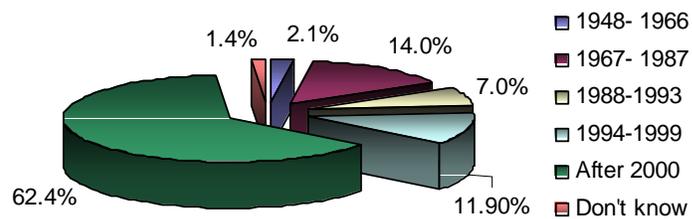


Figure 3-4: Percentage of population exposed to bulldozing of their land in the West Bank by Israeli Authorities and the period of bulldozing

In the governorate of Qalqiliya, 92.6% of the people exposed to land razing their lands were bulldozed after the year 2000. In Jenin 72.2% of the people exposed to land razing and almost 100% in Tulkarm their lands were bulldozed after the year 2000. Most of the bulldozed land (79.7%) was arable land. Lands used for irrigated agriculture were 14%. Lands used as a mix between both irrigated and arable were 4.9%. Lands used for grazing 0.7% while 0.7% was bare before bulldozing.

3.2.4 Uprooting of trees

According to the Palestinian Ministry of Agriculture 1,000,914 trees were uprooted since the beginning of the first Intifada until March 2004 in the Occupied Palestinian Territories by the Israeli authorities for the purpose of building Israeli roads, colonies military bases, and for constructing the segregation wall. The analysis shows that 7.6% of the uprooting took place during the period 1967-1987, 11.9% took place during the period 1988-1993, 12.7% during the period 1994-1999, while the highest percentage (67.8%) of the trees were uprooted after the year 2000 (*start of the second Intifada.*) From the Palestinians affected by land confiscation and/or bulldozing of land, 8.8% revealed that the trees planted in their land were partially or totally uprooted.

During the occupation period, Ramallah and Al Bireh Governorate was the most affected by the uprooting of trees where the percentage reached 35% of the trees uprooted, but during the period 1994-1999, the percentage increased to 62.5% as a result of the intensive Israeli activities in the Governorate. During the same period (1994-1999), Hebron Governorate also was subjected to massive uprooting of trees where most of the

trees were uprooted for the expansion of Israeli colonies and the construction of Israeli bypass roads. In the West Bank northern Governorates most of the trees uprooting took place after the year 2000. In Jenin Governorate, 92.9% of population affected by this Israeli activity indicated their trees were uprooted during this period. During the same period, in Qalqiliya Governorate the percentage reached 90.5%, in Tulkarm 85.7%, in Nablus 72.7% and in Bethlehem 66.7%. Therefore, it became evident that the construction of the Segregation Wall and the Israeli bypass roads that have been under construction in the West Bank during this period is behind those high percentages. Therefore, the Israeli activities have a negative impact on agriculture in all Palestinian Governorates in the West Bank

3.3 Impact of the Israeli activities on cattle raising

In the West Bank, 35.8% of the interviewees stated that as a result of increased Palestinian urbanization and increased Israeli colonization activities there has been a decrease in cattle raising due the decrease in grazing lands. This impact is shown in Table 3-12.

Table 3-12: Impact of Israeli activities on cattle raising

Effects	Governorate %											Total
	Bethlehem	Hebron	Jericho	Jenin	Jerusalem	Nablus	Qalqiliya	Ramallah	Salfit	Tubas	Tulkarm	
No effect	55.6	69.0	96.2	49.7	50.0	52.3	11.9	45.1	3.1	13.5	35.1	44.3
Poultry farms were affected by closures											0.9	0.1
Decreased due to insufficient transportation				0.6							0.9	0.2
Decreased due to bad economical situation			1.3			3.7						0.6
Decrease due to shortage in graze lands	36.1	19.0	1.3	40.1	50.0	12.8	29.9	50.0	61.5	63.5	41.2	35.8
Cattle raising increased in ranches	8.3			9.6		28.4	43.3	0.8	30.8	9.6	2.6	12.5
Limited Grazing areas due to bypass roads								1.6				0.2
Decrease for all reasons mentioned above		11.9	1.3			2.8	14.9	2.5	4.6	13.5	19.3	6.2

3.3.1 Impact on water

The citizens interviewed revealed that Israeli colonization activities have a negative impact on water (see Table 3-13). Around 20% of the persons interviewed in all the West Bank governorates stated that the water supply became irregular due to Israeli colonization activities. According to 15.9% of the interviewees, there is both a decrease in available water quantity and an irregular water supply. In Salfit and Nablus 40% and 45.9% respectively believed that irregular water supply is an outcome of Israeli colonization activities. In addition, there has been a decrease in available water quantity according to 15.8% of the citizens interviewed in all the West Bank. Around 63% of interviewees in Jericho and 54.8% in Hebron stated that there is a decrease in available water quantity due to the urbanization and Israeli colonization activities. According to 15.4% of people interviewed in Salfit the water became polluted with solid waste. From the persons interviewed in Tubas 40% stated that there is dryness of water sources due to Israeli colonization activities. In Jenin 51.5% of the citizens interviewed revealed that there is a decrease in available water quantity and a irregular water supply due to Israeli colonization activities.

Table 3-13: Impact of Israeli activities on water quality and quantity

Effects	Governorate %											Total %
	Bethlehem	Hebron	Jericho	Jenin	Jerusalem	Nablus	Qalqiliya	Ramallah	Salfit	Tubas	Tulkarm	
No effect	38.9	35.7	24.1	13.8	58.3	23.9	49.3	33.6	32.3	18.0	48.2	30.5
Decrease in available water quantity	5.6	54.8	63.3	4.2	16.7	19.3	4.5	16.4		10.0	2.6	15.8
Irregular water supply	22.2	4.8	3.8	15.6	16.7	45.9	14.9	18.0	40.0	28.0	8.8	20.0
Polluted with waste water			7.6	1.2			1.5	4.1	15.4			2.8
Decrease in water quality	5.6	2.4	1.3	2.4			19.4		3.1	4.0	10.5	4.3
Dryness of water source	2.8			1.8			3.0	0.8	4.6	40.0		3.5
Theft of Water by the occupants								0.8			0.9	0.2
Decrease in available water quantity, irregular supply	25.0	2.4		51.5	8.3	3.7		24.6	1.5		4.4	15.9
Polluted with waste water, irregular				0.6		0.9	4.5	1.6	3.1		7.0	2.0
Polluted with waste water, decrease in available water quality				1.2		1.8	1.5				17.5	2.9
All above effects				7.8		4.6	1.5					2.2

With regard to water quality 64.9% of the citizens interviewed revealed that the quality of water has deteriorated due to the Israeli occupation and the colonization activities of the occupying power. The highest percentages of those who believed that the water quality has deteriorated were from the people living in Tubas 92.3%, in Jenin 87.4% and in Nablus 78.0%. Only in the three Governorates of Qalqiliya, Tulkarm and Salfit less than 50% of the people stated that the water quality has deteriorated. On the other hand, some

32.2% of the persons interviewed believed that the Israeli activities did not have any impact on the water quality.

3.4 Impact of the Israeli activities on the Palestinian household

The household economic condition is an indicator of a household’s ability to improve its living conditions. The availability of financial resources and funds enable a household to purchase a new residential unit or expand an existing one. In contrary, worsening of the economic condition and the lack of financial resources increase poverty levels and may lead to the deterioration of the household economic condition, which impacts negatively the urbanization process.

3.4.1 Impact on the household economic conditions

The Israeli occupation of the West Bank has played a major role in the household’s economic condition. Many households were affected by the Israeli closures and the absence of a suitable investment atmosphere this is in addition to the inability of the local markets to absorb all the Palestinian labor force.

The Israeli restrictions imposed on the mobility on Palestinian population especially on border crossing and roads caused an increase in unemployment rates and therefore increase in poverty levels. The analysis shows that 82.7% of the population surveyed stated that the household economic situation was negatively affected by the Israeli colonization activities, see Table 3-14.

Table 3-14: Percentages of people stating that the Israeli activities affected their household economic conditions

Governorate	Result
	Negative impact %
Bethlehem	91.7
Hebron	90.5
Jericho	34.2
Jenin	87.4
Jerusalem	83.3
Nablus	90.8
Qalqiliya	92.5
Ramallah	65.6
Salfit	95.4
Tubas	96.2
Tulkarm	94.7
Total %	82.7

In the World Bank’s report (2003), it was indicated that just before the year 2000 twenty one percent of the Palestinian population were under the poverty line (which is US\$2 per day), this number increased to nearly 60% by December 2002. The number of people under poverty line had tripled to reach nearly 2 million. In addition the average daily consumption of the poor had decreased from an equivalent to US \$1.47 to US \$1.32.

Similarly the -Graduate Institute of Development Studies (IUED) in their report “Palestinian Public Perceptions on Their Living Conditions” issued in 2003, conducted a poll to analyze, monitor and assess the living conditions in Palestine. This report showed that in July 2003, 42% of the people were above poverty level, 34% were below poverty level (excluding the hardship cases) while 24% were below poverty level and in hardship cases.

More than 88% of the women interviewed revealed that the household economical situation was negatively affected by Israeli colonization activities. Around 70.3% believed that employment opportunities increased for women during the peace process, while only 42.6% believed that their employment opportunities increased after the year 2000. Approximately the same percentage of men interviewed believed that employment opportunities for women increased during the peace process, while only 29.4% believed that employment opportunities increased for women after the year 2000. The negative impact on the household economic situation was related to the reasons shown in Table 3-15.

Table 3-15: Reasons of the negative impact of Israeli activities in the West Bank on the household economic conditions and the percentage of population justifying those reasons

Reasons	Governorate %											Total %
	Bethlehem	Hebron	Jericho	Jenin	Jerusalem	Nablus	Qalqiliya	Ramallah	Salfit	Tubas	Tulkarm	
Bad economic situation / Paralysis of Commercial sector	42.4	15.8	14.8	39.0	30.0	53.5	27.4	43.8	25.8	18.0	48.1	37.2
Loss of Job or source of income/ income reduced	18.2	23.7	59.3	35.6	70.0	28.3	41.9	16.3	48.4	26.0	35.2	33.3
Instability of political situation	3.0		3.7	2.7			3.2	10.0			2.8	2.7
Closures and checkpoints	18.2	15.8	11.1	5.5		2.0	1.6	12.5	11.3	28.0	3.7	8.5
Lack of Job opportunities	6.1	7.9		2.7		3.0	12.9	2.5	6.5	4.0	1.9	4.2
The increasing rate of unemployment	3.0	36.8				5.1	1.6	2.5		2.0		3.4
insufficient transportations and high expenses	3.0			7.5		5.1		5.0	1.6		3.7	3.6
No work	0.3											0.1
House demolition			3.7	1.4		1.0		7.5		2.0	1.9	1.8
Razing & Bulldozing of agricultural lands/ Uprooting of Trees			3.7	1.4			1.6		1.6			0.7
Harassments (Got Arrested)			3.7			1.0	1.6			2.0		0.6
Difficulty in Marketing	3.0			4.1		1.0	8.1		4.8	18.0	2.8	3.9

As shown in Table 3-15, the highest percentage (37.2%) of the persons interviewed attributed the negative impact to the bad economic situation and the paralysis of the

economic sector. A considerable percentage of the population (33.3%) attributed the negative impact to the loss of jobs and the reduction in income level as a result of closures and land confiscation, which affected directly their household economic conditions.

In the IUED study, 67% of the people surveyed attributed the difficulties in running business to difficulties in reaching work place, 52% to difficulties to inabilities to work because of curfews, 42% to difficulties in purchasing raw materials, 37% to inabilities to market products, 29% to inabilities to pay bank loans and 27% to damage of agricultural lands. This study, the World Bank and the IUED reports have shown analogous results of the negative impact of Israeli colonization activities on the Palestinian household.

During the years 1999 – 2001, the economic situation worsened and the gross domestic product per capita (GDP/capita) decreased from US\$ 1819 to US\$ 1442, see Table 3-16.

Table 3-16: GDP, GNI, GDI per Capita between the years 1998-2001 as economic indicators

Year	GDP per capita US \$	GNI per capita US \$	GDI per capita US \$
1998	1,684.40	1,994.00	2,133.30
1999	1,819.70	2,125.70	2,269.90
2000	1,644.30	1,896.50	2,101.70
2001	1,442.30	1,580.70	1,904.80

Source: PCBS 2003

GDP, GNI, GDI, are economic indicators to determine development. Improvement of GDP increases the ability of the country to allocate investment for the housing sector, basic infrastructure and social services. As a result of all above reasons, the drop in the economy has resulted in a decline in the Gross National Income per capita (GNI/capita) from US\$ 2125 in 1999 to US\$1580 in 2001, and hence, the Gross Domestic Income per capita (GDI/capita) declined from US\$ 2269 in the year 1999 to US\$ 1904 in the year 2001.

All leaders interviewed stated that the monthly income of the individual has decreased since the beginning of the second Intifada. The majority described a dramatic decrease of 70-80 % in the income level. The economical sectors in the West Bank were also affected due to the difficulties of exporting products and due to the loss of Israeli customers. Around 92 % of the leaders revealed that the unemployment rate has increased since the beginning of the second Intifada, and the majority stated that it has reached 70-80 %.

The analysis shows that approximately one third of the population has a monthly income of less than US\$140. The highest percentages of those who have monthly income less than US\$140 are found in the population living in Salfit Governorate. The analysis shows that the population in Ramallah Governorate has the best economic situation with an average monthly income between US\$ 430- 570. It can be concluded; that the drop in the economy during the last years has affected negatively all development aspects in the West Bank, which in return affected negatively the urbanization process.

3.4.2 Impact on the household social conditions

The Israeli occupation of the West Bank has played a major role in damaging the Palestinian social and economical infrastructures. The social relations; family ties and

integration have been affected in all West Bank urban and rural communities as a result of the Israeli colonization activities. The analysis shows that almost 49% of the population surveyed in the West Bank has stated that the household social condition was negatively affected by the Israeli colonization activities. Out of the women questioned 51.5% stated that Israeli colonization activities have had a negative impact on the social condition of their families. The percentages however vary from one Governorate to another based on the type of Israeli activity, the urban services and functions, the availability of financial resources, and potentials of each Governorate that directly affect the social conditions. The negative impact on the household social conditions as stated by the population surveyed in each Governorate is shown in Table 3-17.

Table 3-17: Percentages of people stating that the Israeli activities affected their household social conditions

Governorate	Result
	Negative impact %
Bethlehem	69.4
Hebron	26.2
Jericho	21.5
Jenin	70.7
Jerusalem	66.7
Nablus	32.1
Qalqiliya	76.1
Ramallah	37.7
Salfit	30.8
Tubas	30.8
Tulkarm	66.7
Total %	48.9

Table 3-18 shows that after the year 2000, 42.1% became affected through losing contacts with other family members and friends as a result of closures and checkpoints where the movement from one place to another within the West Bank became very difficult and risky.

In addition, the transportation cost became higher because in order to reach a destination, people used to go through alternative and longer routes to avoid delays and harassments at the Israeli checkpoints that are located at the entrances of cities and along main roads.

3.4.3 Impact on the educational sector

Education is an indicator of a community's capability to create a civilized society able to improve and develop and able to follow the world civilization, science and technology. During the years of

Table 3-18: Reasons of the negative impact of Israeli activities in the West Bank on the household social conditions and the percentage of population justifying those reasons

Justification	%
Social visits became rare due to closures & checkpoints	18.7
Harassments (Members Got killed or arrested)	17.5
The constant Israeli invasions and curfews	0.7
Losing contacts with family and friends	42.1
Left the family Looking for work	0.9
Closures	3.1
Relations affected /Cold relationships/Family disintegration	14.7
Other reasons	2.4
Total %	100.0

Israeli occupation, the educational life was directly affected all over the West Bank by the Israeli colonization activities. More than 55% of the population surveyed pointed out that the educational life of their family members was negatively affected as a result of the different Israeli colonization activities, see Table 3-19. More than 60% of the women questioned stated that Israeli colonization activities have had a negative impact on the educational life of their family members.

The northern West Bank Governorates such as Qalqilya, Jenin and Tulkarm, in addition to Jerusalem and Bethlehem were negatively affected as a result of closures, incursions and curfews imposed on the population and as a reflection of the different Israeli activities and the political atmosphere that became a fashion discussion at schools or universities, which is observed through the students activities and reactions to the incidents.

Many students had and have difficulties to reach schools and universities as a result of the restriction of movement and the many Israeli checkpoints on the way. During the first and second Intifada (uprising) (1987-1994, and 2000-to date), schools and universities were closed for several days or months.

In the study done by the IUED, 54% of the interviewees indicated that it was “difficult”, “very difficult” or “almost impossible” for students to access schools. The most affected were students residing in villages where 68% indicated difficulties or impossibilities to reach school, 48% in cities and 46% in refugee camps (IUED, 2003.)

In the report “Education Under Occupation: Palestinian children talk about life and school” (Save the Children, March 2002) it was indicated that “275 schools in the Palestinian territories are within 500 meters of an Israeli military post. They make up 15.6% of the total number of Palestinian schools, serving 118,662 students out of a school-going population of 865,540.”

The results of this study are almost analogous with the results obtained from other studies and reports, where all have shown the negative impact of Israeli colonization activities on the Palestinian educational sector.

3.4.4 Impact on the health sector

A healthy society is an indicator of the ability of a community to develop and improve. Wellbeing of people is affected from aggression, discrimination and through the difficulties and humiliation encountered at the Israeli checkpoints, road blocks and earth mounds spread all over the West Bank. These obstacles constitute a major problem for the movement of patients to hospitals and clinics and other health services located at the urban centers. Around 47.7% of the population surveyed stated that they and their families were negatively affected by the Israeli colonization activities and related the impact to the following

Table 3-19: Percentages of people stating the Impact of the Israeli activities on education

Governorate	Result
	Negative impact %
Bethlehem	72.2
Hebron	45.2
Jericho	17.7
Jenin	68.9
Jerusalem	75.0
Nablus	43.1
Qalqilya	77.6
Ramallah	33.6
Salfit	43.1
Tubas	71.2
Tulkarm	78.9
Total %	56.9

Table 3-20: Percentages of people stating the negative Impact of the Israeli activities on health

Governorate	Result
	Negative impact %
Bethlehem	44.4
Hebron	52.4
Jericho	16.5
Jenin	73.1
Jerusalem	83.3
Nablus	27.5
Qalqilya	40.3
Ramallah	44.3
Salfit	40.0
Tubas	26.9
Tulkarm	76.3
Total %	47.7

reasons: sickness, fear, shortage of medical and health services, psychological effects, lack of transportation services, unhygienic places and unhygienic water, see Table 3-20.

It is worth mentioning here that a higher percentage of the women questioned (59.4%) than of the men (42.9%) revealed that Israeli colonization activities affected negatively the health situation of their family members. It was observed that 37.8% of the population related the negative effect of the occupation activities to psychological reasons caused by the feeling of fear and insecurity, 27.1% relates the reasons to sickness caused by the various Israeli activities such as the pollution of water resources from waste water drained from the Israeli settlements to the Palestinian agricultural lands and wells, or from spraying the agricultural fields by poisonous chemicals, or beating during arrest. Around 16.9% related the reason to the harassments and humiliation encountered by Israeli occupying forces, this in addition to other reasons as shown in Table 3-21.

The IUED survey showed that 25% of the households in the West Bank and Gaza were very healthy, 58% were rather healthy, 12% were rather unhealthy and 4% were very unhealthy. With regard to restrictions on hospitalization since the beginning of the second Intifada 26% indicated that there were no restrictions, 26% indicated that there was a delay and 6% indicated that hospitalization was denied while 43% did not need hospitalization.

Table 3-21: Percentages of people stating the reasons of the negative effect of the Israeli activities on health.

Reasons of the negative impact on health	%
Sickness	27.1
Harassments and humiliation	16.9
Lack of Medical services due to the situations	8.1
Psychological effects (Fear, insecure situations)	37.8
No Reason	1.7
Insufficient transportation to reach Hospitals	8.1
Unhygienic places	0.2
Unhealthy water	0.2
Total %	100

Table 3-22: Percentage of population prohibited to build in the West Bank because of Israeli military orders

Governorate	Answer %	
	No	Yes
Bethlehem	3.4	9.2
Hebron	4.6	6.7
Jericho	7.1	21.7
Jenin	21.9	3.3
Jerusalem	0.5	6.7
Nablus	12.3	14.2
Qalqiliya	7.5	9.2
Ramallah	14.4	12.5
Salfit	8.1	4.2
Tubas	6.3	4.2
Tulkarm	14.0	8.3
Total %	100	100

3.5 Impact of the Israeli activities on Palestinian building and construction

3.5.1 Control

The Israeli authorities used several settlement policies in order to control and hinder the development of the Palestinian communities. In the West Bank, 14.1% of the persons surveyed were prohibited to build on their lands by the Israeli authorities. The highest percentages of those prohibited were from Jericho, Nablus and Ramallah governorates with percentages of 21.7%, 14.2% and 12.5% respectively, see Table 3-22.

The percentages varied in the West Bank Governorates. The analysis shows that in Bethlehem Governorate 30.6% of the persons interviewed were prohibited to build on their land because of Israeli military orders, in Jerusalem Governorate 66.7% and in Jericho Governorate 32.9%, see Table 3-23.

In Jerusalem Governorate, a high percentage of Palestinian people were prohibited to build on their own land due to Israeli control policies over Palestinian lands. Many Israeli colonies and colony blocks were constructed on those lands such as *Maale Adumim*, and *Bisgat Zeev*.

Bethlehem is another example where the Israeli colonies such as *Gilo*, *Har Gilo*, *Har Homa* and the *Gush Etzion* block were all constructed on Palestinian lands while the original owners were prohibited to build on it. Many people were not able to build on their lands because of different reasons related to the Israeli colonization activities. The study shows that 32.2% of the people interviewed were not able to get building permits. Around 28% were not able to get a building permit because of government regulation obstacles that are still practiced by the Israeli occupation authorities. From the interviewees 13.2% of the people were prohibited because of Israeli security reasons, 7.4% were stopped because of building on a confiscated land, and 16.4% because of other Israeli colonization activities.

3.5.2 Building licenses

Building licenses are considered as an indicator for future urban development, they are an indicator for investment in the construction sector, and they also reflect the economic and political conditions in the Palestinian Territories. The analysis in this section will show the relationship between the persons who tried to apply for a building license, the result and the year of the application.

It was observed that from the people interviewed 56% tried to get a building license. The highest population percentages tried to get a building license were in Jenin (10.3%), in Ramallah (7.7%), in Tulkarm (7.5%) and in Jericho (6.6%). The least percentage was in Jerusalem with 0.9%. In order to get a building license 50.4% of persons applied to the PNA municipalities and village councils

Table 3-23: Percentage of population prohibited to build within each of the Governorates because of Israeli military orders

Governorate	Answer %	
	No	Yes
Bethlehem	69.4	30.6
Hebron	81.0	19.0
Jericho	67.1	32.9
Jenin	97.6	2.4
Jerusalem	33.3	66.7
Nablus	84.4	15.6
Qalqiliya	82.1	17.9
Ramallah	86.9	13.1
Salfit	92.3	7.7
Tubas	90.4	9.6
Tulkarm	91.2	8.8
Total %	85.9	14.1

Table 3-24: Percentages of persons tried to get building licenses in the West Bank

Governorate	Answer %	
	No	Yes
Bethlehem	1.3	2.9
Hebron	2.3	2.5
Jericho	2.5	6.6
Jenin	9.0	10.3
Jerusalem	0.5	0.9
Nablus	8.6	4.0
Qalqiliya	2.2	5.5
Ramallah	6.4	7.7
Salfit	3.5	4.0
Tubas	2.0	4.0
Tulkarm	5.7	7.5
Total %	44	56

while 42.2% applied for a building license to the Israeli occupation authorities, while 7.4% were refugees who applied to UNRWA offices¹ in the West Bank.

Out of the persons applied, 80.5% were able to get a building license while 19.5% have tried but failed to get it, see Table 3-25. However, the percentages varied in the different Palestinian Governorates e.g., 4.7% of the people who applied for a building license and their application was rejected were from Jericho Governorate, from Nablus 2.9% and from Ramallah 2.7%.

It was also observed that in the West Bank 40.2% of the people were prohibited to build on their land even if they have building licenses. The highest percentage of those who obtained building licenses and were prohibited to build is in Jericho where the percentage reached 9%, in both Nablus and Qalqiliya the percentage was 4.9%, and in both Bethlehem and Ramallah the percentage was 4.1% among all West Bank Governorates.

Table 3-25: Percentages of persons tried to get building license and the result of their application

Governorate	Result %	
	Accepted	Rejected
Bethlehem	3.7	1.4
Hebron	3.9	0.6
Jericho	7.0	4.7
Jenin	17.5	0.8
Jerusalem	0.4	1.2
Nablus	4.3	2.9
Qalqiliya	7.6	2.3
Ramallah	11.1	2.7
Salfit	6.2	1.0
Tubas	6.4	0.8
Tulkarm	12.3	1.0
Total %	80.5	19.5

The percentage of people who were prohibited to build was 31.6% during the period 1967-1987, which is the period between the occupation of the Palestinian Territories and the start of the first Intifada in 1987. Within the period 1994-1999 the percentage of prohibited to build was 33.7%, which is the period where the PNA gained control on parts of the West Bank, during this period the Israeli authorities accelerated the construction and expansion of colonies in the Palestinian Territories and most people were not able to get building permits on the areas (Area C) which remained under full Israeli control. During the second Intifada, the percentage of people applied for a building license declined sharply as a result of the political instability and the deterioration of the economic situation and only few were able to obtain a building license. However, in the West Bank many reasons were given by the issuing authorities; around 63.2 % of the applications rejected refer directly to activities and measures taken by the Israeli authorities.

Table 3-26: Percentages of persons prohibited to build even they have a building license application

Governorate	Persons %
Bethlehem	45.5
Hebron	12.5
Jericho	42.3
Jenin	75.0
Jerusalem	62.5
Nablus	35.3
Qalqiliya	50.0
Ramallah	31.3
Salfit	40.0
Tubas	20.0
Tulkarm	40.0
Total %	41.30

The analysis also shows that the percentage of people prohibited even if they have building licenses varied inside the Governorate itself. In Jenin Governorate e.g., 75% of the people who obtained building permits were prohibited to build on their land. In Qalqiliya the

¹ The United Nations Relief and Works Agency UNRWA was the agency responsible for issuing building licenses for Palestinian Refugees in the refugee camps.

percentage of people prohibited was 50%, and in Bethlehem 45.5%, see Table 3-26.

The analysis shows that almost 22.8 % of the building applications in the West Bank were rejected for reasons related to Israeli plans for constructing colonies and bypass roads, or the location near an Israeli colony. Rejections for Israeli security reasons amounted to 26.3 % in addition to 14.1 % for being in the area used as Israeli security zone. In around 8.8% of the rejections there was no justification from the authorities, while 7.1% of the rejections refer to land use obstacles, see Table 3-27.

Table 3-27: **Reasons for rejecting the building license**

Reasons	%
Israeli colonization activity	22.8
Security zone	14.1
Illegal ownership of Land	5.3
License expenses not paid	3.5
Security reasons	26.3
No Reason/ No Justification	8.8
I don't know	12.1
Land-use Obstacles	7.1
Total %	100

Those reasons explain how the Israeli authorities limited and controlled the Palestinian urbanization during the years of occupation. In Jericho e.g., most building licenses which were rejected came parallel to the intensification of Israeli colonization activities in the Jordan Valley. While in Salfit Governorate, the rejection of licenses came parallel to the construction of Israeli colonies such as Ariel, and the construction of the Israeli road network to connect those colonies.

Many Israeli activities and practices were correlated with building prohibition. In the West Bank, 23.8% of the persons interviewed were subject to both house demolition and building prohibition, 21.8% land confiscation and building prohibition, 18.9%

Table 3-28: **Percentage of persons prohibited to build on their land and reasons of prohibition**

Governorate	House demolished*	Land confiscated*	Land bulldozed*	Trees uprooted*
Bethlehem	5.0	0.9	---	0.8
Hebron	3.0	0.9	0.7	0.8
Jericho	5.9	5.6	1.4	---
Jenin	--	0.4	0.70	---
Jerusalem	--	0.9	---	---
Nablus	2.0	1.7	3.5	5.9
Qalqiliya	2.0	4.3	6.3	5.1
Ramallah	2.0	3.0	2.8	1.7
Salfit	1.0	1.3	1.4	1.7
Tubas	2.0	1.7	1.4	---
Tulkarm	1.0	1.3	0.7	1.7
Total *	23.8	21.8	18.9	17.7
* % of "yes" answers				

were subject to both bulldozing of their land and building prohibition, and 17.7% were subject to both uprooting of trees and building prohibition, see Table 3-28.

After the Israeli occupation to the Palestinian Territories in 1967 and until the start of the first Intifada in 1987 war about 37.5% of the people prohibited to build on their land were also subjected to house demolition. This percentage decreased to 8.3% between the period 1994 to1999 (during peace negotiations), but during the second Intifada (year 2000) the percentage again increased to 16.7%, see Figure 3-5.

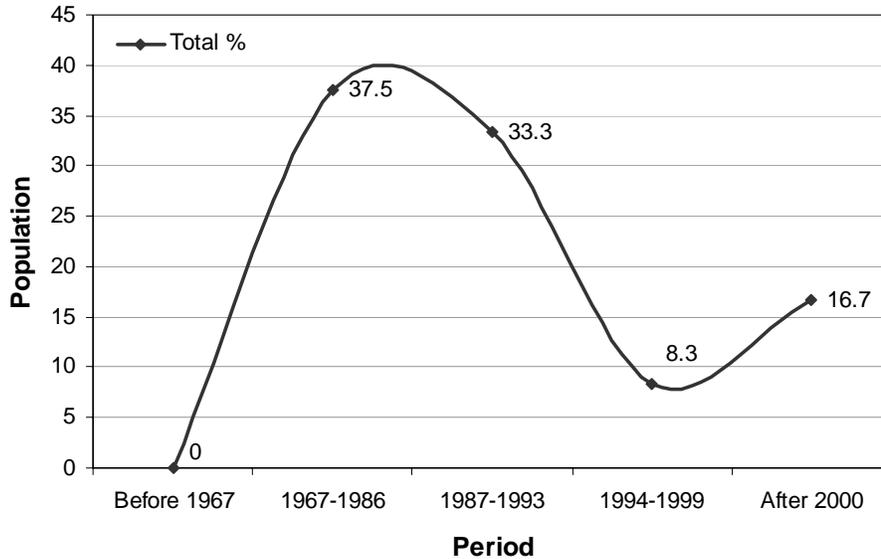


Figure 3-5: Percentage of persons prohibited to build and their houses demolished

3.6 Impact of the Israeli activities on the economic sectors

The Israeli colonization activities have had for a long period a negative impact on the Palestinian economic sectors in the West Bank. In 1996, the percentage of persons employed in the construction sector in relation to the other economic sectors was 18.4%. This percentage increased to 23.8% in 1999 and to 28% in the year 2000. A sharp drop was encountered during the year 2001 as a result of the general drop in the Palestinian economic sector and the consequences of the political instability after the second Intifada. The percentage of the persons employed in the construction sector declined to 17.2%, and in 2002 declined to 20% (PCBS 2003).

All the community leaders questioned in the West Bank revealed that the Israeli colonization activities have a negative impact on the industrial sector. Around 22 % believed that the Israeli activities have negative impacts on the labor force, 10 % on urbanization activities, 18 % on tourist sector and 8 % on commercial sector. Out of the leaders questioned, 74 % revealed that the Israeli colonization had a negative impact on urbanization activities since the beginning of the second Intifada. The analysis shows that within Jenin, Qalqiliya, Ramallah, Salfit, Tubas and Tulkarm Governorates between 80-100 % of the leaders answered that the Israeli colonization has a negative impact on the urbanization activities.

3.7 Impact of the Israeli Segregation Wall on Palestinian communities

The first phase of this Segregation Wall is 123.3 km long and between 40 to 100 meters wide and has been completed from the village of Salem located at the upper north of the West Bank to the village of Masha and the Israeli colony Elkana located on Palestinian lands within the Governorate of Salfit. The Segregation Wall in phase one penetrates the West Bank in certain areas to depths that reach 6 to 7 kilometers parallel to the Green Line and in phase three to more than 23 kilometers east of Ariel colony. The area of Palestinian lands trapped between the Green Line and the Segregation Wall in phase 1 is 112.5 km² and constitutes the most fertile agricultural lands of the West Bank. This area contains over 701 thousands of bearing trees and is known as the Palestinian food basket since it is planted with a variety of fruit trees, vegetables and crops. The trapped Palestinian lands are located on the Palestinian western water aquifer that contains 30 artesian wells and supply the West Bank with over 3.54 million cubic meters of groundwater annually. In addition, during the implementation of phase 1 of the Segregation Wall, a large number of Palestinian green houses were damaged and others were removed as a result of its construction.



Photo 3-6: The segregation wall in Qalqiliya



Photo 3-7: Constructing the segregation wall near Bethlehem3 city



Photo 3-8: The Segregation wall constructed as a fence near Jayyus village

The Israeli activities in the occupied territories cost the Palestinians high prices either by the loss of their land or through the destruction of their private properties. The

encroachment of the Israeli Segregation Wall in the occupied Palestinian villages is a growing danger that threatens the development of Palestinian communities. Not only does it deprive them of valuable agricultural and grazing lands but it also puts physical barriers to their natural growth and disconnects them from each other. The construction of the Israeli Segregation Wall has dramatic effects on urban planning on local, regional and national levels. In many localities the Wall limits, and prevents the urban expansion.

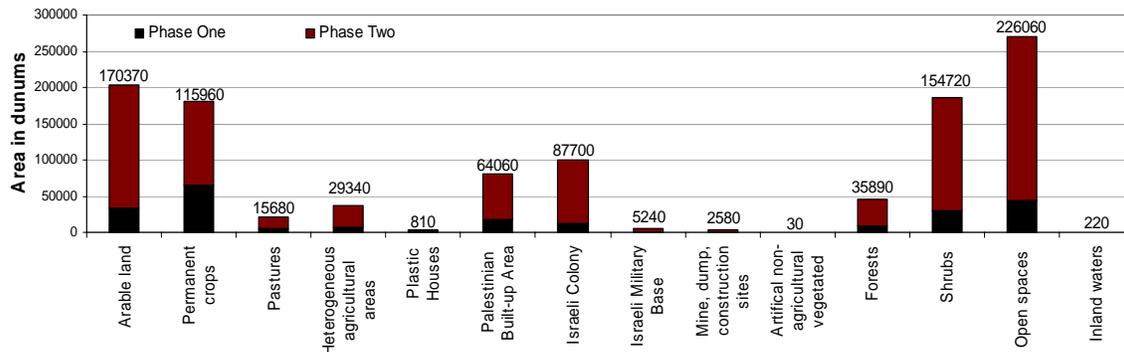


Figure 3-6: Total area of the western Segregation Zone

3.7.1 Socioeconomic impacts of the Segregation Wall

Before the second Intifada, many communities located close to the Green Line have had better economical situation than other Palestinian communities. Due to their location close to the Green line, these communities had better connections with Israel and took advantage of the Israeli labor and consumer markets. When the second Intifada erupted, these connections got disrupted due to closures and resulted in a significant increase of unemployment rate in these areas. The construction of the segregation wall will further affect negatively the economic condition in these communities.

Many of the affected communities have lost access to agricultural lands and water wells due to the segregation wall. The Palestinian Residents have lost access to basic social services, such as schools and health clinics. Family members living in the nearby communities became separated by the Wall and are facing difficulties to keep contact with each other. Iron gates constructed along the Wall are few in number with limited and varying hours of operation. It is not easy to get permits to cross the gates and people have to travel longer distances than before, which makes traveling more expensive.

Migration flows might be a result of the segregation wall. There is an absence of pull factors because it is fairly expensive for people to move, but the push factors are strong. There is a high level of social and economic marginalization, property demolition and protracted access restrictions. Migration as a result of constructing the segregation wall is characterized in the following:

- Migration due to destruction of properties
- Migration of persons possessing Israeli identification cards from the West Bank to Israel
- Migration of traders to planned commercial terminals

- Attempted migration to and from the areas between the Wall and the Green line

Phase 1 of the Segregation Wall encloses 15 Palestinian villages with more than 12000 Palestinian citizens who were cutoff of their trade centers, education, health and all other civil services in addition to 69 villages with almost 218 thousand Palestinians who became affected as a result of segregating the Palestinian agricultural lands and countryside at the other side of the Segregation Wall. The Palestinian citizens especially the farmers were severely affected. Their social life has been damaged and their economic condition has worsened to an alarming level, where unemployment rate has reached 72%. Most of the segregated villages in Jenin, Tulkarm, and Qalqiliya districts became imprisoned between the Green Line and the Segregation Wall. Since they are mostly dependent on nearby villages and small towns, they now lack most of the social services except for some small retail shops.

Educational and health facilities are non-existent in most villages. Some villages have elementary schools but only one secondary school exists in the 15 segregated villages west of the Segregation Wall. Health facilities are rare at the village level. The few health clinics and pharmacies such as in Barta' ash Sharqiya in Jenin district and Baqa ash Sharqiya in Tulkarm district are the only exception. The villages became part of a closed military area as defined by the Israeli government and the villages' daily life became a nightmare. Access of children to elementary schools and students to secondary schools or universities became extremely difficult. Transfer of sick persons to hospitals is also difficult and risky. Entrance to those areas by Palestinian ambulances requires special permits from the Israeli military forces.

3.7.2 Example of the affected Palestinian communities

The Segregation Wall is a physical barrier for natural urban expansion, in addition it separates villages and cities and thereby cutting family ties and peoples connection to civil services. Areas in the Segregation zone are those areas which are disconnected from Palestinian areas either by being situated on the western side of the wall, or being totally surrounded by the Segregation Wall. The following example illustrates the amount of the village land situated in the Segregation zone.

Azzun:

The Segregation Wall snaking around the Israeli colonies situated inside and nearby the village boundary of Azzun. West of Azzun the Wall exists between the Israeli colony Alfei Menashe and the Palestinian villages Izbat at Tabib, Nabi Elias and Khirbet A'shah. An area of Arable land (316 dunums), in addition to forest, permanent crop area and some Palestinian houses became cut-off from the villages. The Wall was also constructed north of the Palestinian villages due to the location of the Israeli colony Zufin in the area. Close to Azzun at its eastern side, a barbed wire fence was constructed. The segregation city makes it difficult for villagers to reach the main city Qalqiliya and its markets to sell their agricultural products. In addition, it is difficult for villagers to reach health services in the city of Qalqiliya.

The existing Segregation Wall became a physical barrier, which limits the Palestinian urban expansion of Azzun village and cutoff its connection with other Palestinian villages.

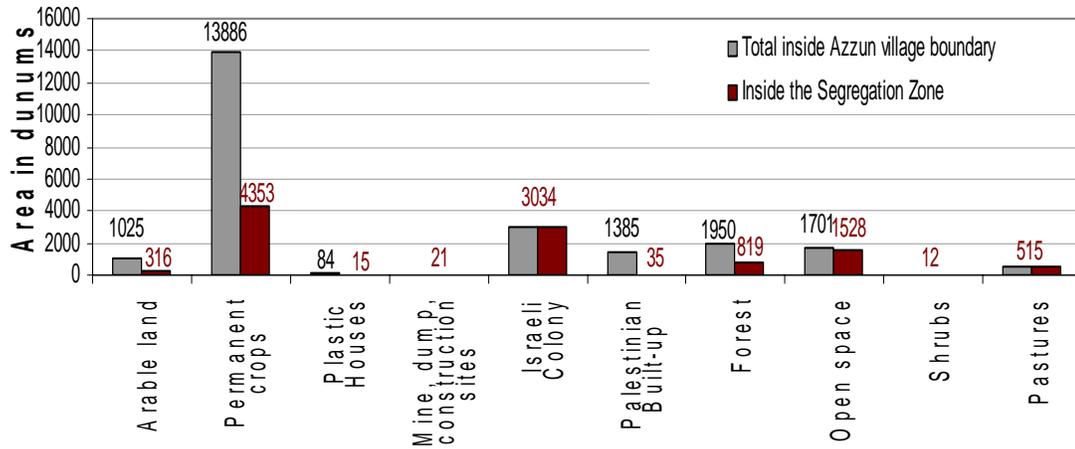
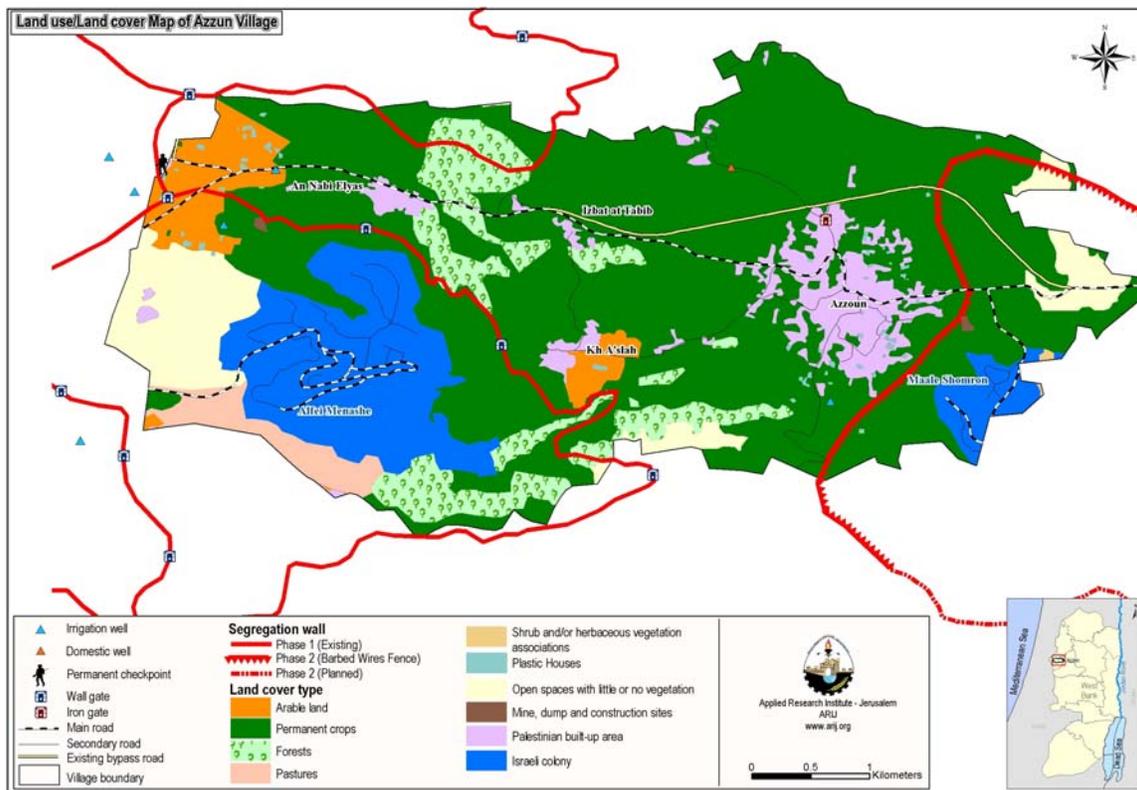


Figure 3-7: Area in the Segregation Zone inside the village boundary of Azzun



Map 3-1: Land use/ Land cover Map of Azzun Village

Section 2: Impact of Palestinian Urbanization on the local communities

3.8 Impact of Palestinian Urbanization on housing

3.8.1 Housing availability, quality, and character

Since the signing of the declaration of Principles between the Israelis and Palestinians in 1993 and until September 2000, the West Bank has witnessed a considerable increase in urban growth and expansion as a result of the peace process that was still taking place during that period. At the same time the Palestinian aspiration for peace and political stability has given many people a push to invest in housing.

The survey shows that 89.4% of the West Bank population believed that the urban expansion has increased in their communities after 1993. Investment in housing contributed to some extent in decreasing the shortage in housing in the West Bank, the survey shows that 51.1% of the West Bank population believes that a sufficient number of housing units became available between the years 1993 and 2000. Even though more than half of the population believes that housing became available during that period, a disparity in the availability in housing existed among the West Bank governorates, Table 3-29 shows this disparity.

Table 3-29: Percentages of population believed that urban expansion has increased in their communities between the years 1999 and 2000

Governorate	%
Bethlehem	94.4
Hebron	85.7
Jericho	93.7
Jenin	94.0
Jerusalem	83.3
Nablus	72.5
Qalqiliya	85.1
Ramallah	87.7
Salfit	87.7
Tubas	98.1
Tulkarm	97.4
Total %	89.40

When the Palestinian National Authority (PNA) gained rule in the West Bank cities and started to establish Palestinian ministries and administrative buildings, many people thought of selling their houses. According to the survey 10.9% of the West Bank population thought of selling their houses and construct new ones because of the housing shortage, which became a good investment opportunity especially after the relative growth in the economy encountered during the years 1993 and 2000.

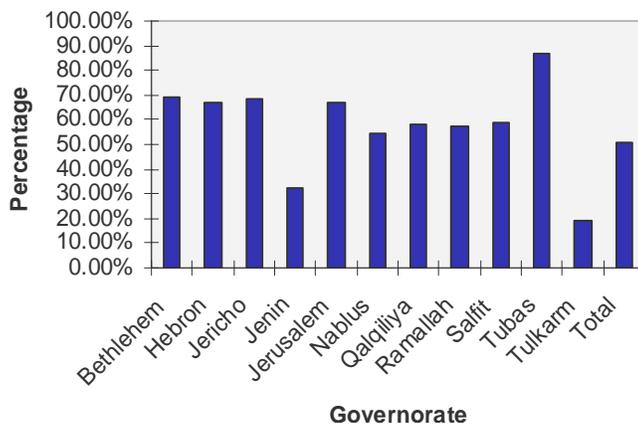


Figure 3-8: Percentages of people believe that the availability of housing increased in the West Bank during the period 1993-2000

Table 3-30 shows that the quality of housing became better between the years 1993-2000; around 76.6% of the population interviewed in the West Bank revealed that housing became better in its form, in its architectural character, its aesthetic elements and visual appearance. During the same period, the PNA established its ministries especially the Ministry of Planning and International Cooperation, the Ministry of Local Government (MoLG), the Ministry of Housing, who directly worked on developing new strategies, policies, plans, and laws related to physical planning.

Table 3-30: showing the percentage of population interviewed in the West Bank governorates and affirmed that housing became better between the years 1993 and 2000 in terms of form, organization, and building materials

Governorate	Better buildings form	Better buildings organization	Better building materials
	Population %	Population %	Population %
Bethlehem	88.9	91.7	69.4
Hebron	90.5	33.3	76.2
Jericho	60.8	74.7	78.5
Jenin	85.6	84.4	63.5
Jerusalem	75.0	83.3	75.0
Nablus	73.4	73.4	56.0
Qalqiliya	80.6	80.6	82.1
Ramallah	77.0	67.2	68.0
Salfit	67.7	61.5	55.4
Tubas	94.2	98.1	46.2
Tulkarm	63.2	64.9	59.6
Total %	76.6	73.8	64.9

New master plans for many Palestinian localities were prepared by the Palestinian municipalities and were approved by MoLG, and the Palestinian Higher Planning Council (PHPC) and all contributed to a better planning and organization of the construction and housing sector.

As result of the Palestinian efforts and achievements, housing became more organized, which was observed during this analysis where 73.8% of the population interviewed pointed out that planning and organization of buildings became better during that period. In addition, 64.9% of the population interviewed revealed that the quality of building materials became better as a result of the availability of imported materials and the competition at the local market.

Around 68.7% of the population interviewed in the West Bank identified the horizontal expansion as the dominant character of urban expansion in their communities, while 31.3% identified the vertical expansion as the dominant expansion character.

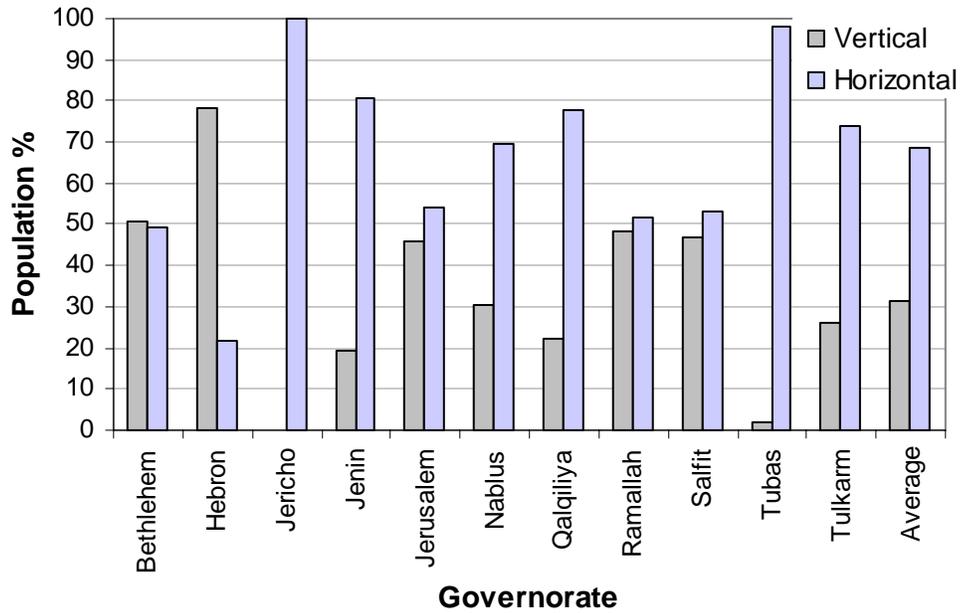


Figure 3-9: Population opinion about the urban expansion character in their communities

Figure 3-9 shows the disparities in the West Bank governorates in relation to the expansion character.

However, the expansion character whether horizontal or vertical varied between the West Bank Governorates. In the governorate of Jericho e.g. almost 100% of the population interviewed identified the horizontal expansion as the dominant urban expansion character in Jericho, while in Hebron, 78.5% of the population interviewed identified the vertical expansion as the dominant urban expansion character.



Photo 3-9: Newly built housing project in Jericho



Photo 3-10: Single floor house in Jericho

3.8.2 Social housing

Since the occupation of the West Bank by Israel in 1967, development in the housing sector became restricted to the private sector as a result of absence of enabling authorities and financial institutions that encourage housing development. Thus the existence of social housing became very limited. After 1994, when the PNA was handed over the administration in West Bank cities, many development and financial institutions were founded and social housing started to appear. However, social housing is still limited in urban concentrations where most of the PNA administration offices are located. The survey shows that only 16.4% of the population interviewed stated that social housing exists in their communities, and that social housing is found in Tulkarm, Ramallah, Nablus, Jenin, Jericho, Hebron and Bethlehem. There are also disparities in the distribution among the Palestinian governorates. For example in Ramallah, 54.1% of the population interviewed stated that social housing exists in their Governorate, in Jericho 25.3%, Bethlehem 19.4%, Hebron 19%, Jenin 15%, Tulkarm 7.9%, and in Nablus 6.4.

Impact of Palestinian Urbanization on social relations, alliance and integration

Social relations and family integration is an indicator that shows the willingness of the family members to stay at the same environs or transfer to other places and indicates whether the urban growth of a certain place will be constant or might change as a result of the push and pull factors that may result in in-migration or outer migration. The impact of urbanization on the Palestinian social relations varied from one community to another. The majority of persons interviewed (68%) revealed that the social relations and family integration are in good condition and were not affected by the urbanization process, see Table 3-31.

Table 3-31: Showing the impact of urban development on social relations as stated by the population interviewed

Governorate	Cold relations %	No comment %	Negative effect-more problems %	Good relations no effect %	Family disintegration %	Affected by political situation %	Don't Know %
Bethlehem	11.1	--	--	86.1	--	2.8	--
Hebron	28.6	--	2.4	66.7	--	2.4	--
Jericho	7.6	1.3	8.9	78.5	1.3	--	2.5
Jenin	16.8	--	4.2	52.7	--	26.3	--
Jerusalem	33.3	--	--	50.0	--	16.7	--
Nablus	8.3	--	3.7	84.4	--	2.8	0.9
Qalqiliya	3.0	3.0	1.5	77.6	3.0	11.9	--
Ramallah	12.3	1.6	7.4	68.9	2.5	7.4	--
Salfit	13.8	--	4.6	75.4	--	6.2	--
Tubas	1.9	--	9.6	78.8	--	9.6	--
Tulkarm	15.8	2.6	7.9	48.2	0.9	24.6	--
Total %	12.5	0.9	5.3	68	0.8	12.1	0.3

In some urban areas such as the city of Hebron where a rapid urban growth emerged, the survey shows that 28.6% of the persons interviewed in Hebron and 33.3% in Jerusalem revealed that the social relations became cooler as the 2 cities are regional centers and attraction poles to people from surrounding villages. In the West Bank it was found out that 12.5% of the population interviewed revealed that the social relations became cool as a result of urbanization.

More than 12% of the population pointed out that the social relations were affected by the ongoing political situation where movement between urban areas became very difficult, travel distance became longer and travel costs became higher. The survey shows that 76.1% of the family members live in the same family house (52.4%) or in houses at the same neighborhood (32.7%), while 11.6% of the family members live in different neighborhoods, 8% live in another city or village, and 4% live abroad, which means that a high level of social alliance and integration is apparent in the Palestinian community. Although, in Hebron only 11.9% of the family members live in the family house, a percentage of 28.6% live in houses at the same neighborhood and 54.8% live in other neighborhoods.

Figure 3-10 shows the distribution among the West Bank Governorates.

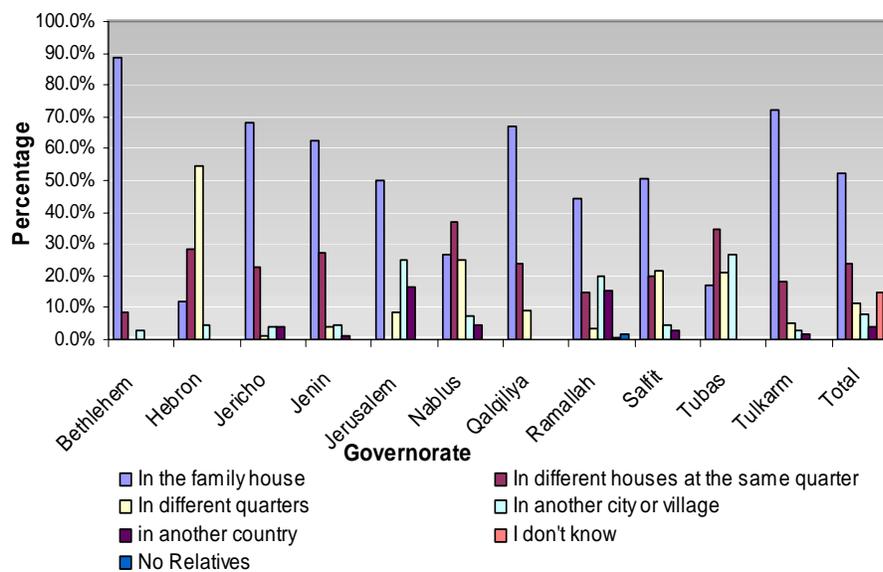


Figure 3-10: Percentage of the population and the place of residence of the family members in the West Bank Governorates

The social ties are also high in the West Bank communities; the survey shows that 48.7% of the West Bank population visits daily their family, the highest percentage was found to be in Bethlehem where 94.4% of the people visit daily their family, while in Tubas for example 13.5% of the people visit their family daily and 61.5% weekly, see Figure 3-11.

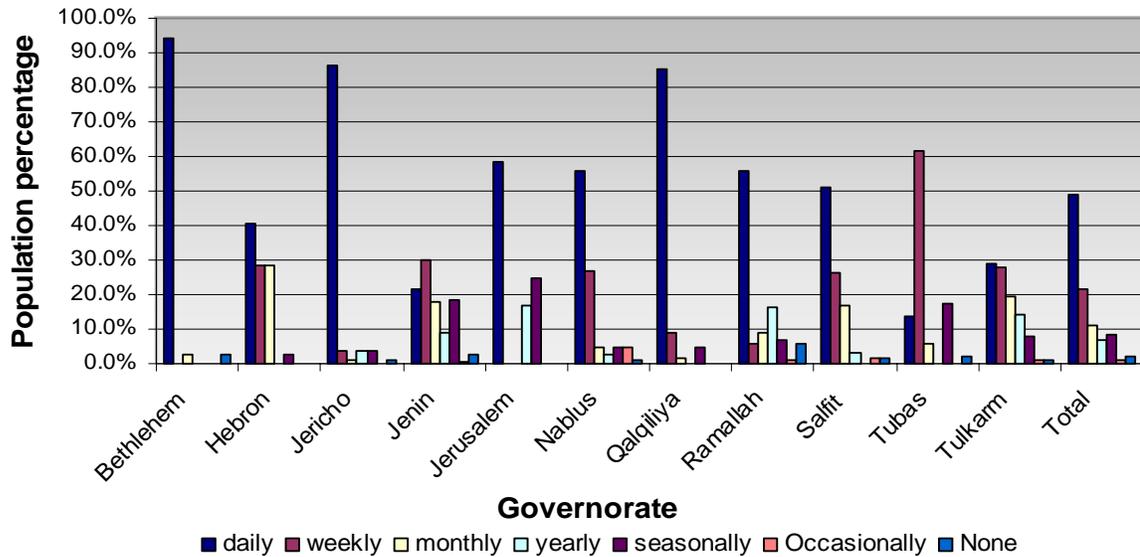


Figure 3-11: The percentage of people in the West Bank governorates and the visits to their family by period

3.9 Recreation and social infrastructure facilities

The availability of social infrastructure facilities such as cultural, recreational and sports facilities within a society is important for its livelihood, progress and development. The number of facilities within a society is also an indicator of the level of its urbanization.

In the West Bank, there are a variety of social and recreational facilities such as sport clubs and cultural clubs etc. However, the presence and the number of facilities depend on the size and the function of the urban center. The survey shows that in the West Bank the highest percentage of the social facilities are sport clubs 49.3% and that in almost every town and village a sport club is found. The percentage of women societies is 16.6% and cultural clubs 14.7%, see Table 3-32.

Table 3-32: Type and percentage of social facilities in the West Bank

Type of social facility	%
Women Societies	16.6
Sport club	49.3
Youth club	3.7
Elderly club	4.2
Community club	4.2
Cultural clubs	14.7
Internet clubs	3.1
Agricultural societies	4.2
Total %	100

Approximately 22% of both the women and the men questioned were members of different types of foundations. The survey also shows that the opinion of 59% of the persons interviewed was that the existence of social and

recreational facilities can help in the improvement and development of their communities.

The number of licensed cultural centers was 158 in 2001. The number of active cultural centers is 69 centers. There were 130 centers closed or that had no activities in 2001, of which 107 were licensed in the West Bank. The available data indicate a concentration of active cultural centers in the Hebron and Nablus governorates, where 41.2% of the West Bank's active centers are located in the Hebron governorate and 31.4% in the Nablus governorate. Active cultural centers vary in terms of size and volume of activities and in their regional distribution. The Ramallah and Al- Bireh governorate have the largest share of a variety of cultural activities, including lectures, workshops, conferences, artistic activities, theatrical performances, cinema, and children's recreational activities. (MAS Social Monitor Issue No. 6, 2003).

3.10 Impact of Urbanization on the Palestinian environment

3.10.1 Impact on agriculture

Urban growth and expansion are usually and to a certain degree associated with the encroachment on agricultural lands, especially in areas where rain-fed and irrigated agricultural lands are dominant. Most of the cities towns and villages in the West Bank are located in areas that are either agricultural or suitable for agriculture, especially at the West Bank central and western zones.

The survey shows that during the last 10 year (1993-2003) almost 15.2% of the people interviewed have used parts of their agricultural land for Palestinian urbanization. As shown in Table 3-33, the percentages of people who built on part of their agricultural land varied from one governorate to another, the highest percentages were found to be in the governorates of Bethlehem, Qalqiliya and Salfit since they are located within lands suitable for agriculture. The survey also shows that after 1993 more than 39.4% of the agricultural land area used by individuals for construction was less than 1 dunum, and 56.2% ranged from 1 to 10 dunums, 1.6% ranged from 11 to 20 dunums, and 2.8% was over 21 dunums.

Table 3-33: Percentage of population used part of their agricultural land for construction after 1993 in the West Bank governorates

Governorate	%
Bethlehem	25.0
Hebron	9.5
Jericho	13.9
Jenin	9.0
Jerusalem	8.3
Nablus	16.5
Qalqiliya	25.4
Ramallah	16.4
Salfit	24.6
Tubas	7.7
Tulkarm	19.3
Total %	15.20

Table 3-34: Percentage of people stating the impact of urbanization on Wild plants and agriculture in the West Bank

Impact	Governorate											Total %
	Bethlehem	Hebron	Jericho	Jenin	Jerusalem	Nablus	Qalqiliya	Ramallah	Salfit	Tubas	Tulkarm	
No effect	41.7	76.2	64.6	33.1	66.7	46.8	10.4	43.8	10.8	38.5	72.8	44.3
Decrease of wild plants area	5.6	9.5	5.1	5.4	--	3.7	1.5	5.8	35.4	17.3	1.8	7.5
Decrease of agricultural lands area	13.9	4.8	27.8	31.9	16.7	34.9	11.9	33.1	44.6	40.4	2.6	25.8
Polluted with dust of nearby quarries	--	--	1.3	1.2	--	--	--	0.8	3.1	1.9	0.9	0.9
Polluted by Pesticides	--	--	1.3	--	--	--	--	--	--	--	--	0.1
Decrease of wild plants area and agricultural land	36.1	9.5	--	27.7	16.7	12.8	62.7	13.2	6.2	1.9	14.9	18.4
Decrease of agricultural lands area and polluted with dust	--	--	--	--	--	--	3.0	0.8	--	--	--	0.3
All of above	2.8	--	--	--	--	--	--	2.5	--	--	7.0	2.5
Total %	100	100	100	100	100	100	100	100	100	100	100	100

In addition to agriculture, the urbanization process has affected the wild plants, and biodiversity to a certain degree as a result of urban sprawl and marble industry. The extraction and mining of rocks at quarries especially in Salfit governorate have resulted in polluting many areas with dust, Table 3-34 shows the percentage of people who believe that urbanization has an impact on agriculture and wild plants.

3.10.2 Impact on water

Efficient distribution of physical infrastructure networks and facilities should be implemented in harmony with housing construction. Adequate supply of infrastructure ensures that the urbanization process serves the communities wellbeing. The investigation whether the urbanization process has any implication on water distribution and supply in the Palestinian communities was verified by the response of 72.1% of the interviewees who concluded that water has been affected by Palestinian urbanization. The justifications of 27.7% of such an upshot was that the urbanization process has resulted in decreasing available water quantities, 13.1% of the population stated that water supply became irregular, and 12.1% stated that water in many urban areas is becoming polluted with waste water see Table 3-35. The highest percentage 64.3% of the population in

Table 3-35: Percentage of the population reasoning why urbanization has affected water in the West Bank

Reason	%
Decrease in available water quantity	27.7
Irregular water supply	13.1
Fresh Water Polluted with waste water	12.1
Decrease in water quality	0.7
Decrease in available water quantity + irregular water supply	14.1
All of above	2.9
Decrease in available water quantity + polluted	0.7
Decrease in available water quantity and equality + irregular supply	0.8
No effect	27.9
Total %	100

Hebron Governorate and 46.8 % in Jericho stated that the urbanization process has resulted in decreasing available water quantities. While the highest percentage (38.5%) of the population in Salfit Governorate and 34.9 % from Nablus Governorates stated that the urbanization process has resulted in irregular water supply.

Table 3-36: Percentage of the population showing the impact of urbanization on water supply in the West Bank governorates

Governorate	Increased %	Decreased %	No change %	Don't know %	Total % in relation to all
Bethlehem	--	63.9	36.1	--	4.2
Hebron	--	57.1	40.5	2.4	4.9
Jericho	2.5	68.4	27.8	1.3	9.1
Jenin	0.6	87.4	12.0	--	19.3
Jerusalem	--	50.0	50.0	--	1.4
Nablus	--	78.0	21.1	0.9	12.6
Qalqiliya	--	49.3	47.8	3.0	7.7
Ramallah	0.8	58.2	39.3	1.6	14.1
Salfit	3.1	36.9	58.5	1.5	7.5
Tubas	1.9	92.3	5.8	--	6.0
Tulkarm	--	41.2	57.0	1	13.2
Total %	0.8	64.9	32.2	1.1	100

As shown in Table 3-36, almost 65% of the people interviewed in the West Bank believe that the water supply has decreased as a result of urbanization. The result of this impact refers mostly to the inefficient physical infrastructure supply and distribution in many areas of the West Bank.

3.10.3 Impact on graze lands

The survey shows that 58.6% of the people interviewed in the West Bank believed that the lands used for cattle grazing have decreased since 1993. This decrease was noticeable especially in the northern West Bank governorates that are rich with grazing lands such as Qalqiliya, where the 94% of Qalqiliya population stated the grazing lands have decreased in their governorate as a result of urbanization. The distribution of the impact on grazing lands is shown in Table 3-37.

Table 3-37: Percentage of the population showing the impact of urbanization on grazing lands in the West Bank governorates

Governorate	Decreased %	No change %	Don't know %
Bethlehem	58.3	36.1	5.6
Hebron	23.8	11.9	64.3
Jericho	64.6	34.2	1.3
Jenin	51.5	21.0	27.5
Jerusalem	83.3	16.7	--
Nablus	18.3	55.0	26.6
Qalqiliya	94.0	4.5	1.5
Ramallah	54.1	38.5	7.4
Salfit	80.0	18.5	1.5
Tubas	75.0	13.5	11.5
Tulkarm	78.1	17.5	4.4
Total %	58.6	26.7	14.7

Around 62 % of the community leaders questioned from all the West Bank revealed that urban expansion has an impact on the water. In Ramallah governorate all of the leaders questioned stated that the water is polluted because of urban expansion. There is a

decrease in available water quantity and quality, the water supply has become irregular and the water is polluted. Almost 68 % stated that urban expansion has led to pollution of wild plants and agriculture, and to a decrease of these areas. Around 40 % revealed that grazing areas have decreased because of urban expansion. Almost 74 % believe that the air is polluted, mainly because of industrial factories and an increase in traffic due to urban expansion, in addition that 54 % of the leaders revealed that urban expansion has led to decrease the total amount of water pumping into their city/ village.

3.11 Public Transportation

Urban areas are usually centers of diverse activities, which require efficient and convenient transportation of persons and goods, in addition that it is often said that transportation is the lifeblood of cities, whereby a sufficient transportation and infrastructure network serve as essential means to achieve efficient urban development. Thus, urban areas need and benefit from public transportation services, which offer greater mobility for the entire population and keep the urban areas livable and attractive.

Based on this concept, the opinion of persons people interviewed was considered to test the sufficiency of public transportation in the West Bank during the last 10 years (1993 to 2003). The analysis shows that over 89% of the people interviewed stated that public transportation was sufficient between the years 1993 and 2000, but after the year 2000 as a result of instability and closures the percentage of people who stated that public transportation is sufficient dropped to less than 20%, see Table 3-38. Between the years 1993 and 2000, the analysis shows that the percentages of people stating that public transportation was sufficient were between 66.7% in Hebron and 100% in Jerusalem, while after the year 2000 the percentages of

Table 3-38: Percentage of population stating that transportation was sufficient during the periods 1993-2000 and after the year 2000 in the West Bank governorates

Governorate	1993-2000 %	After 2000 %
Bethlehem	75.0	36.1
Hebron	66.7	7.1
Jericho	83.5	6.3
Jenin	93.4	13.8
Jerusalem	100	0
Nablus	95.4	3.7
Qalqiliya	98.5	25.4
Ramallah	93.4	32.8
Salfit	87.7	4.6
Tubas	86.5	9.6
Tulkarm	85.1	51.8
Total %	89.2	19.9

people stating that public transportation was sufficient were between 0% in Jerusalem to 51.8% in Tulkarm, which indicates that public transportation sector and the movement of people were extremely affected by the instability of the political situation.

3.12 Lack of services due to increased urbanization

Urban expansion and population growth demand an increase in social and medical services. Around 64% of the citizens questioned from the West Bank revealed that the available public services in their area did not harmonize with urbanization and population increase and some services are missing in certain localities. The analysis shows that 72 %

of the localities surveyed do not have sewage networks such as Qalqiliya and Tubas. Only 10 % of the localities surveyed do not have telephone networks, while 70 % lack Internet connections. Around 20 % of the localities surveyed do not have public medical services and 14 % lack private medical services.

From the leaders interviewed, 88 % revealed that they need more medical services due to increased urbanization. Around 76 % of the leaders stated that they need more social services, especially women societies and community clubs, 84 % stated that they need more educational services, while 76% revealed that they need recreational services due to the increased urbanization.

According to the leaders questioned, 72 % of the localities surveyed need new road networks, and 68 % need to renew the old road networks. 72 % stated that they do not have a public transportation system. 48 % of the localities surveyed need renewing the existing water networks (water pumping), while 32 % need a re-rehabilitation of water networks in their area, according to the leaders questioned, 22 % of the localities surveyed need electricity service because of increased urbanization.

3.13 Recommendations of the population interviewed

A variety of recommendations and suggestions were given by the interviewees who reflected the needs in their areas. These recommendations varied from one governorate to another depending on its location and the points of view of the interviewees. It should be noted that 40.7% of the people interviewed have made no suggestions. Following is a summary of these recommendations given by 59.3% of the people interviewed:

- 1. To emphasize on the need for good political & economical situations-stability & security:** 20.6% of the interviewees stated that the need for a good political & economical situations-stability & security is the most important ingredient necessary for the development of their communities. The highest percentages of people who are with this opinion were from Hebron 41.5%, Jerusalem 33.3%, and Bethlehem 30.8%.
- 2. To Help create Job Opportunities:** 7.8% of the interviewees emphasized on the need to create job opportunities in order to reduce the unemployment rates and to reduce the dependency on Israel through the establishment of industrial zones, the introduction of new and modern technologies, and to encourage foreign investment in the Palestinian Territories. The highest percentage of interviewees provided this suggestion in relation to other recommendations were from Hebron (18.1%), Nablus (17.5%), and Tubas (15.8%).
- 3. To supply and improve the public services:** 6.6% of the population interviewed highlighted that there is a need to supply and improve the public services and basic infrastructure in their communities such as paving of roads, installation of sewage network, street lights etc. The highest percentage of interviewees provided this

suggestion in relation to other recommendations were from Ramallah (13.7%), Tubas (12.6%), and Jericho (11.6%) governorates.

- 4. To provide more medical services: 5%** of the interviewees stated that there is a need for more medical facilities and services in their community. The highest percentages of people who are with this suggestion were from Jericho 9.9%, Salfit 9%, and Ramallah 8.2%
- 5. To improve the agricultural sector: 4.7%** of the interviewees stated that the need to develop and improve the agricultural sector through the help of farmers as this sector has the highest share among the other economic sectors and that the improvement of this sector will contribute to the development of their communities through the generation of income. The highest percentages of people who are with this opinion were from Tubas 18.9%, Qalqiliya 9.8%, and Salfit 9%.
- 6. To establish more educational facilities and services: 3.8%** of the population interviewed highlighted that there is a need to build more schools in their communities to reduce the suffering of students who travel to their schools which are located in other communities. The highest percentage of interviewees provided this suggestion in relation to other recommendations were from Hebron (10.6%), Bethlehem (7.7%), and Jericho (7.4%).
- 7. To establish more Social centers to help the youth: 3.4%** of the interviewees emphasize that the youth should become more literate and active as they are the future of their nation, therefore they should be provided with the necessary facilities and shall be encouraged to do various youth activities which will enhance their capabilities and qualifications to improve their community. The highest percentage of interviewees provided this suggestion in relation to other recommendations were from Jericho (6.6%), Tubas (6.3%), and Tulkarm (4.8%).
- 8. To establish social committees and women societies: 2.2%** of the interviewees stated that there is a need to establish social committees and women societies in their community. The highest percentages of people who are with this suggestion were from Bethlehem 5.8%, Jenin 5.6%, and Hebron 5.3%.
- 9. To establish recreation centers: 2.0%** of the population interviewed in the West Bank expressed the need to establish recreation centers in their community, and that under the current political circumstances the lack of such a social facility affects livelihood of their community and puts many people under depression. The highest percentages of people who are with this suggestion were from Nablus 6.1% and Salfit 5.1%.
- 10. To improve the transportation services and facilities: 1.7%** of the interviewees stated that the need to develop and improve the transportation services and facilities is important for the movement of people to work places and transport of goods, and it is important to alleviate the restrictions on movement imposed by the occupying

authorities and the current political situation which hinder the interaction of people with the different categories of urban areas. The highest percentages of people who are with this opinion were from Qalqiliya 4.9%, Salfit 3.8%, and Ramallah 3.4%.

11. To provide training courses for people (Women, children & youth):1.3% of the population interviewed highlighted that there is a need to provide the people in their community especially women, children & youth with the necessary training courses to participate in their community's development and be aware of any risk or that may happen in their community. The highest percentage of interviewees provided this suggestion in relation to other recommendations were from Bethlehem (3.8%), Hebron (3.2%), and Jericho (2.5%).

12. To establish seniors Societies: 0.2% of the interviewees underlined the need to take care of the seniors and elderly through establishing community centers in each community to activate and enable them to communicate and be more effective. This suggestion was only in Bethlehem 1.6% in relation to the other suggestions and in Tulkarm 0.8%.

Spatial and Socioeconomic analysis at micro level

A number of 73 targeted cities, towns, villages and refugee camps were selected for the overall analysis based on a stratified sampling technique taking into consideration the classification used by the Palestinian Ministry of Local Government (MLG) for the Palestinian communities of the West Bank. The Palestinian localities were classified according to the following four classifications:

1. Class A: Municipalities of the main cities, which are the urban centers of the Palestinian Governorates
2. Class B: Municipalities that were established prior to the control of the Palestinian National Authority and those have a population of more than 15,000 persons
3. Class C: Municipalities of the Palestinian localities with population between 5,000 and 15,000
4. Class D: Municipalities of the Palestinian localities with population of less than 5,000
5. Class E: the Palestinian villages

In order to give an overview of the urban dynamics, the recent master plans and Village boundary delineation which was used during the British Mandate was used for the spatial analysis. The distribution of questionnaires for the socioeconomic analysis according to the classification was 16.6% for class A, 20.3% for class B, 25% for class C, 15.6% for class D, 13.2% for class E, and 9.2% for Refugee Camps. The following sections show examples of the analysis undertaken according to the aforementioned classification.

4.1 Main cities (Class A)

Four main cities were selected for the in-depth study; those cities are: Jericho, Nablus, Ramallah and Tulkarm. All of the cases selected from class A have at least one refugee camp inside their village boundary. Under cities of class A, the city of Ramallah is represented in this study as it is the only case where Israeli colonies are constructed within its village boundary.

4.1.1 Ramallah city, Population, living conditions, and urban trends

Ramallah city is considered the major urban center of Ramallah and Al Bireh Governorate located at a central location in the West Bank. The total urban area in Ramallah city was 17858 dunums in the year 2000 including the refugee camps of Qaddura and Al Am'ari, The estimated population is about 23700 in Ramallah city, 6800 in the refugee camps, 36700 in Al-Bireh and 2300 in Mazari' an Nubani (PCBS, 2003).

The municipality engineer in Ramallah city stated that services and construction are the main economical sectors in the city. Approximately 61% of the citizens in Ramallah city and 53% of the population in the refugee camps are within the working age, compared to 55% of the citizens in Al-Bireh and 51% of the population in Mazari' an Nubani (PCBS, 1999), out of these numbers an average of 50% are females.

Both the engineer and the Mayor revealed that the economical situation during the period 1993-2000 was good and the employment opportunities for women increased due to the establishment of governmental and women societies, but since the beginning of the second Intifada the income decreased by 30% and the unemployment rate increased from 30% in 1999 to 60% by the end of the year 2000.

Approximately 62% of the households in Ramallah city and 45% of the households in the refugee camps consist of 1-5 members, compared to 57% in Al-Bireh and 42% in Mazari' an Nubani (PCBS, 1999). On average 43% have 6-10 members and 5.5% have more than 10 members in their households respectively, whereby the average number of household members is higher in the refugee camps and small villages than in the cities.

About 4% of the population in Ramallah city and 8% in the refugee camps are illiterate, compared to 5% in Al-Bireh and 10% in Mazari' an Nubani, out of these numbers 73%, are females. Approximately 56% of the students in Ramallah city and 49% of the students in the refugee camps are females, compared to 50% in Al-Bireh and 55% in Mazari' an Nubani. Nevertheless, more females than males are illiterate, more females than males are currently receiving higher education in Ramallah city and in Mazari' an Nubani.

The engineer and the Mayor stated that the administrative area of Ramallah was 12,000 dunums and in Al-Bireh 9800 dunums before 1993. In Ramallah the current administrative area is 14,500 dunums and the Master plan area is 12,000 dunums. In Al-Bireh both the administrative area and the area of the Master plan are currently 12,500 dunums. The Master plan of Ramallah serves for 20 years and the people are committed to it, while in Al-Bireh it serves for 5 years and the people are not completely committed to it. Both noted that the future of development and sustainability depends on the stability of the political situation and that the Israeli violations are decreasing the future chances of an efficient urban development because of the existing military bases, colonies and Israeli bypass roads in constructed in the area.

Two plans for urban development were set for the area since 1993. The municipality engineer and the Mayor revealed that the Palestinian Authority, local Committees and EU countries are financing the urbanization plans. They stated that urbanization has increased during the peace process as a result of the increase in immigrant numbers to the Palestinian Territories since Ramallah became the administrative center of the Palestinian National Authority.

The satellite images analysis of Ramallah for the years 1989, 1994 and 2000 showed that there is increased urbanization mostly on permanent crops, and to some extent on arable

land and on heterogeneous agriculture in the northeast and western parts of the city. Since 1994 the urban area has expanded mostly northwestwards inside the Master plan boundary. The urban area east of Qaddura camp and Al Am'ari camp as well as two small urban locations east of Al-Bireh, have appeared since 1994. East of the refugee camps urbanization was on the expense of some heterogeneous agriculture area and to some extent urbanization has had a negative impact on the environment.

There are three Israeli colonies situated east of Al-Bireh: Beit-El to the north, Pesagot at the center and Kokhav Yaacov to the south. The three colonies are classified as urban and religious, they were all established by the Israeli Likud government in 1977, 1981 and 1984 respectively (Peace now and ARIJ Database 2003). In 2001, the population in the colonies counted 4287, 1295 and 1666 colonists respectively and the colonies' areas were 940, 429 and 1965 dunums in the year 2003. There are several Israeli military bases inside the village boundary of Ramallah and Al-Bireh. The largest military base is situated near the colony of Beit-El. The satellite images analysis showed that the area occupied by military bases increased from 1216 dunums in the year 1989 to 1434 dunums in the year 2000. In addition to the colonies and the military bases, there are several Israeli bypass roads inside the village boundary of Ramallah and Al-Bireh. The bypass roads are linking the colonies and the large military base, making a network of Israeli roads surrounding the city of Ramallah.

The Mayor in Al-Bireh stated that 350 people faced land confiscation in the period between Oslo and the beginning of the second Intifada (1993-2000). Around 500 dunums were confiscated at the favor of Israeli colonizing activities in 1996. The Mayor in Al-Bireh stated that 350 houses have been partially demolished and 5 houses completely demolished since the beginning of the second Intifada. He believed that during this period 5 families have been subjected to complete migration and 20 to temporary migration.

The satellite images analysis for the years 1989, 1994 and 2000 showed that the Israeli colonies inside the village boundary of Al-Bireh have expanded mostly on valuable agricultural land near the city of Ramallah. The colony of Beit-El has expanded southwards on heterogeneous agriculture land with the objective of being encircled by a military base on its eastern and southern parts. Pesagot has expanded northwards on arable land, eastwards on heterogeneous agricultural land and westwards on permanent crops area. The northern part of Kokhav Yacov has expanded on arable land and on open space inside the village boundary of Al-Bireh. Some of the persons interviewed in Ramallah revealed that because of Israeli colonization activities, the soil and air became polluted, wild lands and agricultural area have decreased, water quantity has decreased resulting in sporadic water supply, and many trees were uprooted by the Israeli authorities.

The increase in urban area in Ramallah between 1989 and 1994 reached 16.1% with annual expansion of 397 dunums, while during the period between 1994 and 2000 the increase in urban area reached 24.5% with annual expansion of 585 dunums.

The analysis of population growth in Ramallah in correlation with the development of urban areas showed that the decrease in population density (m^2 per capita) slowed down after the establishment of the PNA in 1994 than in the former period. In the period between 1989 and 1994, the urban area per capita decreased dramatically from $532 m^2/capita$ to $358 m^2/capita$, and it reached $299 m^2/capita$ in the year 2000.

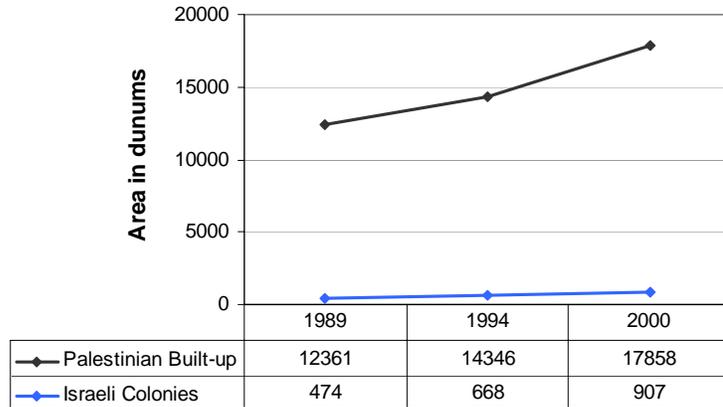
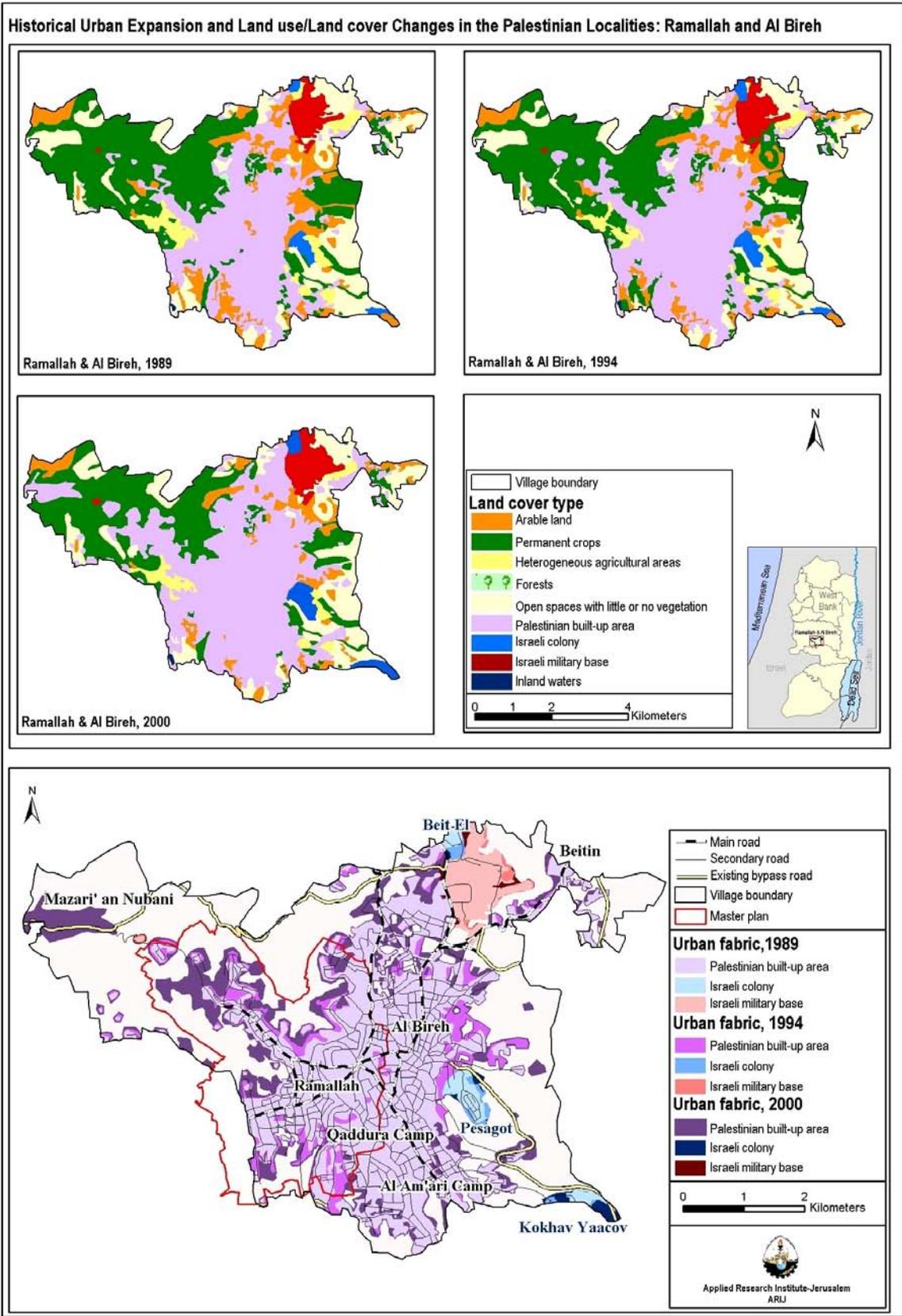


Figure 4-1: Expansion for Palestinian urban areas and Israeli colony areas inside the village boundaries of Ramallah and Al-Bireh

4.1.2 Urban profile conclusions of class A*

Nablus city has the highest population of the localities selected from Class A and is the major regional urban center in the northern part of the West Bank. Differences in built-up density between cities of Class A depend on the population size, the geographical constraints, availability of land in addition to the Israeli colonization activities such as land confiscation. Population density is high in Nablus city compared to the other cities where the population has increased dramatically while the expansion of urban area has been limited. The main reason is attributed to topography as Nablus city is located between steep mountains that constitute physical barriers for urban expansion. In 1989 Nablus and Tulkarm cities had approximately similar built-up densities which were $150 m^2/capita$ and $153 m^2/capita$ respectively. A significant difference in density was encountered between the two cities between 1989 and 2000, in the year 2000 the built-up density in Nablus became $78m^2/capita$ compared to $106 m^2/capita$ in Tulkarm. Figure 4-4 shows that the urban expansion was larger in Tulkarm city than in Nablus city, even though the population in Nablus city is about three times as large as in Tulkarm. Jericho has the least population in comparison to the localities selected from class A for this study. The population in Jericho city represents only approximately 13% of that in Nablus city. The built-up density in Jericho saw a constant decrease in the period between 1989 and 2000.

After the establishment of the PNA, new Master plans were developed in most cities. However, the population commitment to municipality regulations varied from one city to another. The satellite images analysis for the years 1989, 1994 and 2000 showed that the urban areas increased and the agricultural areas declined in all the selected localities from Class A.



Map 4-1: Historical Urban expansion and Land use/ Land cover changes in Ramallah city

The urban expansion and the decline in agricultural areas were significant in Ramallah city, see Figure 4-4 and Figure 4-5. Ramallah city is a special case since it became an administrative center after the establishment of the Palestinian Authority in 1994. During the period that accompanied the peace process (1994-2000) the built-up density decreased in a slower pace than in the period 1989-1994, due to an increased urbanization. It is worth mentioning, that the Israeli colonies have also expanded at the expense of Palestinian valuable agricultural lands, especially heterogeneous agricultural lands. Many cities were directly affected by the Israeli activities – bulldozing of agricultural lands, uprooting of trees and houses demolition for the construction of Israeli bypass roads, colonies and the Segregation Wall, this is in addition to the closures and checkpoints which have had a negative impact on the Palestinian economy.

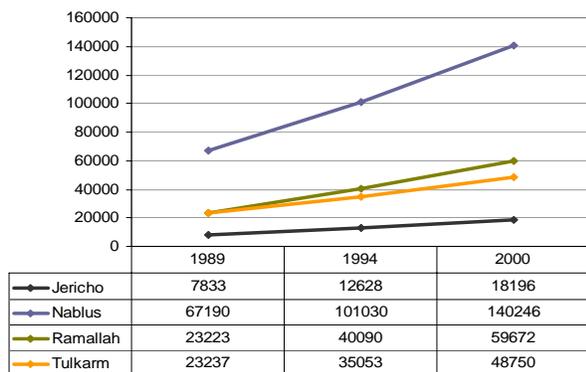


Figure 4-2: Projected population growth, class A

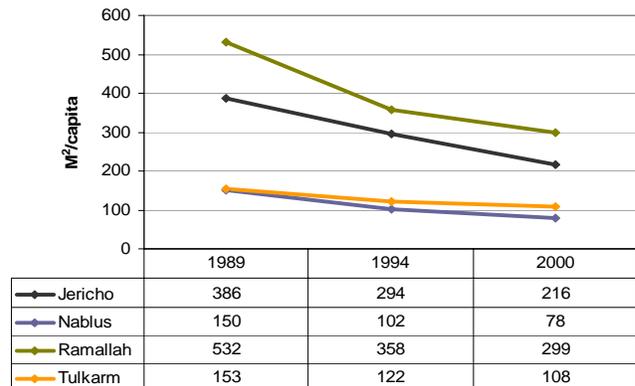


Figure 4-3: Built-up density, class A

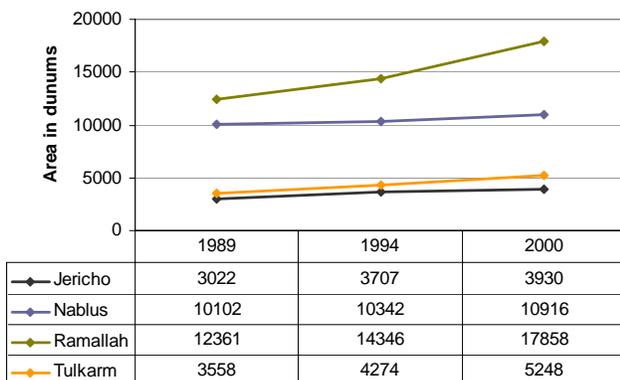


Figure 4-4: Expansion for Palestinian urban areas, class A

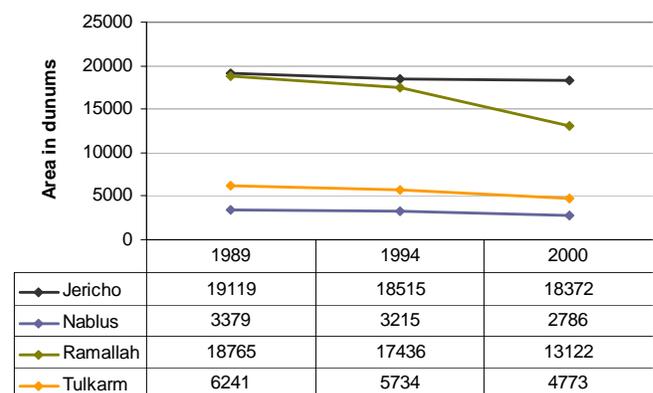


Figure 4-5: Change in agricultural areas, class A

* The numbers include the refugee camps and villages inside the village boundaries.

4.2 Cities with population > 15,000 (Class B)

Four cities with population less than 15,000 were selected for study: Bir Zeit in Ramallah Governorate, Halhul in Hebron Governorate, Salfit in Salfit Governorate and Tubas in Tubas Governorate. Halhul, Salfit and Tubas are located in area A according to the geopolitical classification, while Bir Zeit is located in area B. Halhul and Salfit both include Israeli colonies and Israeli military bases within their village boundaries, besides, Salfit is directly affected by the construction of the Israeli Segregation Wall. Under cities of class B, the city of Tubas is represented in this study.

4.2.1 Tubas city, population, living conditions, and urban trends

Tubas city is considered the major urban center of Tubas governorate. The urban area in Tubas city was calculated at 2621 dunums in the year 2000 and the estimated population in 2003 was 15100 inhabitants (PCBS, 2003). Southwest of Tubas exists the Palestinian refugee camp El Far'a on an urban area of 484 dunums and an estimated population of 5400 refugees.

The Mayor of Tubas city stated that the agricultural sector is the dominating economical sector in Tubas. Approximately 52% of the citizens are within the working age (15-64) where 48% are females (PCBS, 1999). In the refugee camp about 52% of the population are within the working age, of whom 50% are females.

The Mayor in Tubas believed that the economical situation during the period accompanied the peace process was very good, but the income level has decreased by 70% after the beginning of the second Intifada in the year 2000. One reason for the loss of income was land confiscation and uprooting of trees because of Israeli colonization activities. Unemployment rate increased dramatically from 20% in 1999 to 70% after the year 2000. Approximately 47% of the households in Tubas city and 53% of the households in El Far'a Camp have 1-5 members, 46% and 40% have 6-10 members respectively and in both localities 7% have more than 10 members in their households.

About 10% of the population in Tubas city and 9% in the refugee camp are illiterate, out of these numbers 78% and 72% are women respectively. In Tubas city, 48% of the students and half of the students in El Far'a Camp are women, nevertheless, more women than men are illiterate.

The Mayor of Tubas stated that the administrative area of Tubas city was 2500 dunums before 1993. The current administrative area (the area of the Master plan) is 7500 dunums. The Master plan serves for 20 years and the Mayor stated that it was not yet approved and that people were not completely committed to it. The Mayor noted that the Israeli colonization activities resulted in degrading the economical situation and hence decreasing the future chances for an efficient urban development. The Mayor revealed that two plans for urban development were set for the area since 1993; he stated that urbanization has increased during the peace process because of immigrants to the Palestinian Territories and less Israeli intervention. The situation has changed during the

second Intifada where the ongoing political conditions have a negative effect on the urbanization activities. Most of the people interviewed in Tubas city believed the urban expansion increased in their area during the peace process and that the expansion pattern was horizontal.

The land cover analysis of Tubas city includes only a part of the village boundary of Tubas, see Map 4-2. The satellite images analysis for the years 1989, 1994 and 2000 showed that urbanization has expanded southeastwards mainly on arable land and to some extent on permanent crops. Two small urban localities southwest and east of the city have appeared outside the Master plan's boundary since 1994. In addition, part of the main city is expanding outside the Master plan's boundary on the southeastern side. The informants believed that urbanization has a negative impact on the environment. Several felt that the agricultural land and open spaces have decreased.

Most of the people questioned in El Far'a Camp believed that the urban expansion increased in their area during the peace process and that the urban expansion pattern was horizontal. Map 4-2 shows that in El Far'a camp, urbanization is increasing towards the city center on arable land.

There is no Israeli colony close to Tubas city, nevertheless the district has been subjected to Israeli colonization activities since 1967 mainly due to its location in the Jordan valley. The Mayor of Tubas stated that 60000 dunums of land were confiscated and 40 artesian wells were closed in the period between 1967 and 1993. The wells were located alongside the Jordan Valley from Bardala village in the north to Burj Na'ja in the south. He added that 160 dunums of land were confiscated for bypass roads in the area before the peace process.

The Mayor of Tubas stated that 150 people were faced with land confiscation during the period between Oslo and the beginning of the second Intifada. The Mayor stated that 200 houses have been partly demolished and 10 completely demolished since the beginning of the second Intifada, and 50 families have been subjected to temporary migration, while 100 families have been subjected to complete migration. The Mayor also stated that 200 olive trees were uprooted in the area since Oslo till the beginning of the second Intifada, while 500 olive trees were uprooted since the year 2000.

After the establishment of the Palestinian Authority in 1994 the urban area in Tubas increased by 32% with annual expansion of 126 dunums, while it increased by 11% with annual expansion of 47 dunums for the period 1989-1994 (see Figure 4-8). Arable land has been affected by the urban expansion since 1989 and mostly after 1994.

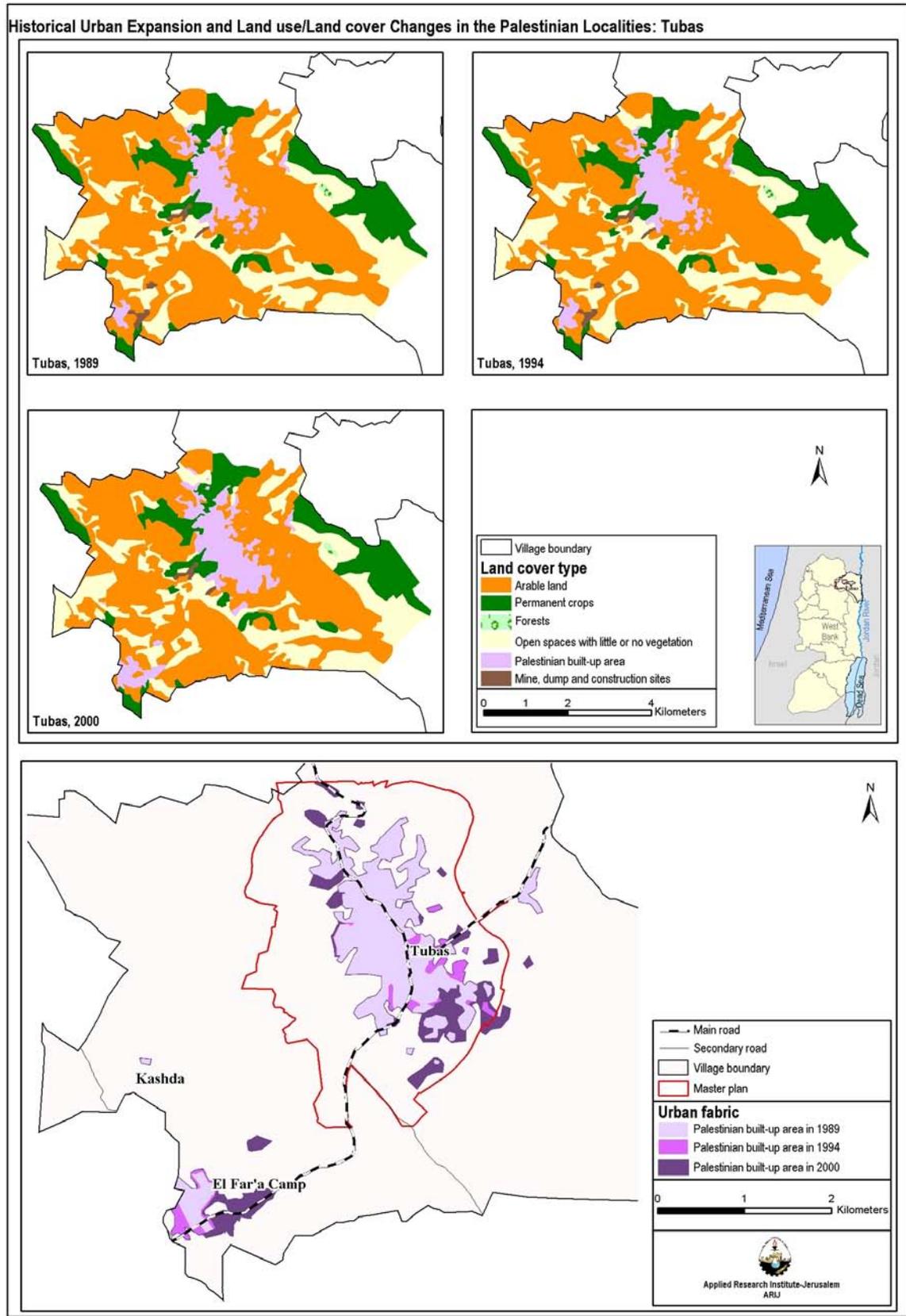
The analysis of population growth in Tubas in correlation with the development of urban areas showed that in the period between 1989 to 1994 urban area per capita decreased dramatically from 269 m²/capita to 189 m²/capita, and it reached 174 m²/capita in the year 2000.

4.2.2 Urban profile conclusions of class B*

The population figures of Halhul and Tubas is approximately the same, while Salfit and Bir Zeit have less population (Figure 4-6). Figure 4-7 shows that the built-up density is lower in Tubas compared to the other cities selected from class B. The main reason is the compaction in the city. It is significant that all the localities selected from class B except for Halhul encountered a higher decrease in population density (m² per capita) in the period between 1989 and 1994 than in the period between 1994 and 2000. Halhul city is surrounded with valuable agricultural land, covered with vineyards and fruit trees that are vital for its economy and hence are unsuitable for urban expansion, therefore the urban development reflects an infill-strategy, where the construction activities are within the city and not expanding outwards, and the decrease in population density in the city was stable during the period from 1989 to 2000.

Out of the selected localities from class B, Bir Zeit had the most remarkable urban expansion during the period that accompanied the peace process, at the same time it is the only locality situated in area B. The reason behind the remarkable urban expansion is the presence of Bir Zeit University. Figure 4-8 shows that in the year 2000 Bir Zeit had almost the same size of built-up area as Salfit, even though the population was approximately 65% of that in Salfit.

All of the cities are affected by Israeli colonization activities; however Salfit and Halhul are especially affected as they have colonies expanding into their village boundaries. A large area of land has been confiscated, trees have been uprooted and houses demolished in these cities both before and after the beginning of the second Intifada.



Map 4-2: Historical Urban expansion and Land use/ Land cover changes in Tubas

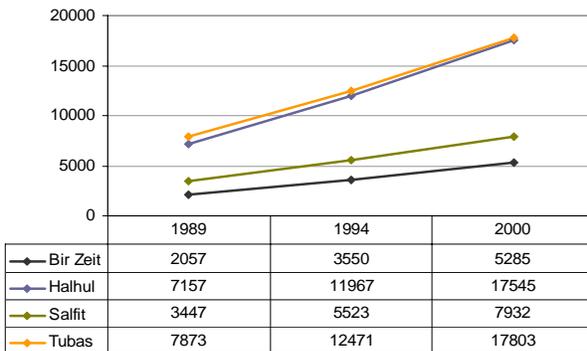


Figure 4-6: Projected population growth, class B

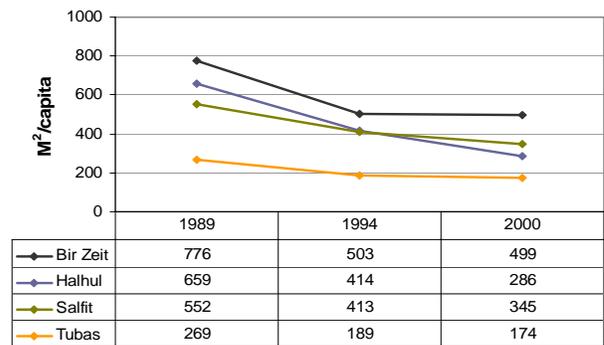


Figure 4-7: Built-up density, class B

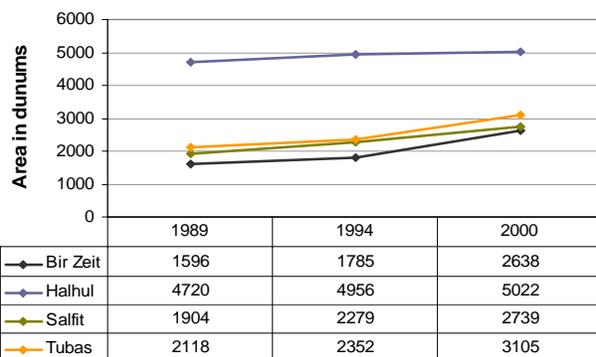


Figure 4-8: Expansion for Palestinian urban areas, class B

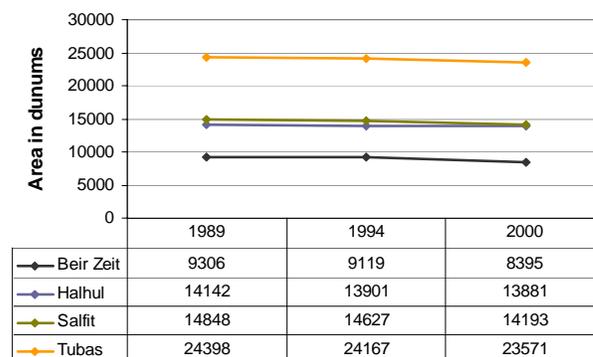


Figure 4-9: Change in agricultural areas, class B

*The numbers include El Far'a Camp in Tubas city.

4.3 Cities with population between 5,000 and 15,000 (Class C)

Four localities with projected population between 5,000 and 15,000 were studied including: Al Yamun, Azzun, Beit Sahur and Deir al Ghusun in Jenin, Qalqiliya, Bethlehem and Tulkarm Governorates respectively. Al Yamun and most of Beit Sahur are situated in area A according to the geopolitical classification. Part of Beit Sahur is situated in area C, while Azzun and Deir al Ghusun are entirely situated in area B. Several Israeli colonies exist within Azzun village boundary, where Beit Sahur, Deir al Ghusun as well as Azzun are directly affected by the construction of the Israeli segregation zone. Under cities of class B, the city of Deir al Ghusun is represented in this study.

4.3.1 Deir al Ghusun, population, living conditions and urban trends

Deir al Ghusun is situated northeast of Tulkarm city, the urban area of the village was 1,205 dunums in the year 2000 and the estimated population was 8,900 inhabitants in the year 2003 (PCBS, 2003). Inside the village boundary of Deir al Ghusun two villages

exist, Al Jarushiya with an estimated population of 857 inhabitants and Al Masqufa with an estimated population of 200 inhabitants.

The Mayor in Deir al Ghusun stated that the agricultural and the service sectors constitute 50-54% and 25% of the total economical sectors respectively. Approximately 53% of the citizens are within the working age population (15-64) where 48% are females (PCBS, 1999). The Mayor revealed that the economical situation during the period accompanied by the peace process was good, but the economy has decreased by 70 % since the beginning of the second Intifada, and unemployment rate increased dramatically from 55% in 1999 to 80% after the year 2000. Industrial and commercial sectors had better performance before the year 2000 than after. Approximately 51% of the households in Deir al Ghusun have 1-5 members, 43% have 6-10 members and 6% have more than 10 members in their households (PCBS, 2003). About 9% of the population in Deir al Ghusun is illiterate, out of this number 83% are women. In addition 46% of the students in Deir al Ghusun are women.

The Mayor of Deir al Ghusun revealed that the administrative area of the city was 871 dunums before 1993. The current administrative area and the area of the Master plan is 3,000 dunums, and 2 plans for urban development were set for the area since 1993. In 1999 the municipality started to work according to the Master plan which serves for 20 years. In the period accompanied by the peace process the construction sector was in good condition because of the increasing rate in building activities and most of the people interviewed in Deir al Ghusun believed that the urban expansion increased in their area during the peace process. After the year 2000 the decrease in income resulted from the Israeli colonization activities has negatively affected the building activities. Map 4-3 shows that urban area in Deir al Ghusun has increased on heterogeneous agriculture and permanent crops. Since 1994 the village has expanded southwestwards outside the Master plan boundary.

Some of the informants believed that urbanization has an impact on the environment. Several people in addition to the Mayor felt that as a result of the urban expansion the available water quantity, water quality in addition to the amount of water pumping have decreased; wild lands and agricultural areas have decreased and the number of cattles decreased because of shortage in graze lands. The mayor revealed that the air became polluted to some extent due to increase in traffic.

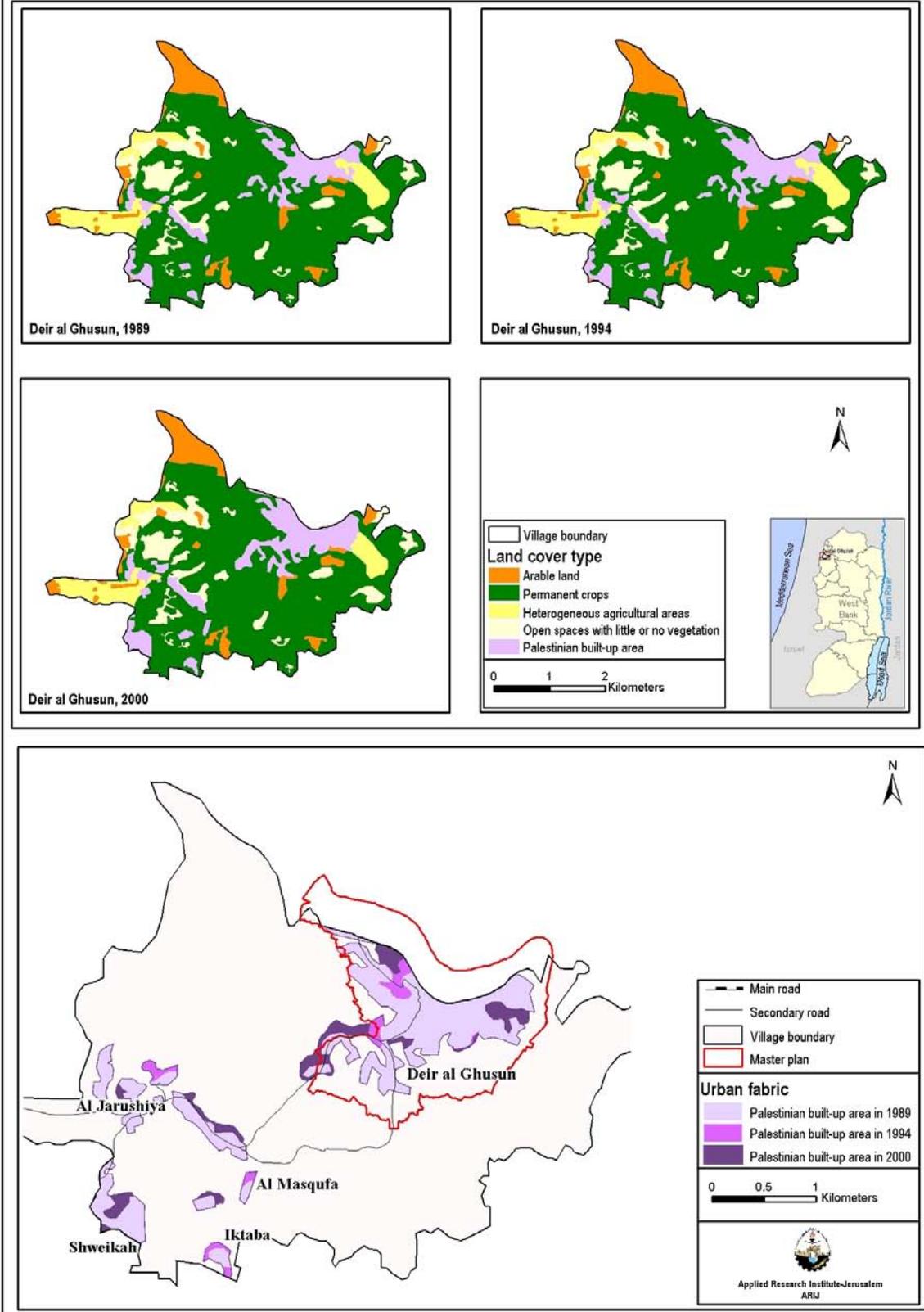
The Mayor in Deir al Ghusun noted that there are no expectations for the coming development because of the Israeli occupation. Even if there is no Israeli colony inside the village boundary, the mayor stated that 100 people were faced up with land confiscation since the second Intifada and 268 dunums of rainfed and irrigated land were confiscated for other Israeli colonizing activities. The confiscation happened in the year 2002. A number of 27 houses have been partially demolished and 3 completely demolished since the beginning of the second Intifada, in addition to several people who have been subjected to bulldozing of their land and uprooting of their trees.

The Mayor in Deir al Ghusun revealed that in the period between Oslo and the second Intifada, Israeli colonization has had a negative impact on the agriculture sector because of difficulty in marketing, while it had a positive effect on the animal sector because of increase in animal production. Agricultural lands and open spaces have decreased and the number of cattle decreased because of shortage in graze lands.

The Palestinian build-up area increased dramatically after the establishment of the Palestinian Authority, which became responsible for issuing building permits in Deir al Ghusun since 1994. The increase in urban area reached 20.6% with annual expansion of 34 dunums in the period between the years 1994 and 2000 compared to 9.2% with annual expansion of 17 dunums in the period between the years 1989 and 1994. The urban area increased on the expense of permanent crops areas which was decreasing the whole period.

The analysis of population growth in Deir al Ghusun in correlation with the development of urban areas showed that in the period between 1989 to 1994 urban area per capita decreased from 246 m²/capita to 178 m²/capita, and it reached 154 m²/capita in the year 2000.

Historical Urban Expansion and Land use/Land cover Changes in the Palestinian Localities: Deir al Ghusun



Map 4-3: Historical Urban expansion and Land use/ Land cover changes in Deir al Ghusun

4.3.2 Urban profile conclusions of class C

Figure 4-10 and Figure 4-11 show that Al Yamun and Beit Sahur have the highest population and the least built-up density of the localities selected from class C. Azzun and Deir al Ghusun have the lowest population and the highest built-up density.

All the selected localities from class C have encountered an increase in urban expansion and a decrease in agricultural areas since 1989, and decreased even more after 1994. The degree of expansion depended on the availability of financial resources and the allocation of development projects, housing and infrastructure. However, in Beit Sahur the urban expansion has been particularly significant. The main reason is attributed to the establishment of housing projects which were founded after 1994. Many towns in class C are affected by the construction of the Israeli segregation wall. The grazing lands located at the northern and western peripheries of Al Yamun have decreased a result of the segregation wall construction.

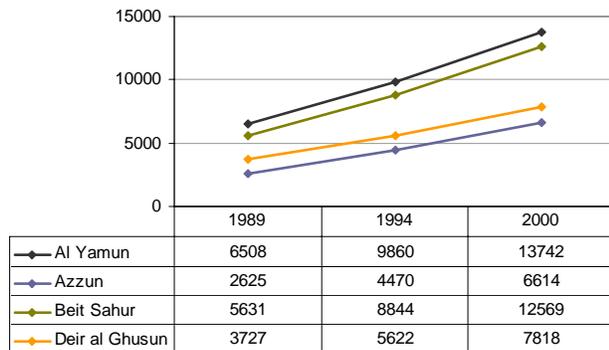


Figure 4-10: Projected population growth, class C

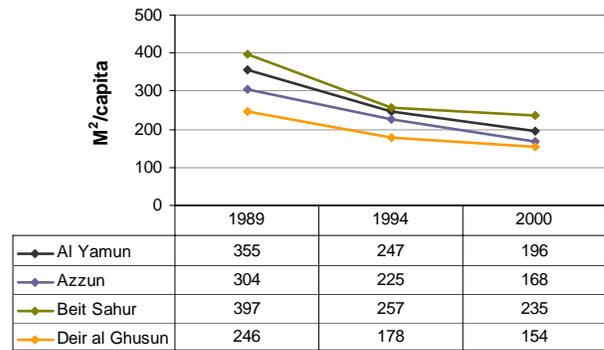


Figure 4-11: Built-up density, class C

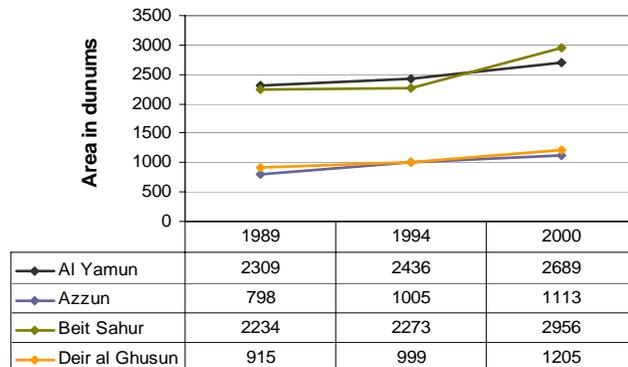


Figure 4-12: Expansion for Palestinian urban areas, class C

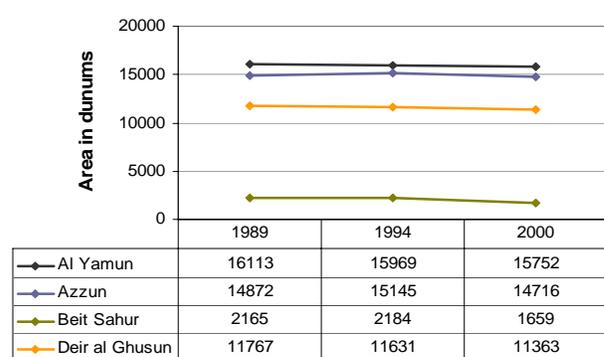


Figure 4-13: Change in agricultural areas, class C

4.4 Villages with population < 5000 (Class D)

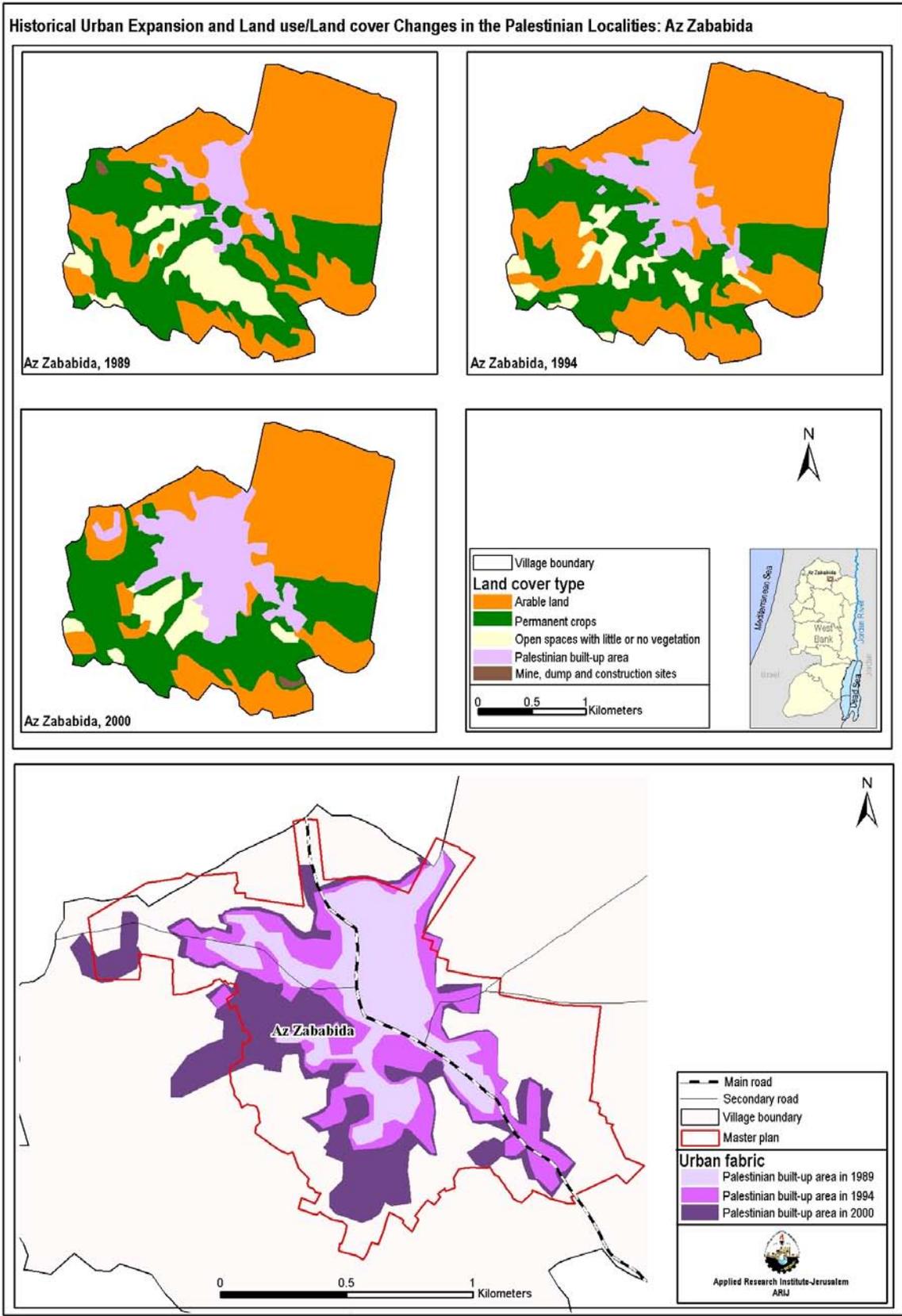
Five villages with projected population of less than 5,000 were studied including Al Walaja, Az Zababida, Beit Einun, Deir Ballut and Jayyus in Bethlehem, Jenin, Hebron, Salfit and Qalqiliya Governorates respectively. According to the geopolitical classification, Az Zababida is situated in area A, while Al Walaja and Jayyus are in area B, and Beit Einun and Deir Ballut are in area C. The three villages of Al Walaja, Deir Ballut and Jayyus contain Israeli colonies within their village boundaries and most of their lands are located behind or entirely bounded by the Israeli segregation zone. Under cities of class B, the cities of Az Zababida and Jayyus are represented in this study. Az Zababida was selected due to its extreme urban expansion and Jayyus due to the colonization activities inside its village boundary.

4.4.1 Az Zababida, Population, living conditions, and urban trends

Az Zababida is located near the southeastern boundary of Jenin governorate. The urban area of the village was 1,066 dunums in the year 2000 and its estimated population was 3,600 in the year 2003 (PCBS, 2003). Approximately 56% of the citizens are within the working age population (15-64) where 49% are females (PCBS, 1999). Approximately 57% of the households in Az Zababida have 1-5 members, 41% have 6-10 members and 2% have more than 10 members in their households. About 8% of the population is illiterate, out of this number 71% are women. In addition that 48% of the students in Az Zababida are women.

Az Zababida is situated in area A, and the PNA is responsible for issuing building permits in the village. Map 4-4 shows that urban area in Az Zababida has increased dramatically on the expense of permanent crops, arable land and open space. The expansion is mostly inside the Master plan boundary, except for two locations on the western boundary where the urban area is expanding outside the Master plan boundary. In the period between the years 1994 and 2000 the increase in urban area reached to 55.4% with annual expansion of 63 dunums compared to 85.9% with annual expansion of 63 dunums in the period between the years 1989 and 1994.

The analysis of population growth in Az Zababida in correlation with the development of urban areas showed a dramatic increase in population density (m^2 per capita) all the period from 1989-2000. However after the establishment of the PNA in 1994, the increase in population density slowed down in comparison to the former period. During the period between 1989 and 1994, the urban area per capita increased from 244 m^2 /capita to 300 m^2 /capita, and it reached 334 m^2 /capita in year 2000.



Map 4-4: Historical Urban expansion and Land use/ Land cover changes in Az Zababida

4.4.2 **Jayyus village**, population, living conditions, and urban trends

Jayyus is located northeast of Qalqiliya city near the western boundary of the West Bank. The urban area in the village was 399 dunums in the year 2000 and its estimated population was 3100 in the year 2003 (PCBS, 2003).

The Mayor of Jayyus stated that the agriculture sector is the dominant economical sector in the village. Approximately 54% of the citizens represent the working age population (15-64) where 47% are females (PCBS, 1999). Approximately 35% of the households in Jayyus have 1-5 members, 53% have 6-10 members and 12% have more than 10 members in their households. About 9% of the population in Jayyus is illiterate, out of this number 74% are females. In addition that 43% of the students in Jayyus are females. In Jayyus, and according to its mayor, unemployment rate has increased dramatically from 50% in 1999 to 90% after the year 2000.

The Mayor of Jayyus revealed that the area of the Master plan for the village is 534 dunums (1993). The municipality started to work according to the Master plan in 1995, but the mayor stated that people are not committed to it. Map 4-5 shows that Jayyus is a village situated in the middle of heterogeneous agriculture land, where the urban area has increased on permanent crops and heterogeneous agriculture areas.

The Israeli colony Zufin is situated west of Jayyus, the colony was established in 1990 and is classified as urban. In 2001 the colony occupied an area of 380 dunums with an estimated population of 850 colonists. Urban areas in Zufin have expanded to reach 811 dunums in 2003. The satellite images analysis for the years 1989, 1994 and 2000 shows that urban areas in Zufin has expanded at the cost of arable land, permanent crops and open space, and mostly eastwards towards the village of Jayyus. A bypass road exists at the western side of the village boundary to connect the colony Zufin to Israel.

The mayor stated that 60 people were exposed to land confiscation during the period that accompanied the peace process, and an area of 700 dunums was confiscated. After the beginning of the second Intifada in the year 2000, some houses have been partially demolished in the village and a large number of olive and fruit trees were uprooted. The Mayor noted that the segregation wall have a negative impact on the economical situation of the residents of Jayyus. A high percentage of the population depend on agriculture and most of the plastic houses, vegetable, citrus-, almond-, fruit- and olive trees were cutoff behind the wall.

The satellite images analysis for the years 1989, 1994 and 2000 shows that the increase in urban area in Jayyus reached 19.1% with annual expansion of 11 dunums during the peace process, while it increased by 38.4% during the period 1989-1994 with annual expansion of 19 dunums. According to the Mayor of Jayyus the urbanization increased during the period accompanied the peace process. As a result the expansion of Palestinian build up area decreased dramatically after 1994 even though the village is situated in area B.

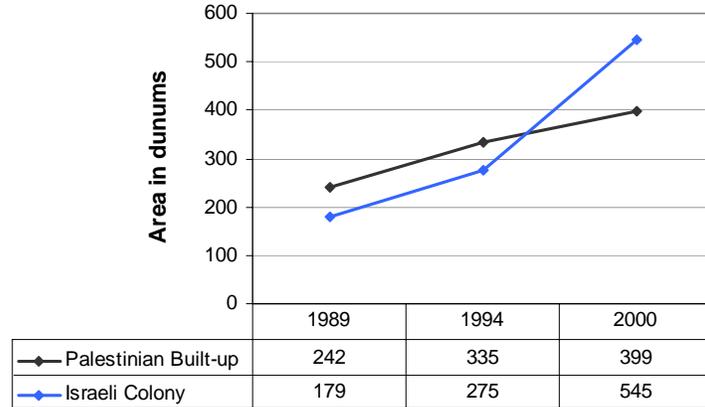
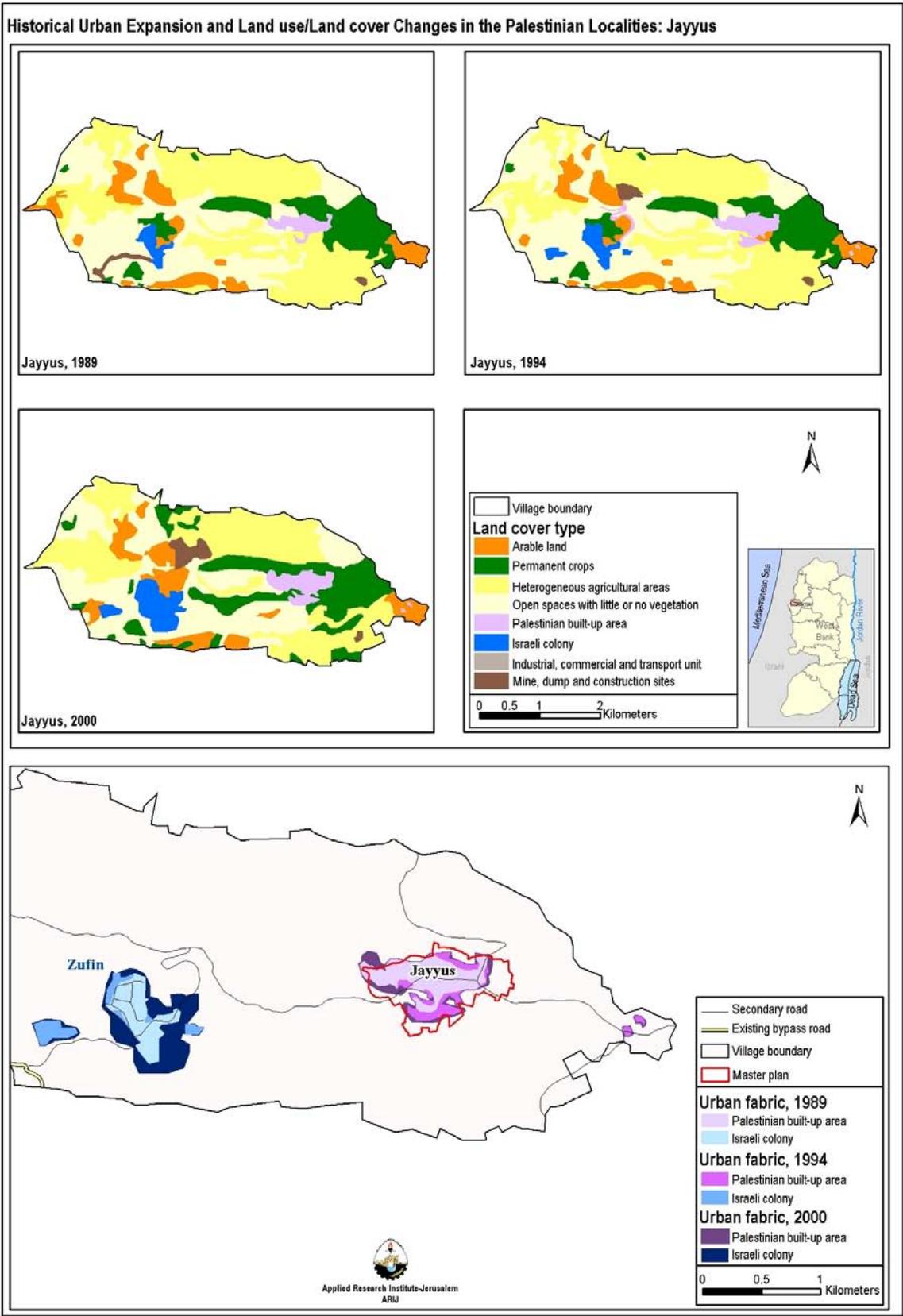


Figure 4-14: Expansion for Palestinian urban areas and Israeli colony areas inside the village boundary of Jayyus

Israeli colonies expanded dramatically after 1994, which reflects the Israeli Governments policies regarding the continuation of expanding colonies in the West Bank. Figure 4-14 shows that the colony of Zufin occupied more land than the Palestinian urban areas inside the village boundary of Jayyus in the year 2000, a number of 818 Israeli colonists live in a built-up area of 545 dunums compared to the over 2600 Palestinians who live in a built-up area of 399 dunums.

The analysis of the population growth in Jayyus in correlation with the development of urban areas showed that the decrease in population density (m^2 per capita) slowed down after the establishment of the PNA in 1994 than in the former period. During the period between 1989 and 1994, urban density decreased from $230 m^2/capita$ to $187 m^2/capita$, and it reached $151 m^2/capita$ in year 2000.



Map 4-5: Historical Urban expansion and Land use/ Land cover changes in Jayyus

4.4.3 Urban profile conclusions of class D

Al Zababida became more developed as a result of its location in area A, while a similar and less urban development was encountered in areas B & C because of less Israeli intervention. Figure 4-16 shows that Az Zababida is a special case as it is the only case where the population density increased in the period between 1989 and 2000. Figure 4-17 shows that the urban area in Az Zababida expanded dramatically the whole period. Figure 4-16 shows that m^2 per capita decreased dramatically during the whole period from 1989 to 2000 in al Walaja, and especially before 1994. In spite of the decrease in density, the built-up density is still low in the village. The reason is that the houses in al Walaja are scattered and have only one or two floors. The economical situation was good in al Walaja before the beginning of the second Intifada due to possibilities of work in Israel. This allowed the villagers to build villas instead of houses with many floors. Al Walaja is seriously threatened by the construction of the Israeli Segregation Wall. Jayyus, Al Walaja, Beit Sahur and Deir Ballut are all threatened by the construction of the Israeli segregation wall and Israeli colonies are constructed inside their village boundaries or nearby area.

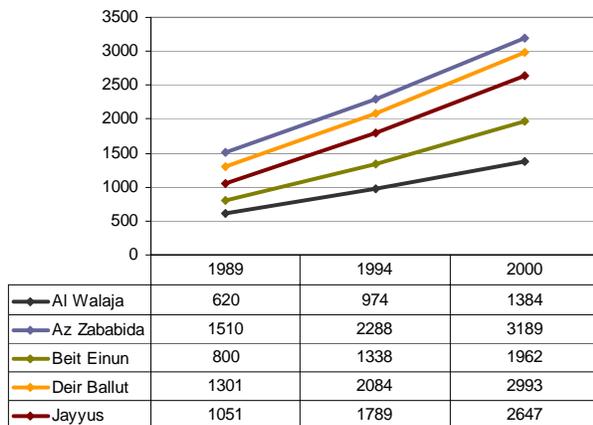


Figure 4-15: Projected population growth, class D

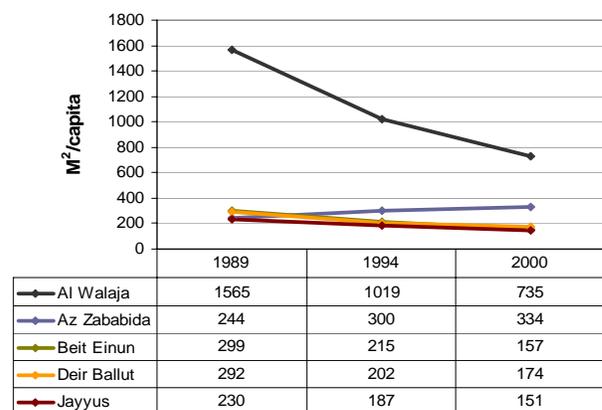


Figure 4-16: Built-up population density, class D

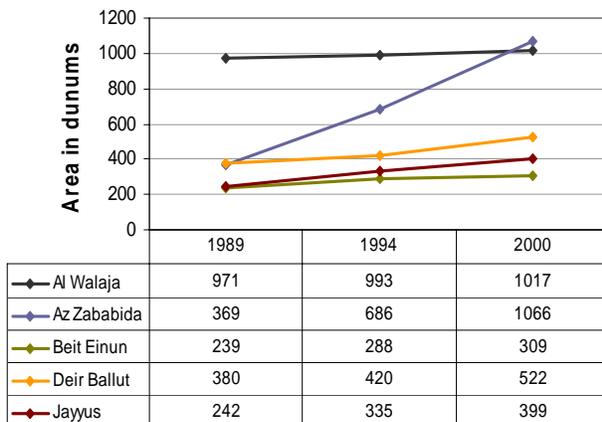


Figure 4-17: Expansion for Palestinian urban areas, class D

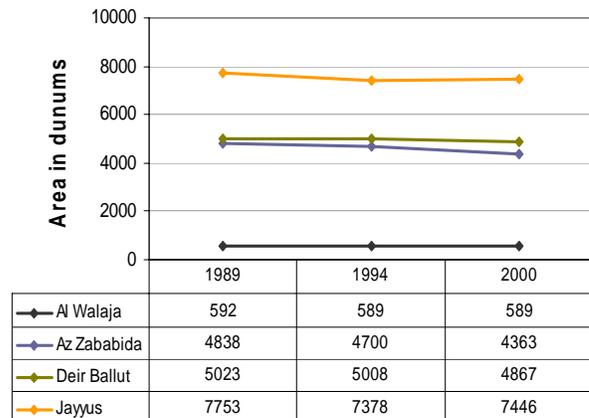


Figure 4-18: Change in agricultural areas, class D

4.5 Villages and Hamlets (Class E)

Three small villages and hamlets were studied including Deir al Hatab, Ein ad Duyuk at Tahta and Ein el Beida in Nablus, Jericho and Tubas Governorates respectively. According to the geopolitical classification of the Palestinian – Israeli agreements, Ein ad Duyuk at Tahta is located in area A, while Deir al Hatab and Ein el Beida are located in area B. Several Israeli colonies are established within the borders of Deir al Hatab and Ein el Beida villages, however, the lands of Ein el Beida village is directly affected by the construction of the Israeli segregation zone. Under cities of class B, the city of Deir al Hatab is represented in this study.

4.5.1 Deir al Hatab, Population, social conditions and urban trends

Deir al Hatab is situated east of Nablus city. The urban area in the village was 338 dunums in the year 2000 and its estimated population was about 2,100 in the year 2003 (PCBS, 2003). The agricultural sector occupies 20-24 % of the economical sector in the village. Approximately 50% of the citizens represent the working age population (15-64) where 50% are females (PCBS, 1999). Approximately 33% of the households in Deir al Hatab have 1-5 members, 51% have 6-10 members and 17% have more than 10 members in their households. About 10% of the population in Deir al Hatab is illiterate, out of this number 78% are women. In addition 43% of the students in Deir al Hatab are females. In Deir al Hatab, and according to its village council member, unemployment rate increased dramatically from 30% in 1999 to 90% after the year 2000. He said that the Israeli activities have had a bad effect on the labor force.

The council member revealed that the administrative area of Deir al Hatab was 200 dunums before 1993. Both the administrative area and the area of the Master plan are currently 250 dunums which serves for 20 years and the council member stated that the people are not completely committed to this Master plan. After the year 2000 there was a negative effect on the urbanization sector and building activities decreased because of the political instability. At the same time he noted that the Israeli violations are decreasing the future chances of an efficient urban development because of a degraded economical situation due to closures and checkpoints.

The village council member in Deir al Hatab revealed that there has been no plan for developing the urbanization in the area since Oslo and at present. He stated that urbanization has increased during the peace process because of immigrants to the Palestinian Territories. The economic situation has changed during the second Intifada that took place in September 2000 where the urbanization activities decreased due to decreased income level. The people questioned in Deir al Hatab believed that the urban expansion increased in their area during the peace process and that the urban expansion pattern was horizontal. Map 4-6 shows that Deir al Hatab has increased in every direction on permanent crops and arable land. However, the urban area has mainly expanded southwestwards outside the Master plan boundary of the village. On the northeastern village border two urban localities appeared in the middle of heterogeneous agricultural land. If this expansion continues further it will sprawl on valuable agricultural land. The urban expansion has had a negative an impact on the environment, the soil became

polluted with solid and water waste, and wildlife lands and agricultural areas have decreased.

Elon Moreh was established in 1980 northeast of Deir al Hatab and was classified as an urban settlement. In 2003 the area of the colony was 1208 dunums and its estimated population counted 1030 colonists in 2001. During the year 2002 three new outposts appeared around Elon Moreh, the first to the northwest and the second to the south of the colony. Today, the colony with its Satellite neighborhoods are expanding towards each other and threatening the Palestinian agricultural lands and open spaces. In addition to the colony an Israeli bypass road crosses Deir al Hatab village boundary at its midsection and connects Elon Moreh with other Israeli colonies and with Israel. The spatial analysis shows that between the years 1989 to 2003 there has been a dramatic increase of the Israeli colonization activities on the expense of Palestinian forest area, open spaces and on permanent crops.

According to a village council member, the Israeli authorities in 1998 confiscated 2000 dunums from the village lands located outside the village administrative boundary and belong to 70 villagers. According to the village council member a number of 400 olive trees were uprooted between 1993 and 2000, in addition to 1000 fruit and olive trees which were uprooted after the year 2000. The council member stated that Israeli activities have a negative impact on the agricultural and animal sectors. The farmers became unable to reach their agricultural and grazing lands since they became surrounded by Israeli colonies. Some of the people questioned stated that the open spaces and agricultural lands have decreased because of Israeli colonization activities. In addition several informants revealed that there is bulldozing and uprooting of trees and that cattle raising has decreased because of the closure of graze lands.

The analysis shows that the built-up area in Deir al Hatab has increased dramatically during the peace process as shown in Figure 4-19. The increase in urban area amounted to 35.2% with annual expansion of 15 dunums in the period between the years 1994 and 2000 compared to 16.8% with annual expansion of 7 dunums in the period between the years 1989 and 1994. At the same

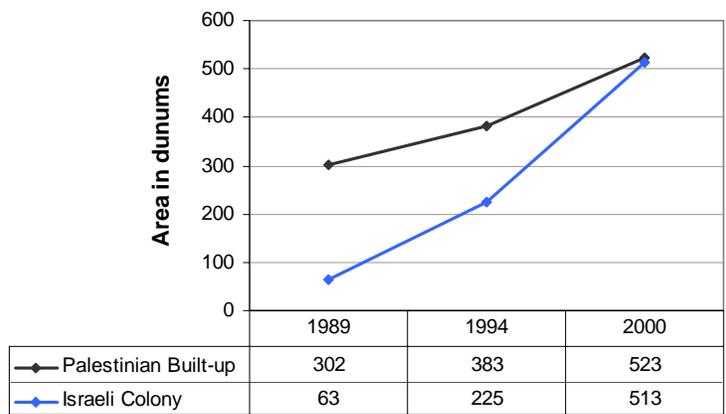
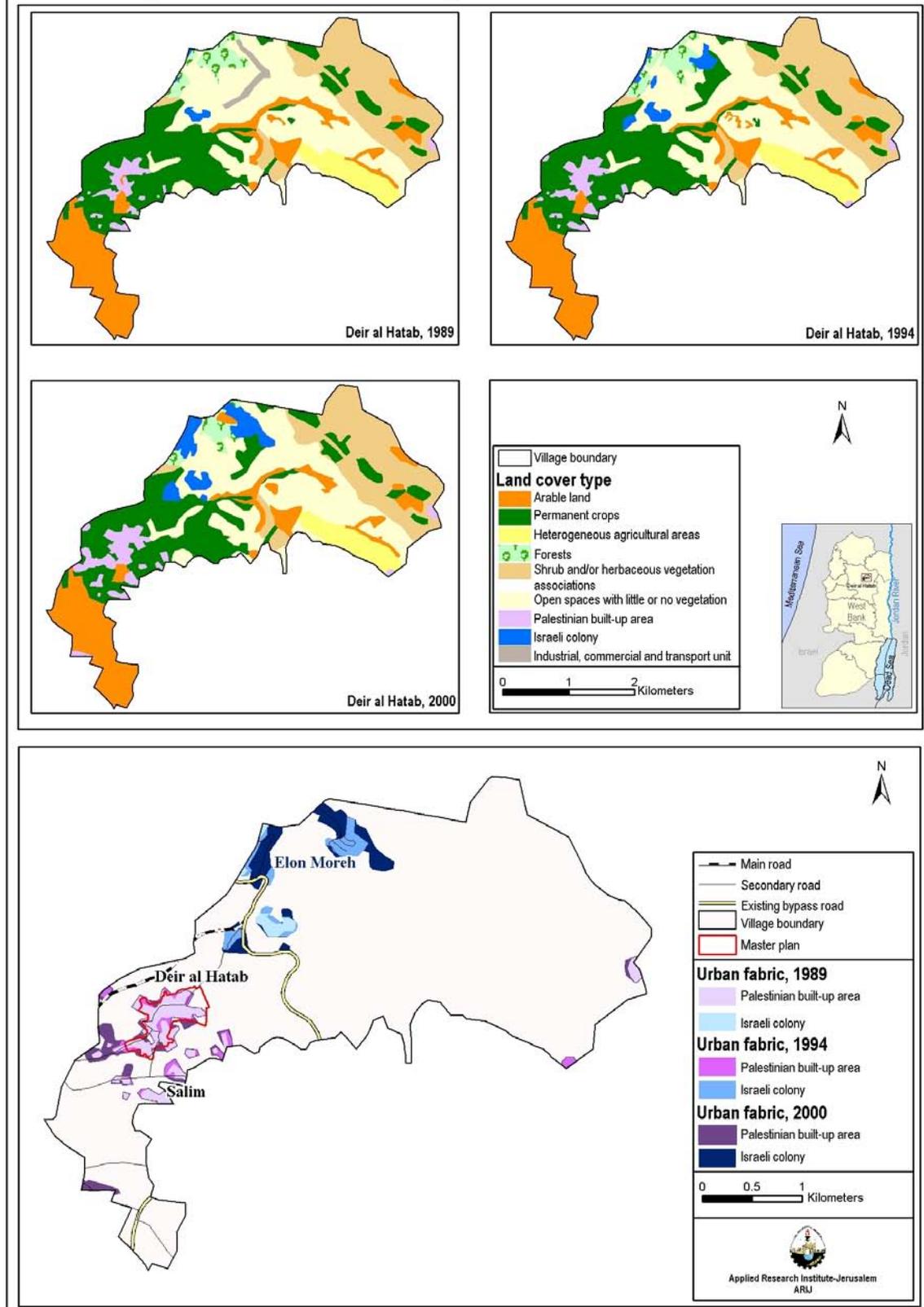


Figure 4-19: Expansion for Palestinian urban areas and Israeli colony areas inside the village boundary of Deir al Hatab

time, Israeli colonies inside the village boundary increased dramatically both before and after 1994. The analysis also shows that between 1989 and 1994 the urban density (urban area per capita) decreased dramatically from 239 m²/capita to 186 m²/capita, and it reached 181 m²/capita in year 2000.

Historical Urban Expansion and Land use/Land cover Changes in the Palestinian Localities: Deir al Hatab



Map 4-6: Historical Urban expansion and Land use/ Land cover changes in Deir al Hatab

4.5.2 Urban profile conclusions of localities class E

The analysis shows that the urban expansion was modest in Ein ad Duyuk At Tahta between 1994 and 2000. The reason is that the area southwest of the village was included in the Israeli proposed colony Master Plan and the construction on that area was prohibited for Palestinians.

Figure 4-21 shows that in the villages of Deir al Hatab and Ein el Beida, both situated in area B, the built-up density almost stagnated in the period between 1994 and 2000. While the built-up area expanded more in the period after the establishment of the Palestinian Authority in 1994 than in the period from 1989 to 1994.

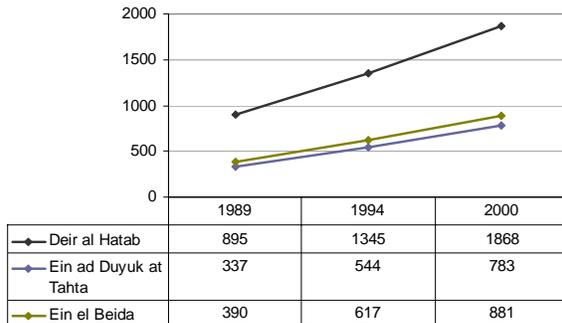


Figure 4-20: Estimated population growth, class E

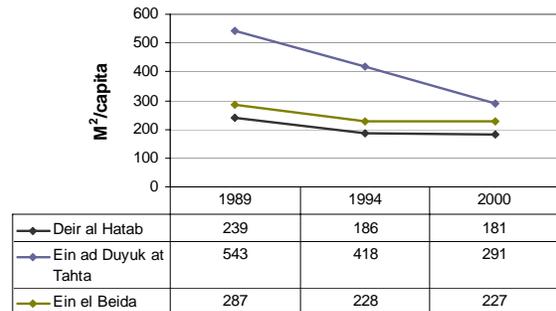


Figure 4-21: Built-up density, class E

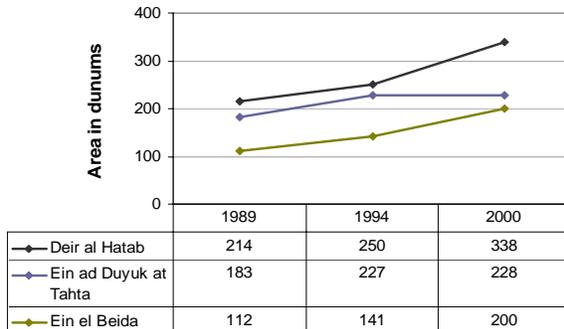


Figure 4-22: Expansion for Palestinian urban areas, class E

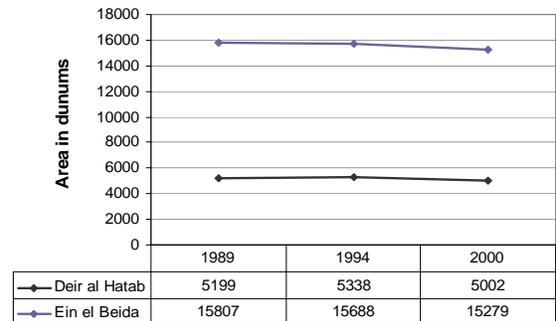


Figure 4-23: Change in agricultural areas, class E

Figure 4-22 and Figure 4-23 show that the expansion of urban area between 1989 and 2000 in Deir al Hatab and Ein el Beida has slightly affected the Palestinian agricultural areas, while the Israeli colonies expanded on the expense of Palestinian significant and valuable agricultural lands.

Future directions of urban growth (development): Analysis and perspectives

So far this research has given an indication of the significant changes which have been brought about by urban growth over the last 13 years. An investigation of the land cover in the West Bank Governorates has been qualified and quantified, and the socioeconomic impact of urbanization on the Palestinian population analyzed.

In the future there will, undoubtedly, be further urban expansion in the study area. Hence, the future urban development is estimated taking into consideration future population scenarios which are also projected till year 2020. The purpose of this chapter is to make realistic projections of possible future directions of urban growth and to model how this development could be best accommodated in a spatial manner in the West Bank. In particular, the aim here is to locate those areas that are most suitable for urban growth using a spatial GIS-based model. However, from the urban planning point of view, the aim is not to design individual buildings within a city, nor to seek to create a "perfect city". Rather, this modeling is proposed to help the decision makers who shape the urban and regional fabrics of society to pursue their own plans, according to their own sets of criteria, whilst, trying to avoid unwanted side-effects of unplanned development.

5.1 Population projections

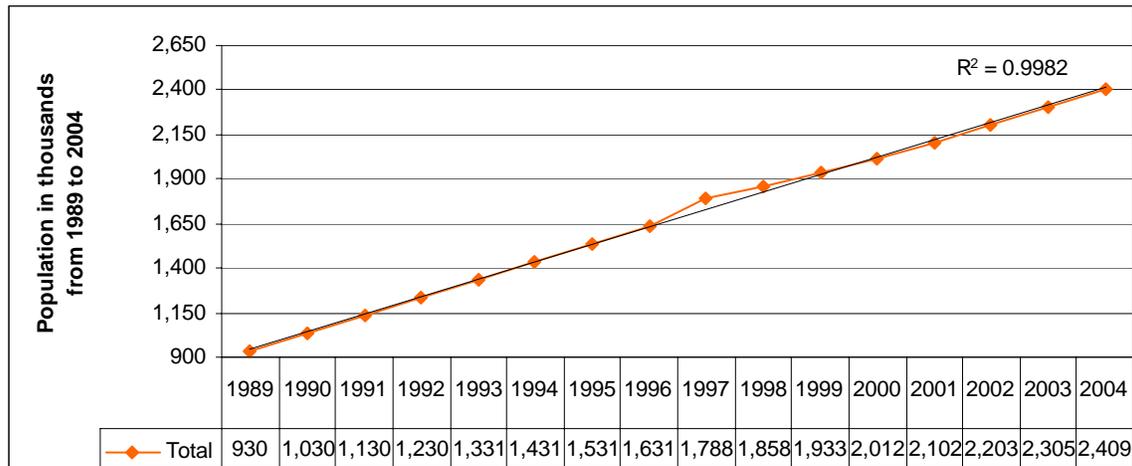
Future population projections for each Governorate in the West Bank were obtained using linear regression model in accordance to the projections done by the Palestinian Central Bureau of Statistics (PCBS) till year 2010. The base year used was 1997 where actual census data was collected. Population projections were done for each following year till 2020 and for preceding years till 1989. Figure 5-1 (a & b) shows total population projections for medium growth scenario in the West Bank from year 1989 to 2020. For convenience and better illustration the years: 2000, 2005, 2010, 2015 and 2020 will be used for analysis. Projections were based on three future population scenarios, see Figure 5-2:

Low Growth Scenario: This scenario assumes that growth in population will slow down as a result of long-term trends in declining fertility rates, net out-migration and slow economic growth.

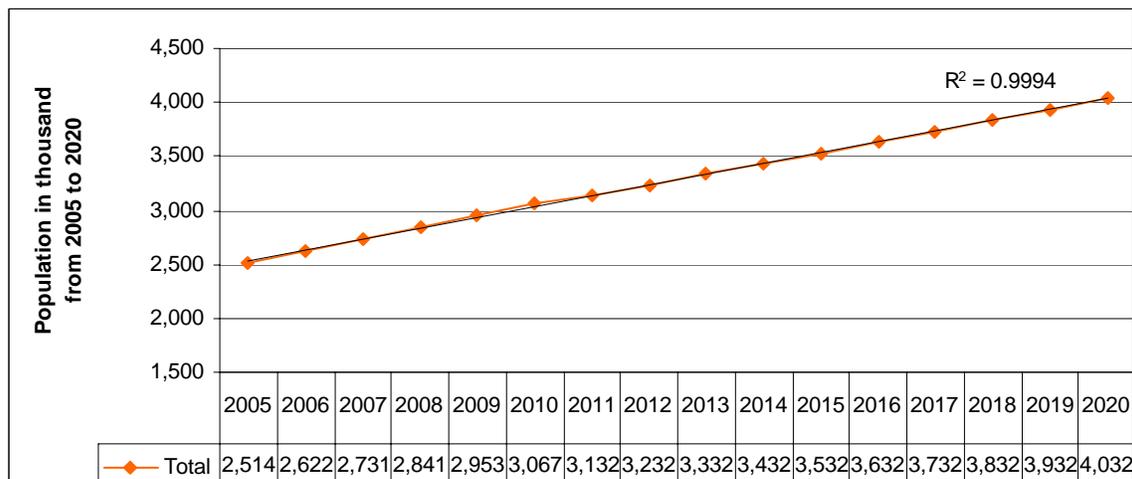
Medium Growth Scenario: This scenario assumes that population growth will remain constant in the future. Any long-term decline in fertility rates will be offset by a net increase in immigration resulting from the flow of a limited number of refugees from outside the West Bank.

High Growth Scenario: This scenario assumes that population growth will be faster in the future. The scenario is based on the assumption that a large number of refugees will

return to the West Bank between 2005 and 2020 after the declaration of the Palestinian state. The fertility rates are assumed to decrease to a percentage which will still be higher than the fertility rate in the medium scenario. The nature of this influx will depend on the outcome of successful negotiations which will lead to a permanent peace solution. The scenario also assumes a very low rate of out-migration as a result of improved economic conditions.



(a)



(b)

Figure 5-1: Population projections for medium growth scenario in the West Bank
(a): from year 1989 to 2004
(b): from year 2005 to 2020

Although the year 1997 was the base for population projections, the year 2004 (the current year) was used as the base for analyzing the results. In the low growth scenario, population in the West Bank is projected to increase by 3.9%, 23.5%, 38.6% and 54.0% in 2005, 2010, 2015 and 2020 respectively from the year 2004. However, in the medium growth scenario, population is projected to increase by 4.4%, 27.3%, 46.6% and 67.4% in 2005, 2010, 2015 and 2020 respectively. While in the high growth scenario, population is projected to increase by 4.9% by 2005, 31.1% by 2010, 54.7% by 2015 and 80.8% by 2020 from the current year. R^2 of the regression lines used in the three scenarios was significantly high with values of approximately 0.99.

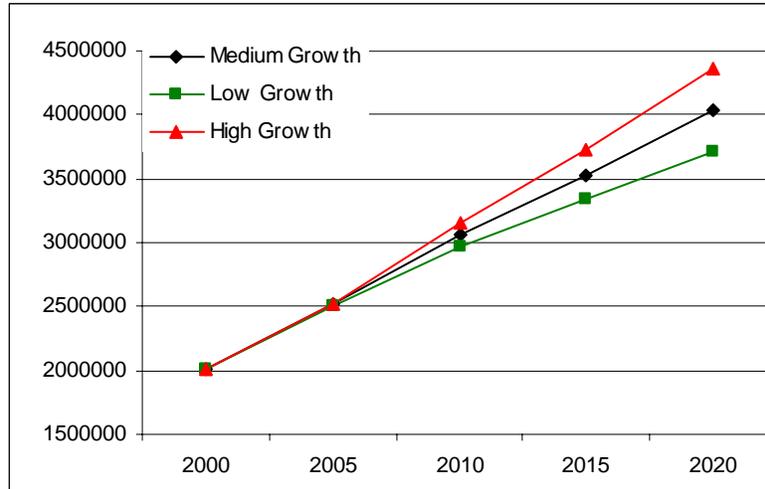


Figure 5-2: Projected total Palestinian population in the West Bank till year 2020

5.2 Built-up area projections: Land needs for population growth scenarios

The three scenarios of low, medium and high growth were also used in projecting the future built up area. To study the trend of urbanization in the West Bank Governorates, built-up area data was calculated from the LANDSAT images and plotted against years from 1989 to 2000. The data resembled a linear trend thus a linear equation was used to project the future built-up area for the medium growth scenario, see Figure 5-3.

The projected built-up area till year 2020 in the medium growth scenario was used to project the built-up area for the low and high growth scenarios and calculate the future directions of urban growth which had an R^2 value of about 0.98, see Figure 5-4.

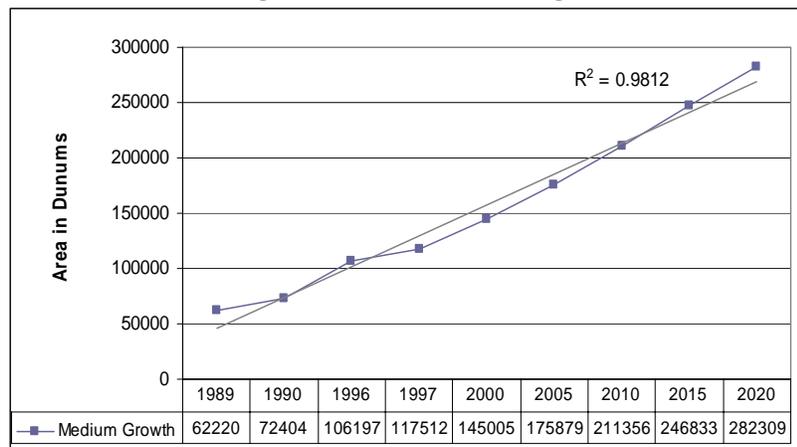


Figure 5-3: Actual and projected net built-up area of medium growth scenario in the West Bank from 1989 to 2020

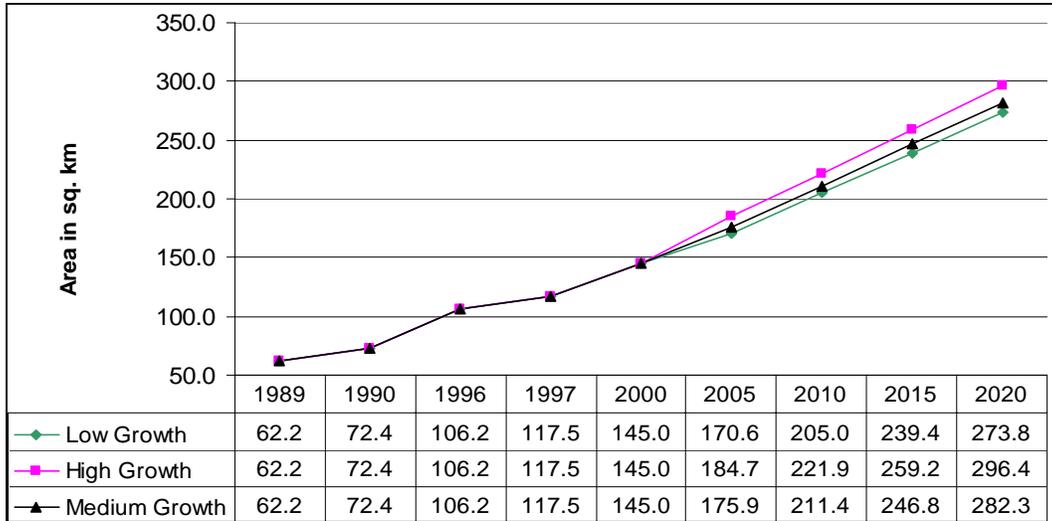


Figure 5-4: Actual and projected total net built-up area of the three scenarios in the West Bank from 1989 to 2020

Based on the population and built-up area projections for the three different scenarios, the land needed of built-up area per capita was calculated as follows

- Low growth scenario: it was assumed that the economic situation will decelerate as a result of long-term trends in declining fertility rates, net out-migration and slow economic growth. Housing is expected to be constructed by single households based on their affordability. Thus, the horizontal expansion housing typology will continue to dominate which will lead to increase in the built-up area and decrease in population density, see Figure 5-5.
- Medium growth scenario: it was assumed that the existing situation will continue with some geopolitical restrictions on land use such as the segregation wall and Israeli colonies in addition to other Israeli activities related to land in the West Bank.
- High growth: it was assumed that under peace the economic situation will be improved where foreign investments will be encouraged especially from Palestinians living abroad. Housing finance institutions will function more effectively and investors and developers will start to build in a vertical expansion typology in order to meet the population growth and housing needs. Therefore, the built-up area in relation to population growth tends to decrease as illustrated in Figure 5-6

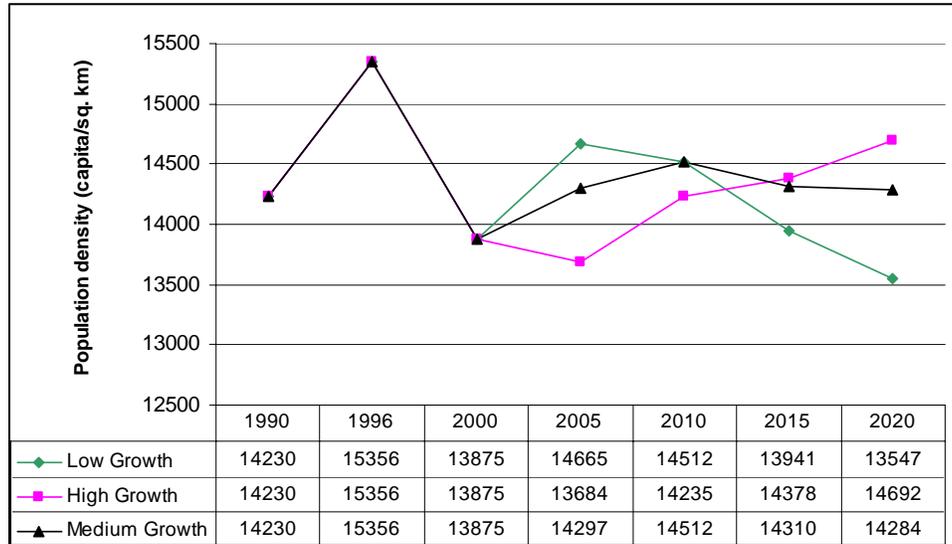


Figure 5-5: Average of projected net population density in the West Bank until year 2020

It is noticed from the projected population density chart, see Figure 5-5, that in the low growth scenario the population density gets higher in the year 2005 before it drops, this is because of the financial conditions which put constraints on building, on the long run the horizontal expansion in the built-up area causes the density to drop in the years 2010, 2015 and 2020. In the medium growth scenario, the population density is projected to increase in the years 2005 and 2010 due to the Israeli actions related to the Palestinian lands which cause political and financial constraints on building. The continuation of more horizontal expansion causes the density to drop in the years 2015 and 2020. In the high growth scenario the population density is projected to drop in the year 2005, this is because of the increase in the built up area due to the projected good financial conditions and investment. The transformation in the typology of buildings from mainly horizontal to vertical causes the population density to increase in the years 2010, 2015 and 2020, see Figure 5-5.

The projected net built-up area needed per capita was calculated for the three scenarios. In the low growth scenario, the net built-up area per capita in year 2000 was 69.4 m²/capita which dropped to 65.4 m²/capita in 2005. However, it gradually increased to 65.9, 68.5 and 70.4 m²/capita in the years 2010, 2015 and 2020 respectively. In the medium growth scenario it is projected that the m²/capita will drop to 67.1, 65.9, 66.7 and 66.7 for the years 2005, 2010, 2015 and 2020 respectively. The analysis revealed that in the high growth scenario, the m²/capita is projected to increase to 70.1 in the year 2005 while in the years 2010, 2015 and 2020 the net built-up area allocated per person will decrease to 67.2, 66.4 and 64.9 respectively. This decline in the m²/capita indicates that more of vertical expansion is taking place or, on the other hand, that the rate of population growth is becoming larger than the rate of increase in the built-up area, thus in the low growth scenario the m²/capita rises while it drops in the high growth scenario, see Figure 5-6.

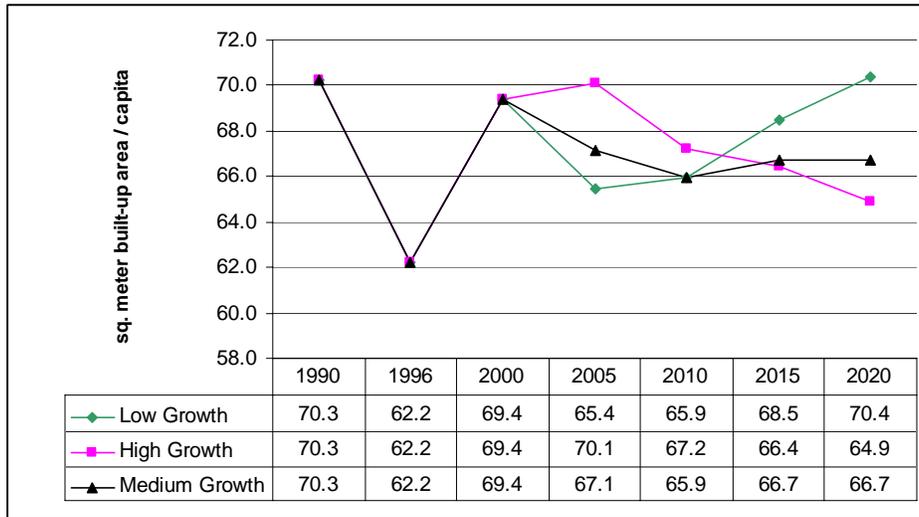


Figure 5-6: Average of projected net built-up density in the West Bank until year 2020

5.1.1 The housing units needed by the year 2010 based on households projections

A study was done by the Palestinian Central Bureau of Statistics (PCBS) in the year 2003 for projecting the number of housing units in the West Bank using Average of Head of Households Hypothesis. Estimations for the year 2004 show that in the West Bank the number of households is around 414,559, and the number of housing units is around 482,932, see Table 5-1 and Figure 5-7. The projected number of households for the year 2010 is 558,707 and the number of projected housing units is 650,804.

Assuming that there is no deficit in housing units in the West Bank in the year 2004; there will be a need to construct a number of 167,872 new housing units during the coming 6 years. If the current socio-economic conditions continue to negatively prevail, a deficit in the housing units will definitely be encountered, and this will lead to deteriorating the Palestinian households living conditions.

Table 5-1: Projected Households and Housing Units in the West Bank by year

Year	Number of Households	Number of Housing Units
1998	307,587	358,289
1999	321,269	374,226
2000	336,141	391,550
2001	353,463	411,728
2002	373,090	434,590
2003	393,458	458,315
2004	414,591	482,932
2005	436,499	508,452
2006	459,208	534,904
2007	482,756	562,334
2008	507,170	590,772
2009	532,477	620,250
2010	558,707	650,804

Source: PCBS 2003

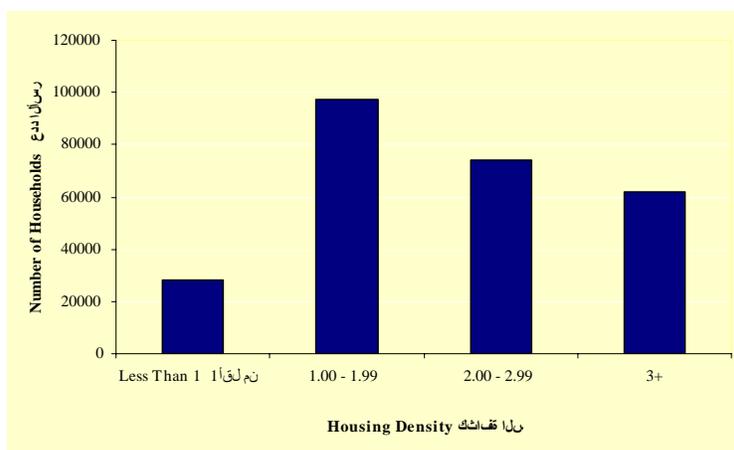


Figure 5-7: Existing Households by Housing Density (Number of household /housing unit)

5.3 Future projections at Governorate level

Projections of built up area and population were performed for each Governorate in the West Bank for the three scenarios low, medium and high growth. In analyzing the three scenarios and their projected values performance and correlation by Governorate it was noticed that the Governorates' performance in the low, medium and high growth scenarios had the same trend direction¹. It was chosen that the high growth scenario will be used in the following analysis since it is the extreme case, see Figure 5-8. However, Table 5-2 shows the projected population according to the three different scenarios in the years 2000, 2005, 2010, 2015 and 2020 by Governorate, while Table 5-3 summarizes the net built-up area development estimations for the three different scenarios in the same time span by Governorate.

Table 5-2: Projected population according to the three different scenarios by Governorate

Governorate	Year 2000	Population in thousand											
		Year 2005			Year 2010			Year 2015			Year 2020		
		Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
Jenin	216	268	269	271	317	327	337	356	376	397	395	429	464
Tulkarem	143	177	178	179	209	216	222	235	248	262	260	283	305
Nablus	278	345	346	348	407	419	432	456	483	509	506	550	594
Qalqilya	78	99	100	100	120	124	128	136	144	152	153	166	179
Tubas	39	49	49	50	59	61	62	66	70	74	74	80	87
Salfit	52	66	66	66	79	81	83	88	94	99	99	107	116
Ramallah & Al Bireh	232	296	297	299	359	370	381	407	431	454	457	496	536
Jerusalem	354	420	422	424	482	496	511	530	561	591	578	629	679
Jericho	35	45	45	45	53	55	57	60	64	67	67	73	79
Bethlehem	147	184	185	186	220	226	233	247	261	276	275	299	323
Hebron	437	553	556	559	671	691	712	757	801	845	847	920	994
Total	2,012	2,502	2,514	2,527	2,975	3,067	3,159	3,338	3,532	3,726	3,710	4,032	4,355

¹ With a change in the built up area between the ranking of Salfit and Tubas in the high growth scenario.

Table 5-3: Net built-up area development estimations according to the three different scenarios by Governorate

Governorate	Year 2000	Built-up in Dunums											
		Year 2005			Year 2010			Year 2015			Year 2020		
		Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
Jenin	13146	15874	16365	17183	18911	19495	20470	21947	22626	23757	24983	25756	27044
Tulkarem	8619	10218	10534	11060	12092	12466	13090	13967	14399	15119	15842	16332	17148
Nablus	14475	17170	17701	18586	20251	20878	21922	23332	24054	25257	26414	27231	28592
Qalqilya	5245	6115	6304	6619	7455	7686	8070	8796	9068	9521	10136	10450	10972
Tubas	1928	2338	2410	2530	2783	2869	3012	3228	3328	3494	3673	3787	3976
Salfit	3089	3558	3668	3852	4411	4547	4775	5264	5427	5698	6117	6306	6621
Ramallah & Al Bireh	18315	21784	22458	23580	26802	27631	29013	31820	32805	34445	36839	37978	39877
Jerusalem	26110	31125	32087	33692	37051	38197	40107	42978	44307	46522	48904	50417	52937
Jericho	2695	3178	3276	3440	3722	3837	4028	4265	4397	4617	4809	4957	5205
Bethlehem	15128	17543	18086	18990	21092	21745	22832	24642	25404	26674	28191	29063	30516
Hebron	36254	41700	42990	45139	50444	52004	54604	59188	61019	64070	67932	70033	73535
Total	145005	170602	175879	184673	205015	211356	221923	239428	246833	259174	273840	282309	296425

The future population projections showed that Hebron recorded the highest number of population with 530,541 persons which is projected to increase by 87.3% by the year 2020, see Table 5-4 and Figure 5-9. Hebron Governorate was followed by Jerusalem, Nablus, Ramallah, Jenin, Bethlehem, Tulkarm, Qalqilia, Salfit, Tubas and Jericho Governorates, see Figure 5-8. Nevertheless, Jericho Governorate has the least number of population with 42,839 persons which is projected to increase by 84% and reach 78,823 in 2020. The analysis showed that although Jerusalem Governorate has the second highest population number in 2004; it would continue to increase by 66.4% which is the lowest percentage of population growth compared to the other Governorates, Figure 5-9.

Table 5-4: Projected built-up area and population in year 2004 by Governorate

Governorate	Year 2004	
	Built-up (Dunums)	Population
Jenin	15739	258321
Tulkarm	10147	170621
Nablus	17066	332299
Qalqiliya	6028	95250
Tubas	2318	47298
Salfit	3492	62968
Ramallah & Al Bireh	21423	283446
Jerusalem	30865	408042
Jericho	3164	42839
Bethlehem	17354	177170
Hebron	41187	530541
Total	168783	2408795

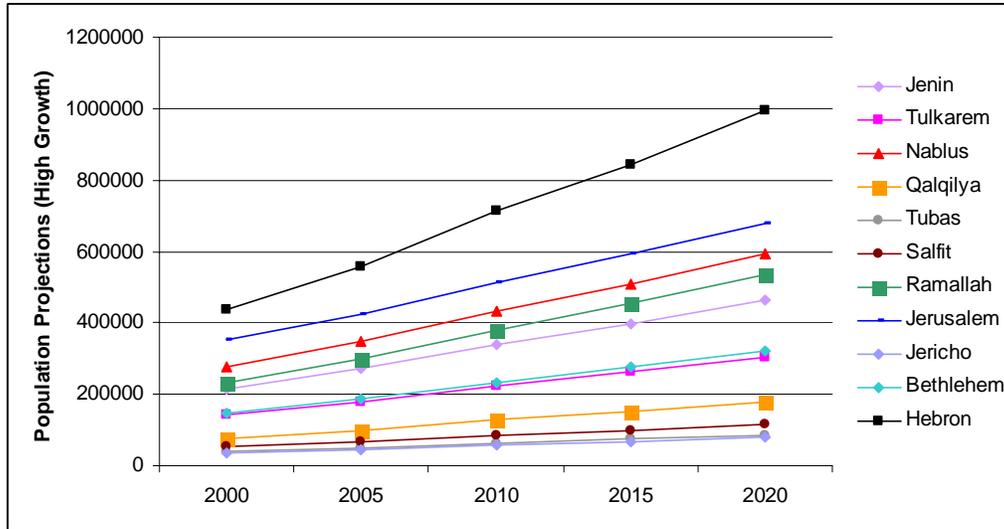


Figure 5-8: Projected population of high growth scenario by Governorate

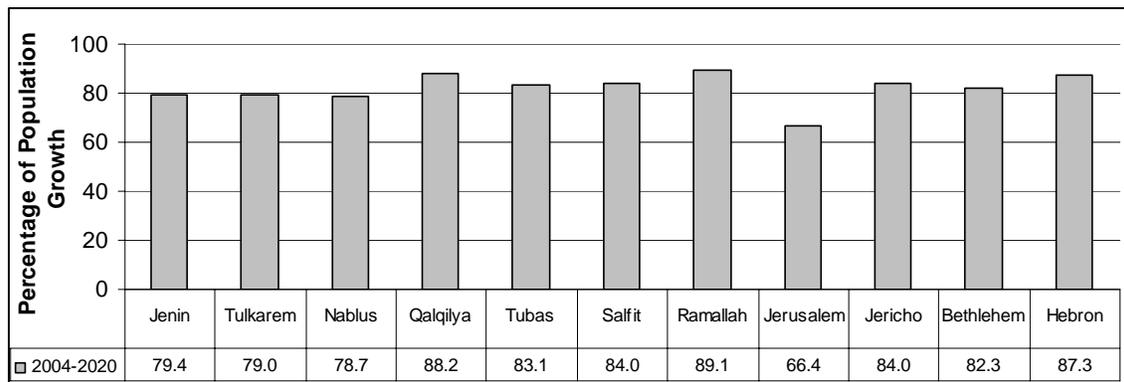


Figure 5-9: Projected population percentage of increase in year 2020 of high growth scenario by Governorate

The results of the future projections of built-up area revealed that Hebron Governorate has also the highest amount of built up area with 41187 dunums which is projected to increase by 70% occupying 73535 dunums by the year 2020, see Table 5-4 and Table 5-3. The other Governorates are descending in an order starting from Jerusalem, Ramallah, Bethlehem, Nablus, Jenin, Tulkarm, Qalqilya, Jericho, Tubas and Salfit, see Figure 5-10. It was noticed that Salfit Governorate has the lowest amount of built-up area, whilst has the highest percentage of built up area growth with 80.6%, see Figure 5-11.

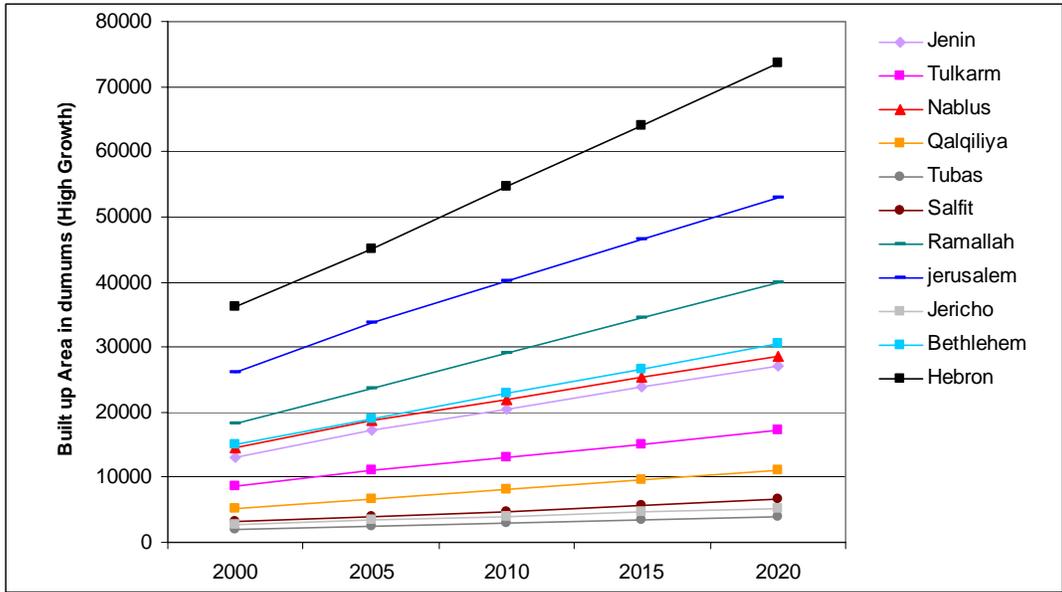


Figure 5-10: Projected built-up area of high growth scenario by Governorate

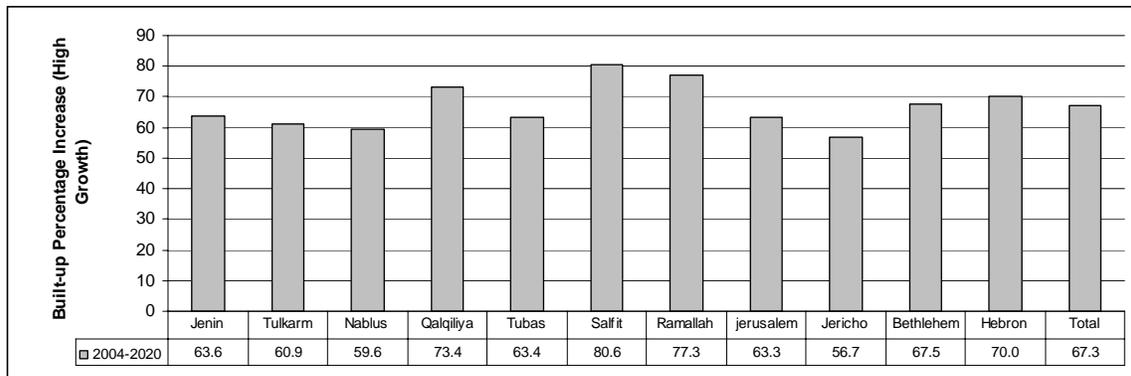


Figure 5-11: Projected percentage of increase of built-up area in year 2020 of high growth scenario by Governorate

The figures above show that Ramallah Governorate has the highest percentage of population growth and the second highest percentage of built-up area growth with values of 89.1% and 77.3% respectively. This reveals the fact that Ramallah Governorate is the administrative center for the Palestinian National Authority where many Ministries and national and international organizations are located and manifest investments are taking place.

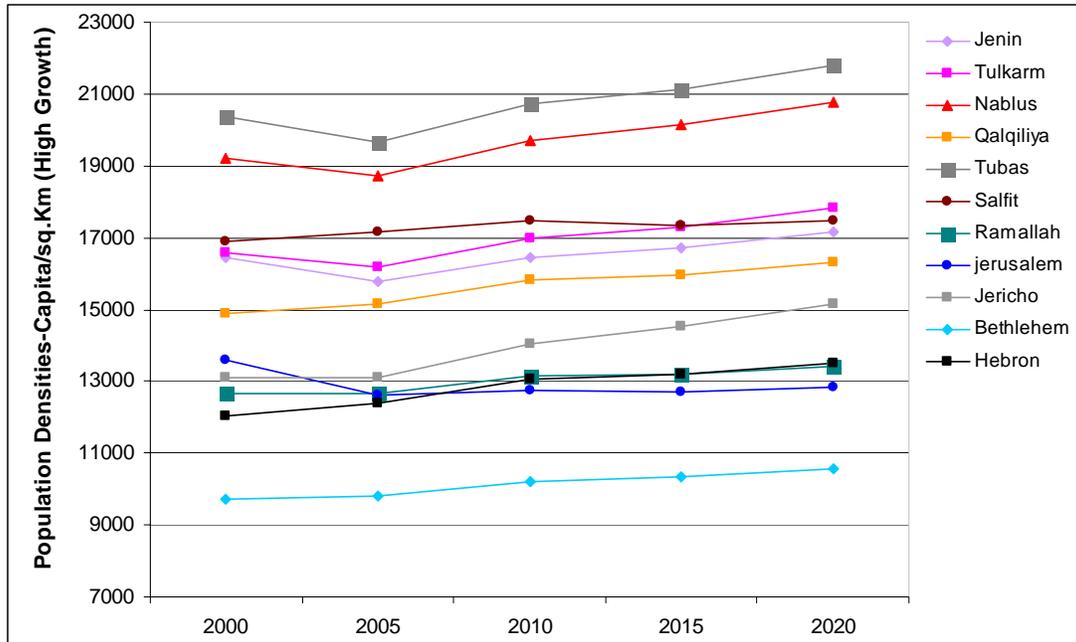


Figure 5-12: Projected population density for the West Bank governorates

Figure 5-12 illustrates the projected population densities for the high growth scenario in capita/km² from year 2000 to year 2020 by Governorate. Tubas has the highest population density which means that the rate of growth of population is larger than the rate of growth of built up area or that people are tending to build more of vertical buildings, but due to the rural nature of Tubas Governorate it is more likely that the first reason might be more valid. Nablus comes second in regard to the population density, see Figure 5-12. Since Nablus Governorate has a relatively large city that is considered the urban center in the northern region, it is more likely that vertical growth will take place in addition to the topography of the main city which lies between mountains which poses limitations on horizontal growth. It is interesting to note that the Governorates that have the largest population densities lie in the northern part of the West Bank. Jerusalem and Bethlehem have the least population densities in the West Bank. This could be due to the building restrictions in Jerusalem and due to the relatively low population growth compared to the other West Bank Governorates.

5.4 Land Available for future urban development

Since this study aimed at modeling future urban development in West Bank and to locate those areas that are most suitable for urban expansion, a suitability map was prepared using a GIS-based model. GIS, as the basis of a planning support system, can assist in the identification of suitable land for urbanization, given a number of GIS layers. Each of these layers reflects a certain criteria advised by the planner that is thought to have a direct influence on the potential site for urban development. Therefore, the site (defined as a pixel in space) of an urban activity is thought of as a function of a number of factors, each of which has its own influence (weight) on the importance of the site to become a

potential urban area (Kuiper 1999). Thus some factors may prevail and others may fail to influence site selection; the balance of these factors will define the overall importance of a site for urban development.

The approach carried out was the sum weighted modeling approach, using the spatial analyst module in ArcGIS 8.3. Here, factors that contribute to the suitability of sites for urbanization were carefully selected. The factors were limited to those which could be represented both spatially and as quantitative values that could be weighted. Hence, for example demographic change could not be included. The factors were assigned a weighting from 1 to 4 based on the extent to which they indicated suitability for urban development. A value of one indicates a high suitability for urban development, while a value of four is not suitable for urban development. The key factors selected were re-sampled to 40 meters, the pixel size of the DTM used in the analysis, and were as follows:

1. The classification of land as Areas A, B and C

The classification of an area as A, B or C reflects the political constraints on urban development. Area A, which is under total Palestinian Control, was defined as the area most desirable for Palestinian expansion and assigned a low weighting. Area B was assigned a mid rating, and Area C, which is under Israeli control, was defined as the area less desirable for Palestinian expansion.

2. Water sensitivity areas

Water sensitivity areas defined and published by the Ministry of Planning (MOPIC) were utilized in the model. Water sensitivity is a crucial factor in locating new development. The presence of such a variable in the model will enable wise planning of new urban areas, so that they are developed in a way that will not have a destructive influence on surface and ground water. Manual digitizing of this cover was carried out to obtain digital cover. This cover was also converted to grid and re-sampled to 40 meters.

3. Land use / Land cover (LULC) (as derived from IKONOS scenes)

Land use/land cover (LULC) depicted from IKONOS scenes is a further important factor in the model. The output was grided to 40 and coded from 1 to 4 based on the suitability of land for urban development. Designated agricultural land was coded with a high weight whilst those of less importance were coded with low weight values.

When the built-up area was delineated from the IKONOS images, the whole area which includes the built structures and the surrounding open spaces was considered within the already existing built-up area. It is worth mentioning that built-up area land use was assigned a low weight because the priority in urban development was given to this area in the form of infill and vertical expansion above and among the existing ones. In this context, the suitable area modeled will be the very first option for future urban growth of the Palestinian communities.

4. Master plan (land zoning restrictions)

Master plan boundaries of Palestinian localities in the study area were obtained from the Ministry of Local Government, municipalities and village county councils as AutoCad DXF file extensions, image format and hard copy maps. These were compiled and transformed to grid covers. A low grid value was assigned to grids located within the master plan boundaries and high value for the outer cells. The presence of this variable will promote urban development in areas that lie within the master plan boundaries

5. Soil type

Soil type was included in the model in an attempt to define the fertile soil required for agricultural purposes and prevent it from being exposed to urban development. On the other hand, areas with poor soil types were assigned a high grid value so as to promote urban development on these surfaces. Soil cover was grided to 40 grid size to be compatible with the rest of the data sets.

6. Protected area

It was crucial to include the nature reserves in the model for what influence it has upon the sustainability of the natural resources in the region. Nature reserves cover was grided to 40 for compatibility where a high grid value was assigned to grids located within the areas boundaries and low value for the outer cells.

7. Slope

Using the Grid Module of the ArcInfo platform, slope and aspect models were derived from the DTM model of the West Bank. The output data were re-sampled to 40 meter and rectified to UTM WGS84 projection. This cover was included in the model in order to promote the urbanization on high slope areas, which are more likely to be unsuitable for agricultural use. However this assumption could contradict the cost effectiveness of urban activities, since installing infrastructure on hilly land with sharp clefts can cost double or triple that in the flat regions. Hence, the most suitable slope for urban expansion was designated to be that of medium slope.

8. Segregation wall

The existing, planned and predicted route of the segregation wall that is snaking within the West Bank Governorates was considered as an important factor which influences the Palestinian urban development. After work commencement, the segregation wall aggressively swallowed most of the fertile agricultural land and demolished houses in order to be constructed inhibiting Palestinians from using their lands which lie within about 100 m around the wall. Therefore, a buffer zone was considered where high grid value was assigned to grids located within the master plan boundaries and low value for the outer cells.

9. Proposed master plans of Israeli colonies

The proposed master plans of Israeli colonies grid is a further important factor in the model. A high grid value was assigned to grids located within the Israeli master plan boundaries and low value for the outer cells. The presence of this variable will discourage urban development in areas that lie within the master plan boundaries since

it's suppose to be areas designated for Israeli colonies expansion. The output was grided to 40 and coded. This factor was not considered in the scenario under peace.

10. Regional roads

The existing bypass road coverage was considered and buffered to hinder the urban development within the assigned buffer zone while promoting it outside the zone.

Although the model is fairly simple and weighting factors were subjectively assigned, the results are a useful starting point from which to identify the most appropriate sites for future urban expansion and development. Two suitability scenarios were generated for the entire West Bank Governorates. The first scenario (current situation) reflects the current geopolitical situation considering the classification of the West Bank as areas A, B and C with the existence of the Israeli colonies as well as the impact of the construction of the Israeli segregation wall. However, the second scenario (under peace) developed postulates an Israeli withdrawal from the occupied West Bank since June 1967 including the Israeli colonies eliminating the influence of the geopolitical areas A, B and C. In the second scenario the Israeli colonies were assumed to be integrated in the Palestinian urban structure thus became suitable for urban development. Therefore, the results of the two models were translated into maps where suitability for urban development was sorted into five categories as follows: most suitable, suitable, moderately suitable, less suitable and not suitable areas. The results of the models will be compared with the future urban trends projected above under different population scenarios (in section 5.3) in order to evaluate what practical information the models can provide for planning purposes, see Table 5-5.

Table 5-5: Areas in km² of the potential sites for urban development under different scenarios by Governorate

Governorate	Most Suitable		Suitable		Moderately Suitable		Less Suitable		Not Suitable	
	Current Situation	Under Peace	Current Situation	Under Peace	Current Situation	Under Peace	Current Situation	Under Peace	Current Situation	Under Peace
Jenin	41.6	44.3	118.0	160.8	137.3	42.7	254.0	309.3	18.2	12.1
Tulkarm	19.7	25.6	49.7	70.2	50.1	18.4	120.5	130.8	5.0	0.1
Nablus	37.4	55.4	140.6	201.1	123.5	54.7	290.4	289.9	21.7	12.5
Qalqiliya	7.3	20.2	21.1	31.3	18.5	7.0	111.7	112.6	15.5	3.1
Tubas	10.2	28.8	28.1	32.6	112.3	94.8	142.9	138.8	69.7	68.0
Salfit	4.8	23.0	32.8	61.9	41.3	9.9	95.1	92.7	28.0	14.5
Ramallah & Al Bireh	49.7	76.9	247.4	348.0	196.3	107.5	317.4	299.8	37.2	15.8
Jerusalem	27.6	70.7	113.1	133.3	84.0	61.0	111.6	76.2	17.0	12.1
Jericho	45.6	104.7	279.9	265.3	134.2	153.7	131.6	69.5	12.8	11.0
Bethlehem	39.3	52.4	111.6	131.5	221.6	236.8	158.3	104.8	74.4	80.0
Hebron	95.6	94.7	393.9	427.4	330.7	294.8	228.6	230.6	17.5	18.9
Total	378.8	596.5	1536.2	1863.5	1449.9	1081.2	1962.1	1855.1	317.0	248.1

Under current situation scenario, it is calculated that the total area in the West Bank suitable for urban development equals 1915 km², taking the first two classes as the optimum location suitable for urbanization, see Table 5-5. However, about 20% of the projected suitable sites are already utilized by the current urban land use. This limits the area available for future urbanization to around 1560 km². On the other hand, the analysis showed that the total area suitable for urban development in the West Bank

equals 2460 km² under peace scenario adding more land for expansion of 900 km², see Table 5-5. The maps of the two models generated (shown in annex 3) indicate that the spatial distribution of the sites suitable for development is compatible with most of the sites where development has already taken place. This shows that the number of factors used in modeling had an influence that encouraged urban development in the built-up area region to become a potential urban area considering vertical and infill expansion.

The superimposition of the built up area over Model 1 (current situation) also indicates that most of the Israeli urban areas have been established on areas with a low suitability for urbanization. The majority of the Israeli colonies are built over areas with grid values of 3 and/or 4, which represent highly sensitive regions, see annex 3. Hence, building in these regions may have a negative impact on the natural land and water resources.

Under the low growth scenario, the projected net built up areas in Jenin, Tulkarm, Nablus, Tubas, Ramallah, Jericoho, Bethlehem and Hebron Governorates, were less than the most suitable area in both the current situation and the under peace scenarios. While in the Governorates of Qalqiliya, Salfit and Jerusalem the projected built up area calculated under the current situation will exceed the most suitable area but still will be less than the suitable area. In addition, the calculations showed that under peace situation the projected built up areas were less than the most suitable area in all Governorates, see Figure 5-13.

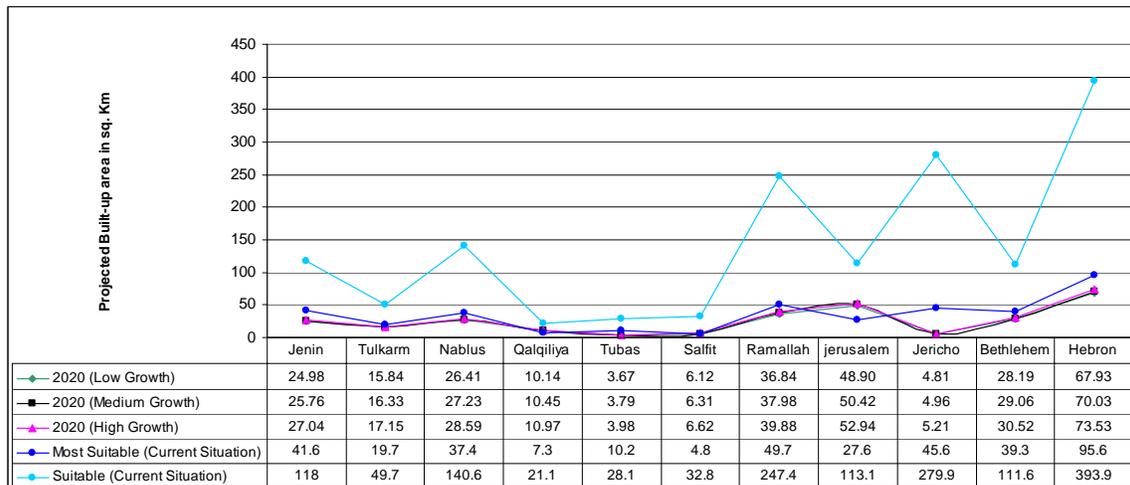


Figure 5-13: Projected net built up area in the West Bank and two scenarios of suitability

Under the medium growth scenario, the projected built up areas in Jenin, Tulkarm, Nablus, Tubas, Ramallah, Jericho, Bethlehem and Hebron Governorates, were less than the most suitable area in both the under current situation and the under peace scenarios, while in the Governorates of Qalqiliya, Salfit and Jerusalem, under the current situation, the projected built up area will exceed the most suitable area but still will be less than the suitable area, see Figure 5-13. On the other hand, under both suitability scenarios of the high growth estimations, the projected built up areas in the Governorates of Jenin, Tulkarm, Nablus, Tubas, Ramallah, Jericho, Bethlehem and Hebron, were less than the most suitable area. Under the current situation, however, the Governorates of Qalqiliya,

Salfit and Jerusalem have a projected built up area that will exceed the most suitable area but still will be less than the suitable area, see Figure 5-13.

Although the projected suitable area for urban development can meet the demand of urban growth and land needs driven by the different three population and built-up area scenarios till 2020, most of this calculated area is inaccessible by Palestinians and fully under Israeli control. For example, considering built-up area projections under high growth and the current situation scenarios, Jenin, Salfit, Hebron, Nablus, Ramallah, Jericho, Jerusalem, Bethlehem and Tubas Governorates have percentages of 1.6%, 8.1%, 10.8%, 11.6%, 14.9%, 23.2%, 26.3%, 38.2% and 52.5% respectively classified as Israeli Closed Military Areas (ICMA) which are highly restricted for Palestinians' utilization. The total suitable area for Palestinian urban growth classified within the ICMA is 216259 dunums. The analyzed data showed that the suitable area classified in the Governorates of Nablus, Salfit Ramallah, Jerusalem and Jericho is mostly located within the borders of the ICMA leaving the Governorates with low or even less percentages of suitable area with -18%, -19%, -13%, 5.3% and -0.1% respectively, see Figure 5-14. Therefore, a sever condition is likely to occur in the abovementioned Governorates under low, medium and high growth scenarios of built-up area projections starting from year 2005.

Further analysis revealed that also the areas with moderate suitability for urban expansion in the meant Governorates are located within the boundaries of ICMA except for Jericho which has a remainder of 7.4% of its total area that will accommodate the future increase in built-up area. This implies forcing the Palestinian urban development using areas classified sensitive and entirely not suitable for built-up land use. As a result, this situation is expected to cause a decline in valuable agricultural areas and fertile land within Governorates adding impact on environmental sustainability, ecosystems and water resources. It is worth mentioning that an amount of 985112 dunums of the modeled suitable area for Palestinian urban development is located in area C (under Israeli control) where building restrictions are imposed by Israelis requiring Palestinian to acquire building permits which are extremely difficult to be issued and obtained by Palestinians.

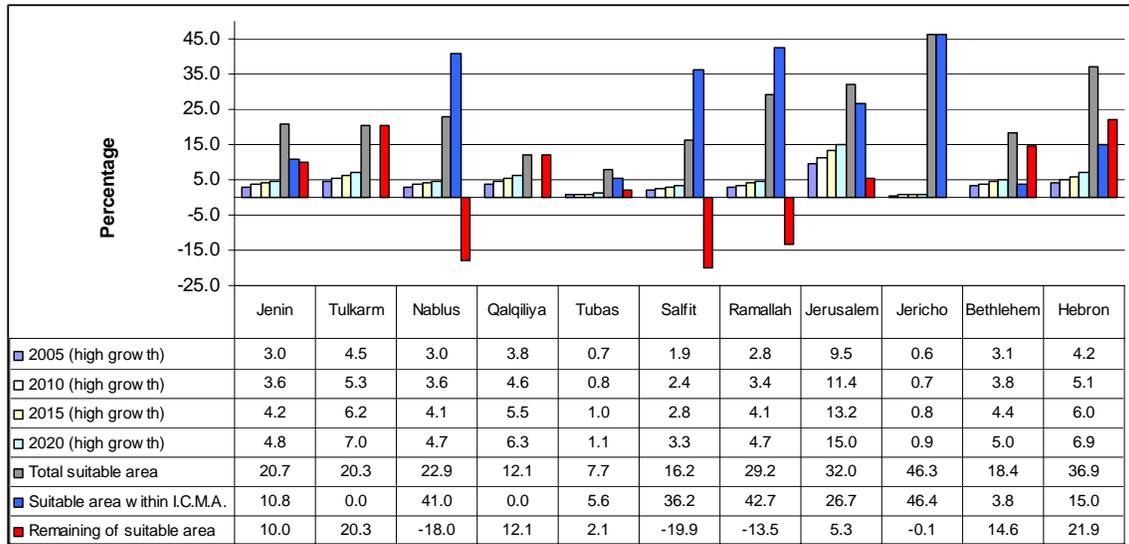


Figure 5-14: Percentage of built-up area of high growth scenario vs. percentage of suitable area for urban development remained under current situation by Governorate

The results suggest that Jenin, Tulkarm, Qalqiliya, Tubas, Bethlehem and Hebron Governorates are less sensitive to the availability of future land for urban development, in comparison with Nablus, Salfit, Ramallah, Jerusalem and Jericho Governorates. But in order for future cities to grow up on land that is suitable for development, and so that the amount of land consumed is minimized, urban planners should start to develop new strategies that will optimize the amount of developed land in an attempt to preserve the sustainability of natural resources and open space.

This was in relation to the net built up area without taking into consideration the green networks, parks, transportation networks, etc, that is needed for viable communities. It is important to emphasize that issues of where and how to build in addition to the lifestyle of the people affects the sustainability and well being of the West Bank areas as a whole.

This model, therefore, highlights the impact of the Israeli presence on restricting the areas suitable for Palestinian urban expansion. Under the pressure of high population growth the area available for urbanization is decreasing every year. Thus, the increase in the area of land that is suitable for urbanization projected in this model scenario offers considerable potential for Palestinian expansion in order to accommodate future population growth.

Nevertheless, future urban planning should not utilize the total amount of the projected suitable land for urbanization but should consider longer term sustainability, and how urban development can be achieved that will cope with rapid population growth over longer time periods.

The models and maps produced to study the suitability for Palestinian urban development provide a good opportunity to reevaluate and assess Palestinian urban land use growth in relation to the existing locality master plans, providing the possibility of sketching new

master plans that will accommodate future urban expansion. In addition, the generated models have the power to depict the areas with high potential for urban development taking into account environmental and natural resources restrictions. Annex 3 presents the generated suitability maps for urban development by Governorate under peace and current situation scenarios. These maps should be considered as a powerful planning tool used by decision makers and urban specialists for future Palestinian urban development in the West Bank.

5.5 Conclusion

It is unlikely that the dramatic urban expansion witnessed over the past decade will decline in the near future, since the population growth estimates indicate a large population increase in the future, which will in turn increase the pressure on land needs for future urban development. Urban development is highly correlated to population growth. The results indicate that urban development will be high under any of the projected population growth scenarios - high, medium or low. In the next 15 years it is estimated that urban development could increase from covering 2.6% of the West Bank in year 2000 to covering 4.8%, 5.2% and 5% under the low, high and medium growth scenarios respectively.

High population growth rates are likely to lead to the creation of new urban centers with most of the functional activities. This phenomenon can already be perceived in large localities and the new declared municipalities. This implies that large cities such as the Governorates' main cities are the most likely to expand at the city skirts. On the other hand, the villages around the main cities are also transforming into smaller urban centers, since they are growing rapidly and started to form agglomerations of Palestinian localities which contain the basic urban services and facilities.

The outcome of the suitability model for urban expansion shows the most appropriate patterns of geographical extension of Palestinian localities for future development. The results also indicate that the Israeli existence has a big impact on restricting the land available for development. This implies that Palestinians have little choice but to keep building inside Area A, building on water sensitive areas and exploiting agricultural land. From an urban planning point of view, doing so will contradict any proper urban planning schemes and violate the standards of urban development at the expense of valuable land.

The large scale development and the projected expansion of built-up areas for the years 2005, 2010, 2015 and 2020, as forecasted in sections 5.2 and 5.3, indicates a serious threat to the natural resources. Therefore, careful planning for urban and rural expansion is needed to regulate these developments and to minimize damage to the environment.

Conclusions and Recommendations

6.1 Conclusions

The analysis showed that over the past thirteen years urban expansion in the West Bank Governorates has been significant. There are two different types of urban areas in the West Bank reflecting conflicting politics and expanding without coexisting. The Palestinian urbanization is characterized by a high natural urban growth, unplanned urban structures and a lack of control, partly due to the occupation. The Israeli urbanization in the West Bank was characterized by an artificial urban growth, which was part of the Israeli colonizing policy in the Occupied Palestinian Territories.

The research findings indicated that there have been two periods of urban development, before and after the establishment of the PNA. As the analysis on both regional and local level showed, the period followed by the peace process was characterized by a boost in the rate of urban growth. The population growth in correlation with the development of urban areas showed that the built-up density decelerated in many places after the establishment of the PNA due to the fact the Palestinians started to develop their own areas which were neglected since the occupation in 1967. On the other hand, the economic situation became better during the peace process, which encouraged both private and public investments.

The research findings also indicate that there is a difference in urban trends in area A, B and C. The political situation has played a great role in forcing the Palestinian built-up area expansion in areas (A) where Palestinians have full control over the land resulting in consuming most of the available land and open spaces.

The analysis also showed that the Israeli colonies established in the West Bank lands continued to expand with a significant increase till year 2003, reflecting the Israeli Government's policies of building new colonies in form of clusters leading to confiscating more Palestinian lands even during the peace process. The Israeli colony area in the West Bank has increased from 77608 dunums to 183360 dunums by an increase of 136% between 1989 and 2003. The percentage of change for Israeli Colonies total area was highest in Jenin (226%) and Nablus (228 %) governorates. The satellite image analysis on regional and local level showed that Israeli colony expansion occurred on the expense of the available Palestinian fertile and valuable agricultural areas in the West Bank. Also most of the loss in forest areas occurred due to the continuous Israeli land confiscation in order to build new colonies or expand existing ones, which affected negatively the ecosystem of the area.

Israeli colonization has been highly significant in different ways, even during the peace process. From the analysis on the local level, it is outstanding that even though some of the cases do not have Israeli colonies constructed near the villages, the citizens have been

directly subjected to land confiscation, land razing and uprooting of trees and they lack freedom of movement due to closures and checkpoints. The impact of Israeli colonization on environment, physical and psychological health, education, household economic conditions and family relations is remarkable.

Land confiscation together with building prohibition in addition to many other obstacles and control measures from the Israeli Authorities, such as house demolitions, land bulldozing and the uprooting of trees, have impaired and hindered a sound and a planned Palestinian urban development and expansion of the Palestinian communities. The Israeli colonies and bypass roads or the Segregation Wall strangled many Palestinian cities, towns and villages. Most of the areas designated for future growth or expansion, were confiscated for the construction or expansion of those Israeli colonies or for other activities as mentioned above. Many areas that are suitable or necessary for the urban functions and services were also confiscated and bulldozed by the Israeli authorities. Therefore, land confiscation and bulldozing negatively impacted the Palestinian urbanization process and still continues to have negative implications on the Palestinian communities living in the West Bank and hinder any possibility for its sustainable urban development.

Furthermore, Israeli control over large parts of the Occupied Territories (Area C, and in certain matters, Area B) has limited integrated planning throughout the region. This colonization is continuing to utilize huge parts of the Palestinian open space and natural resources, without taking into consideration the effects of such actions on the Palestinian communities and the integrity of the Palestinian land. This is especially alarming with the construction of the Israeli segregation wall, which does not take into consideration the continuity and development of Palestinian communities.

Both the socioeconomic survey and the spatial analysis for the study areas showed that significant urban development has occurred in the Palestinian areas since the inception of the Palestinian Authority in 1994. In contrast, within the areas of Israeli occupation (primarily Area C) the Palestinians are being adversely affected by Israeli land confiscation and acquisition. Furthermore, within the Israeli controlled zones official Palestinian development is greatly restricted by the need to obtain building permits from the Israeli authorities. The piecemeal nature of control of the West Bank greatly hampers the development of a sound and coherent urban development policy. It is clear that obtaining a fair peace settlement - in which Palestinian authority is extended over the whole territory - will have a positive impact on the socioeconomic and physical conditions in urban areas, and their peripheral zones, of the West Bank.

The suitability maps (presented in chapter five) indicated that most of the Israeli colonization activities have been established on areas with low suitability for urban development. Therefore, the unstable political situation and the Israeli violations are decreasing development future chances and have negative influence on Palestinian urban development.

The Palestinian built-up area in the West Bank has increased from 62180 to 145005 by an increase of 133% between 1989 and 2000. The percentage of change for Palestinian net built-up area was the highest in Ramallah (212%) and Salfit (217%) governorates. The satellite image analysis showed that part of the urban expansion in the West Bank has been outside exciting master plan boundaries and on the cost of valuable agricultural land.

The socio-economic survey showed that 89.4% of the West Bank population believed that the urban expansion has increased in their communities after 1993. Investment in housing contributed to some extent in decreasing the shortage in housing in the West Bank. The majority of the citizens questioned from the West Bank revealed that the available public services in their area did not harmonize with urbanization and population increase. The analysis showed that 89% of the people interviewed stated that public transportation was sufficient between the years 1993 and 2000. But the percentage dropped to less than 20% after the year 2000 as a result of political instability and Israeli closures.

The perception of community leaders and households interviewed noted that the area of agricultural land has decreased, and the environment has been affected by urbanization and that large areas of cultivated land have been swallowed up by urban development in the last thirteen years. This indicates that the rise in Palestinian public awareness and concern regarding the impact which urban development has had on the natural resources in the West Bank has been significant.

It is unlikely that the dramatic urban expansion witnessed over the past decade will decline in the near future, since the population growth estimates indicate a large population increase in the future, which will in turn increase the pressure on land use. The results indicated that urban development will be high under any of the projected population growth scenarios - high, medium or low. It is estimated that net built-up area development could increase from covering 2.5% of the West Bank in year 2000 to covering 4.8% in year 2020. It is evident that urban development has not been an organized process in the Palestinian Territories and therefore is likely to consume a high portion of scarce natural resources if it continues to grow uncontrolled at the same pace. The results also indicate that the Israeli activities have a big impact on restricting the land available for development. This implies that Palestinians have little choice but to keep building inside Area A, building on water sensitive areas and exploiting agricultural land. The projected expansion of built-up areas for the year 2020 indicates a serious threat to natural resources. Therefore, careful planning for urban and rural expansion is needed to regulate these developments and to minimize damage to the ecosystem.

For modeling future urban development in West Bank and locate those areas that are most suitable for urban expansion, suitability maps were prepared for two scenarios. Under current situation scenario, the analysis showed that the total area in the West Bank suitable for urban development equals 1915 km². However, about 20% of the projected suitable sites are already utilized by the current urban land use, as a result the area available for future urbanization is around 1560 km². Under peace scenario, the analysis

showed that the total area suitable for urban development in the West Bank equals 2460 km² adding more land for expansion of 900 km².

Although the projected suitable area for urban development can meet the demand of urban growth and land needs driven by the different three population and built-up area scenarios till 2020, most of this calculated area is inaccessible by Palestinians and fully under Israeli control. This model, therefore, highlighted the impact of the Israeli presence on restricting the areas suitable for Palestinian urban expansion. Under the pressure of high population growth the area available for urbanization is decreasing every year. Thus, the increase in the area of land that is suitable for urbanization projected in the model scenario offers considerable potential for Palestinian expansion in order to accommodate future population growth.

6.2 Recommendations

In the future, it is very important to understand the nature and functional relationships between the built-up areas needed and the amount of land available, so as to introduce sound urban planning that will pinpoint the potential areas for development. Sustainable urban development will not be attained unless efficient urban planning is imposed to reduce the conflict of urban development with environment and natural resources.

Given the fact that Palestinians are gaining more control over their own urban peripheries, further residential and commercial land use development is likely even to accelerate. The question then must be asked, how can this development be channeled and shaped to optimize the amount of open space, nature reserves and fertile land for agriculture to preserve as much as possible but meet the demand for urban development? In the Palestinian context, most cities still retain the monocentric urban form, where business is agglomerated in the central core. However, due to the rapid growth in population, many of the satellite villages are growing to form cities with sufficient functionalities. As a result of the lack of urban planning, the conversion of farmland to residential housing has accelerated lately, spurring sprawl to continue in these territories. In this context, planners must decide whether they want to encourage even greater centralization (known as compact cities) or to promote polycentric development patterns (known as multinucleation cities).

The first strategy would require decision makers to promote intensified development in the core of the cities and inner suburbs, through the construction of high rise buildings that could accommodate the growing population densities that are forecast for the future. Nevertheless, such a strategy would not be appropriate for all the Palestinian cities, particularly those where open space is very limited in the core, such as in Bethlehem. Therefore, strategic planning should first be tested via the proper Planning Information Technology (PIT) tools, which could inform the selection of the best solution given a number of alternative scenarios. Moreover, future planning should not only address the problem of available land but also should investigate the social implication of these plans and strategies on the local inhabitants. The second strategy of polycentric urban forms

would create new nodes of commercial and residential development outside of the traditional core, leading to new independent urban centers in the future.

Above all, more awareness of land use issues needs to be built at both the municipal and the national levels before land use planning can become an effective development tool. Urban planning concepts and up to date planning tools and technologies should become the dominant player in shaping the future urban development. This will allow the Palestinians to increase the efficiency in land use management and prepare to tackle the complex problem of land development.

Lack of management will cause many problems in the future. Therefore, more focus on the urban planning and management is needed to accommodate the expected future growth. These following recommendations aim at maximizing the benefits for Palestinian communities, whilst minimizing the negative impacts of urban on Palestinian natural:

1. Designate land for future urban development, for at least ten years in advance, through well-designed master plans.
2. Focus more on the issue of unplanned urban development and try to develop future plans to accommodate the natural growth of the Palestinian population.
3. Highly significant cultivated lands have to be protected and conserved. Therefore, specify areas of green cover and open space and green belts in which urban growth will not be permitted in order to reduce the negative impact of urbanization on the designated nature reserve areas.
4. The issuing of new permits should be regulated, so as to avoid new construction on water sensitive areas, which could interfere with the quality and quantity of the water resources. The community leaders stressed their worries regarding the future sustainability of water usage in urban areas.
5. Any development of large-scale projects, such as housing projects, should not be implemented ahead of an Environmental Impact Assessment (EIA). Such assessments should fully take into account the potential side effects of urban development.
6. Investigate thoroughly the issue of urban development and future strategic planning through further research in order to develop sound and effective future urban plans and land use management schemes.
7. There is a need to develop procedures, rules and regulations and plans to guide future urban development at the regional, district and local levels.
8. The issuing of new permits should be regulated, so as to avoid new construction on environmental sensitive areas.

9. Consider meeting the needs of Palestinian people through an efficient delivery of both physical and social infrastructure facilities and services. Therefore, preserve enough space to construct and establish functional activities and social infrastructure facilities such as schools, universities, and hospitals.
10. The related Palestinian authorities and ministries should encourage and develop financing and banking systems that give loans for urban development and on suitable areas
11. Encourage the developers and housing cooperatives to build in a more compacted way in order to optimize the land used for urban development.
12. The planning and construction codes should encourage the urban development only on areas suitable for urban expansion.
13. Reevaluate the municipality regulations in issuing building permits in a way that allow more urban compaction (such as the set Backs) in order to reserve space.
14. Develop environmental urban indicators for future development at National regional and local levels.
15. Investigate thoroughly the issue of urban development and future urban planning through further research. More emphasis should be put to develop research on urban development issues. Therefore, the creation of urban development and research institutions and organizations should be encouraged.
16. There is a need to develop a national urban observatory network

Annexes

Annex 1: CORINE Nomenclature

LEVEL 1	LEVEL 2	LEVEL 3
1. Artificial surfaces	1.1 Urban fabric	1.1.1 Continuous urban fabric
		1.1.2 Discontinuous urban fabric
	1.2 Industrial, commercial and transport unit	1.2.1 Industrial or commercial units
		1.2.2 Road and rail networks and associated land
		1.2.3 Port areas
		1.2.4 Airports
	1.3 Mine, dump and construction sites	1.3.1 Mineral extraction sites
		1.3.2 Dump sites
		1.3.3 Construction sites
	1.4 Artificial non-agricultural vegetated areas	1.4.1 Green urban areas
1.4.2 Sport and leisure facilities		
2. Agricultural areas	2.1 Arable land	2.1.1 Non-irrigated arable land
		2.1.2 Permanently irrigated land
		2.1.3 Rice fields
	2.2 Permanent crops	2.2.1 Vineyards
		2.2.2 Fruit trees and berry plantations
		2.2.3 Olive groves
	2.3 Pastures	2.3.1 Pastures
	2.4 Heterogeneous agricultural areas	2.4.1 Annual crops associated with permanent crops
		2.4.2 Complex cultivation patterns
		2.4.3 Land principally occupied by agriculture, with significant areas of natural vegetation (small shrubs + cultivation)
2.4.4 Agro-forestry areas		
3. Forests and semi-natural areas	3.1 Forests	3.1.1 Broad-leaved forest
		3.1.2 Coniferous forest
		3.1.3 Mixed forest
	3.2 Shrub and/or herbaceous vegetation associations	3.2.1 Natural grassland (open grassland + dwarf shrubs)
		3.2.2 Moors and heathland
		3.2.3 Sclerophyllous vegetation
		3.2.4 Transitional woodland shrub
	3.3 Open spaces with little or no vegetation	3.3.1 Beaches, dunes, and sand plains
		3.3.2 Bare rock
		3.3.3 Sparsely vegetated areas
3.3.4 Burnt areas		
3.3.5 Glaciers and perpetual snow		
4. Wetlands	4.1 Inland wetlands	4.1.1 Inland marshes
		4.1.2 Peatbogs
	4.2 Coastal wetlands	4.2.1 Salt marshes
		4.2.2 Salines
5. Water bodies	5.1 Inland waters	4.2.3 Intertidal flats
		5.1.1 Water courses
	5.2 Marine waters	5.1.2 Water bodies
		5.2.1 Coastal lagoons
		5.2.2 Estuaries
		5.2.3 Sea and ocean

Annex 2a: Questionnaire for community leaders

Socio-Economic Impact of Israeli Settlements and Palestinian Urbanization on Neighbouring Palestinian Communities

Questions for Community Leaders

The Effect of Israeli Settlements

1. a) District _____ b) City _____ c) Town _____ d) Village _____

2. Area: a) A ___ b) B ___ c) C ___ d) H1 ___ e) H2 ___

3. Which of the following positions do you hold?

a) Muhktar ___

b) Municipality president ___

c) Member of municipality ___

d) Secretary of Municipality ___

e) President of village council ___

f) Member of the village council ___

g) Secretary of village council ___

h) Community leader ___

i) Other (Please specify) _____

4. a) Male ___ b) Female ___

5. Approximately how many people live in this area?

6. What is the average income of the people that live in this area?

_____ (JD/month)

7. What was the total amount of land that your area consisted of before Oslo?

_____ (dunums)

8. What was the total amount of land that your area consisted of after Oslo?

9. Approximately how many people in your area have been affected by land confiscation due to Israeli settlements?

10. Approximately how many dunums of land has been confiscated from your area for settlements since Oslo?

_____ (dunums)

11. What is the approximate cost of one dunum of land in your area?

_____ (JD)

12. What was the land that was lost being used for?

a) Agriculture ___

b) Grazing ___

c) Forests ___

d) Other (Please specify) _____

13. Approximately how many houses have been demolished in your area by the Israelis?

a) Number ___ b) Date ___

14. Approximately how many trees have been uprooted in your area to create Israeli settlements?

15. What types of trees were uprooted in your area?

- a) Olive ____
- b) Grape ____
- c) Stone fruit ____
- d) Other (Please specify)_____

16. Approximately how many dunums of land have been taken since Oslo to create by-pass roads in your area?

_____ dunums

17. After individuals have lost their house/land, do you see any continuing harassment/pressure i.e. threats, beatings from the Israelis?

- a) Yes ____ b) No ____ (If no, please go to question # 18)

18. What kinds of harassment/pressure have you seen the Israelis impose on the Palestinians after the establishment of an Israeli settlement?

19. What types of sectors have been affected by the creation of Israeli settlements in your area?

- a) Industry ____
- b) Agriculture ____
- c) Livestock ____
- d) Forests ____
- e) Other ____

20. Approximately how much land in dunums has been reclaimed (because of Israeli redeployment) in your area since Oslo?

_____ dunums

The Effect of Palestinian Urbanization

21. Does this area have a development plan?

- a) Yes ____ b) No ____

22. If yes, has this plan increased, decreased or not changed urbanization in your area?

- a) Increased ____
- b) Decreased ____
- c) No change ____

23. Who finances the preparation of plans in your area?

- a) PECDAR ____
- b) European Union (E.U.) ____
- c) Local community ____
- d) Other (Please specify) ____

24. What kind of authority has been present in this area since Oslo?

- a) Palestinian Authority ____
- b) Israeli Authority ____
- c) Both ____
- d) Other (Please specify)_____

25. Do you feel that urbanization activities in your area have increased, decreased or stayed the same since Oslo?

- a) Increased ___ (Please go to question # 26)
- b) Decreased ___
- c) Same ___
- d) Don't know ___

26. Why do you think that Palestinian urbanization has increased?

- a) Returnees ___
- b) Greater income among Palestinians ___
- c) Less involvement from the Israelis ___
- d) Other (Please specify) _____

27. How has the construction of housing been affected by urbanization in your area?

- a) Use better materials ___
- b) Columns ___
- c) Horizontal ___
- d) Build bigger houses ___
- e) Build smaller houses ___
- f) Other (Please specify) _____

28. Approximately how many people apply for a building permit each year?

29. Approximately how many building permits do you give out each year?

30. Approximately how many people build without a building permit in your area?

31. Has urbanization made services (i.e. license process) for people in this area more available, less available or kept them the same since Oslo?

- a) More available ___
- b) Same ___
- c) Less available ___
- d) Don't know ___

32. What facilities do you think that the area needs now that urbanization has increased?

- a) Medical facility ___
- b) Sewage network ___
- c) Community centre ___
- d) Schools ___
- e) Renewed water system ___
- f) Other (Please specify) _____

33. Do you feel that the environment in your area has been affected by urbanization since Oslo?

- a) Yes ___ b) No ___ (If no, please go to question #36)

34. What aspects of the environment have been affected by urbanization in this area since Oslo? (Check as many as apply)

- a) Water ___
- b) Soil ___
- c) Plants ___
- d) Air ___
- e) Other (Please specify) _____

35. How have these areas been affected?

36. Has the supply of water in your area increased, decreased or stayed the same because of urbanization?

- a) Increased ____
- b) Same ____
- c) Decreased ____
- d) Don't know ____

37. Is there less area for animals to graze in because of urbanization?

- a) Yes ____ b) No ____

38. How do you see the future of development in this area?

- a) Better ____
- b) Worse ____
- c) No change ____
- d) Other (Please specify) _____

39. Do you have anything to add?

Thank you for your time and cooperation.

Annex 3b: Questionnaire for household survey

Socio-Economic Impact of Israeli Settlements on Neighboring Palestinian Communities Household Survey

What we want to do:

Assess the impacts of rapid urbanization in the West Bank on the availability of land and water resources and their likely implications on the Palestinian economy and communities.

The Social Question:

What effect have urban expansion trends in the West Bank had on Palestinian households and communities in the area?

Date: _____

Location (for interviewer)

District: _____

City: _____

Town: _____

Village: _____

N: _____

E: _____

Background

A. These first few questions deal with location and where you are originally from within Palestine.

1. What District are you originally from?

a) Bethlehem ___ b) Hebron ___ c) Other ___

2. What town are you originally from?

3. What village are you originally from?

4. Why did you leave your original district, town or village? (migration)

a) Israeli occupation ___

b) Economic reasons ___

c) Other (Please specify) _____

Personal

B. We would now like to ask you a few general questions about yourself and your family.

5. Sex:

a) Male ___ b) Female ___

17. Approximately how much money was your demolished house worth? (loss of access/income, effect on life conditions)

_____ (JD)

18. Approximately how many houses were demolished in your area?

Economic

Land Confiscation

E. Over 50 000 dunums of Palestinian land in the West Bank was confiscated between the years 1992 and 1995 to create Israeli settlements. The next few questions address the issue of land confiscation in Palestinian communities.

19. Have you experienced any land confiscation because of Israeli settlements? (loss of land)

a) Yes ___ b) No ___ (If no, please go to question #26)

20. What type of land was confiscated from you? (loss of land)

- a) Agricultural ___
- b) Grazing ___
- c) Bare/rock ___
- d) Other (Please specify) ___

21. What reason was given for the confiscation of your land? (loss of land)

- a) Security violation ___
- b) Absentee landlord ___
- c) Land was designated a nature reserve ___
- d) Settlement expansion ___
- e) To create a by-pass road ___
- f) Other (Please specify) _____

22. Was the land that you lost “common land” or privately owned? (loss of land)

a) Common land ___ b) Privately ___

23. Approximately how much land (in dunums), did you lose? (loss of land)

_____ dunums

24. Approximately what was the price of the land that you lost?

_____ (NIS/dunum)

25. What type of settlement is built in your area?

- a) Agricultural ___
- b) Living ___
- c) Industrial ___
- d) Other (Please specify)___

Economic

Uprooting of Agriculture

F. Questions 26–29 ask about any crops or trees that have been uprooted due to Israeli settlements in the West Bank.

26. Has any of your agricultural land been uprooted because of Israeli settlements? (land loss, loss of agriculture)

a) Yes ___ b) No ___ (If no, please go to question # 29)

27. What type of agricultural crops (i.e. olives, grapes) did you have that were uprooted? (land loss)

- a) Olive ____
- b) Grape ____
- c) Stone fruit ____
- d) Other (Please specify) _____

28. How much monthly income have you lost from uprooted crops? (land loss, loss of income)

- a) 0 – 100 JD ____
- b) 101 – 200 JD ____
- c) 201 – 300 JD ____
- d) 301 – 400 JD ____
- e) 401 – 500 JD ____
- f) Over 500 JD ____

29. Approximately how many dunums of agricultural land has been lost to Israeli settlements in your area? (land loss)

_____ dunums

Economic

Building Permits

H. A 1995 UN report states that continuous confiscation of land is frustrating to those Palestinians who still own and want to build homes, but are denied building permits to build by Israel. The following questions address the issue of building permits.

30. Have you ever tried to get a building permit? (unplanned development)

- a) Yes ____ b) No ____ (If no, please go to # 38)

31. What was the outcome of your request?

- a) Obtained permit ____
- b) Denied permit ____

32. If you were denied, what reasons were given for not issuing you a building permit? (unplanned development)

- a) Green land ____
- b) Agricultural land ____
- c) Near by-pass road ____
- d) Near settlements ____
- e) Security zone ____
- f) Others (Please specify) _____

33. From where have you tried to get a building permit?

- a) Israelis ____ b) Palestinian Authority ____

34. Do you think that it is easier to get a building permit from the Israelis or the Palestinian Authority?

- a) Israelis ____ b) Palestinian Authority ____

35. Why?

36. How much did your building permit cost? (unplanned development)

_____ (dollars)

37. How long did it take you to get a building permit? (unplanned development)
_____ (days, week, months, years)

Social/Economic

Family

G. The following questions examine how Palestinian families have been affected by Israeli settlements in their area.

38. Has the loss of your confiscated land affected your family? (effect on life conditions)

a) Yes ___ b) No ___ (If no, please go to question # 41)

39. How has the confiscation of your land affected your family? (Check as many as apply) (effect on life conditions)

a) Academically (i.e. had to change/leave school) ___

b) Physically (i.e. became ill) ___

c) Socially (i.e. lost friends) ___

d) Other (Please specify) _____

40. With the development of Israeli settlements in your area, how do you see the future of the lives of your family here? (effect on life conditions)

41. Where did you live after you lost your house/land? (loss of land, migration)

a) Lived with a friend ___

b) Lived with relatives ___

c) Lived in a tent ___

d) Built a new house in another area ___

e) Other (Please specify) _____

42. Approximately how much money were you making per month before your house/land was lost or uprooted? (loss of land, loss of income)

a) 0 – 100 JD ___

b) 101 – 200 JD ___

c) 201 – 300 JD ___

d) 301 – 400 JD ___

e) 401 – 500 JD ___

f) Over 500 JD ___

43. Approximately how much money are you currently making per month? (loss of land, loss of income)

- a) 0 – 100 JD ____
- b) 101 – 200 JD ____
- c) 201 – 300 JD ____
- d) 301 – 400 JD ____
- e) 401 – 500 JD ____
- f) f) Over 500 JD ____

44. Did you have to change occupations because your house/land was lost or uprooted? (loss of land, change in occupation)

- a) Yes ____ b) No ____

45. What was your occupation before your house/land was lost or uprooted? (change in occupation)

46. Do you currently rent or own a home? (effect on life conditions)

- a) Rent ____
- b) Own ____
- c) Other (Please specify) _____

47. After your house/land were lost or uprooted, were you offered assistance from any agencies? (effect on life conditions)

- a) Yes ____ b) No ____ (If no, please go to question # 50)

48. What type of assistance did you receive? (effect on life conditions)

- a) Financial ____
- b) Social ____
- c) Other (Please specify) _____

49. What types of agencies offered you assistance? (effect on life conditions)

- a) Local (i.e. Land Defense Committee) ____
- b) National ____
- c) International (i.e. United Nations) ____
- d) Other (Please specify) _____

50. Did you appeal the loss/uprooting of your house/land (to the courts etc...)? (loss of land, effect on life conditions)

- a) Yes ____ b) No ____ (If no, please go to question # 52)

51. What was the outcome of your appeal? (effect on life conditions)

- a) Won ____ b) Lost ____ c) Still in progress ____

Environment

Environment

I. One of the many areas that might be affected by Israeli settlements is the environment. Questions 52-57 examine how those individuals living in Palestinian communities are dealing with the environment in the face of Israeli colonization.

52. Do you worry about the environment in your area because of Israeli settlements? (pollution)

a) Yes ___ b) No ___

53. What aspects of the environment have been affected by Israeli settlements in your area? (Check as many as apply) (loss of natural resources, disturbing natural habitats)

a) Water ___

b) Soil ___

c) Plants ___

d) Air ___

e) Other (Please specify) _____

54. How do you try to prevent pollution that comes from Israeli settlements? (pollution)

55. Has the supply of water in your area increased, decreased or stayed the same since Israeli settlements were created in your area? (loss of natural resources)

a) Increased ___

b) Same ___

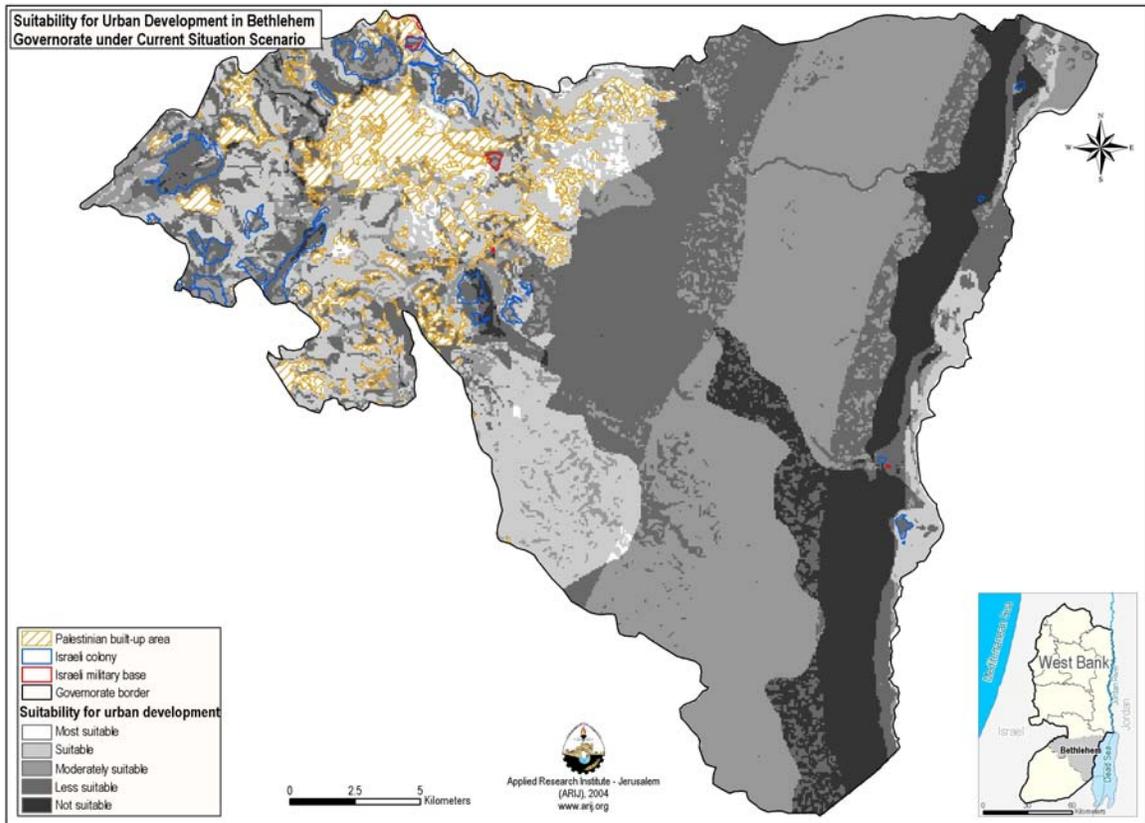
c) Decreased ___

d) Don't know ___

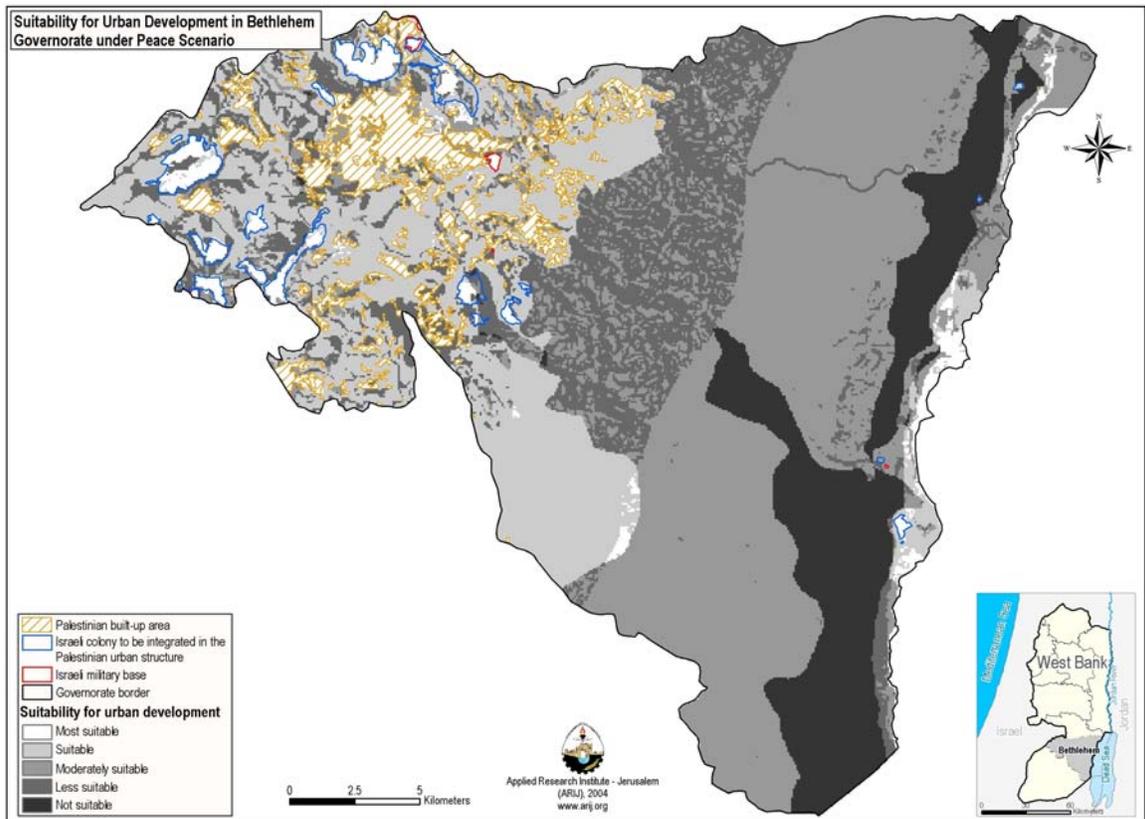
56. Do you have anything to add?

Thank you for your time and cooperation.

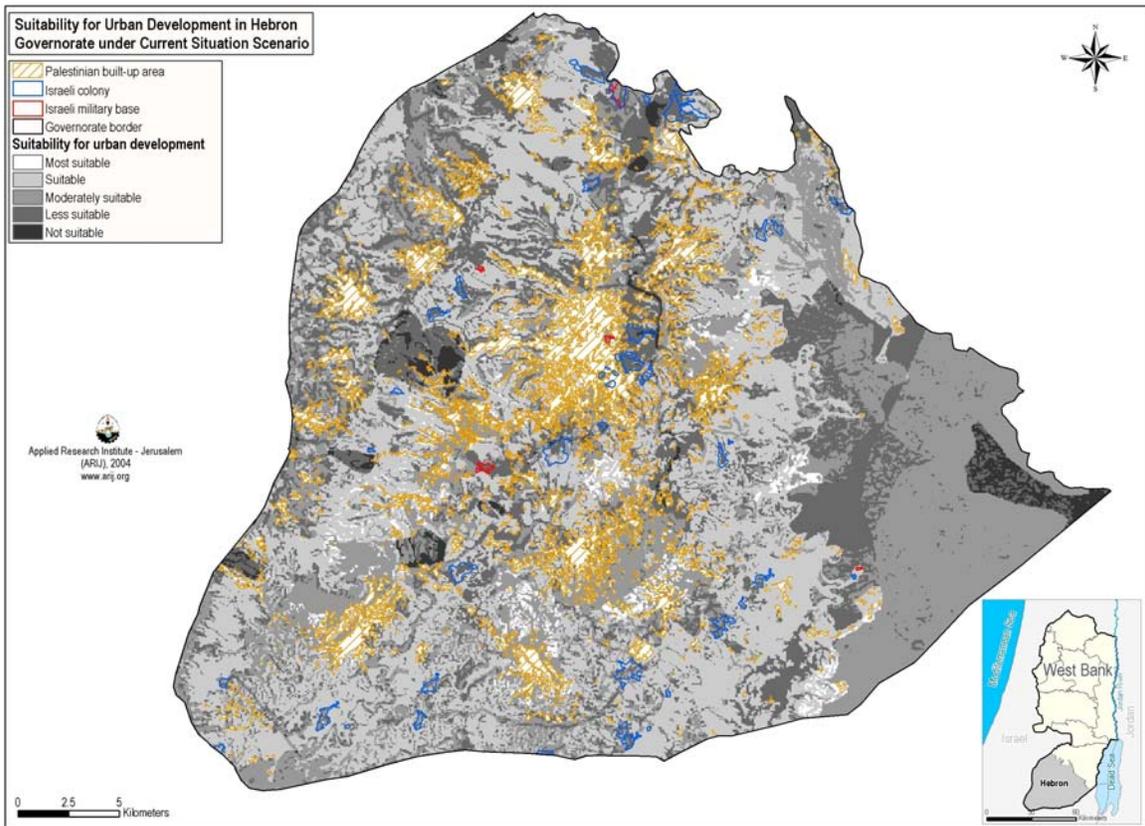
Annex 3: Suitability maps of potential areas for urban development by Governorate



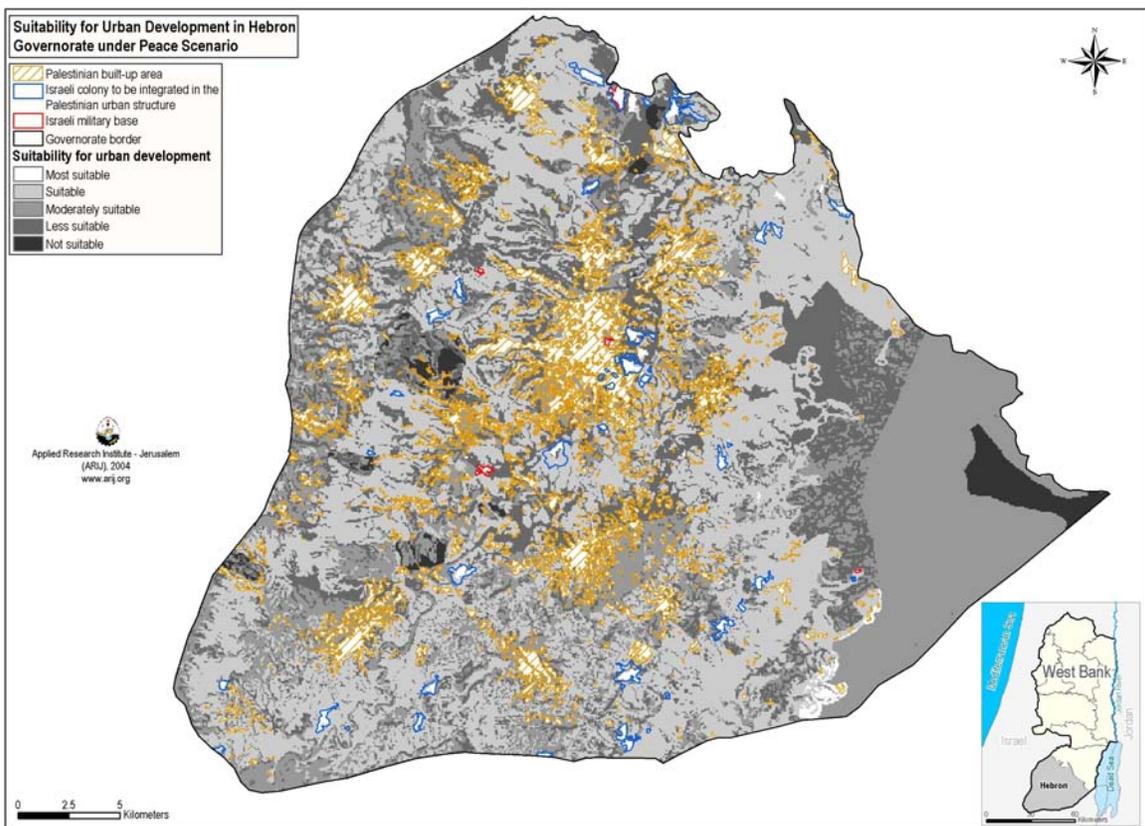
Map 1: Suitability for urban development in Bethlehem Governorate under current situation scenario



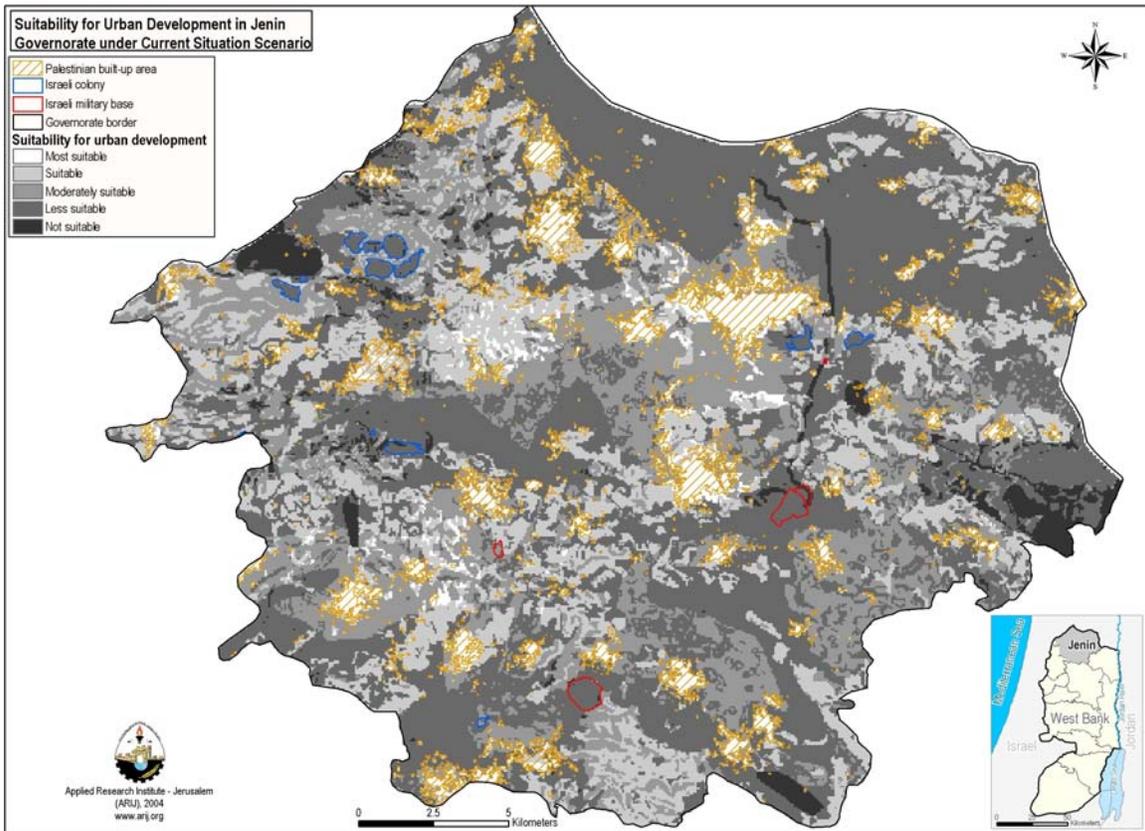
Map 2: Suitability for urban development in Bethlehem Governorate under peace scenario



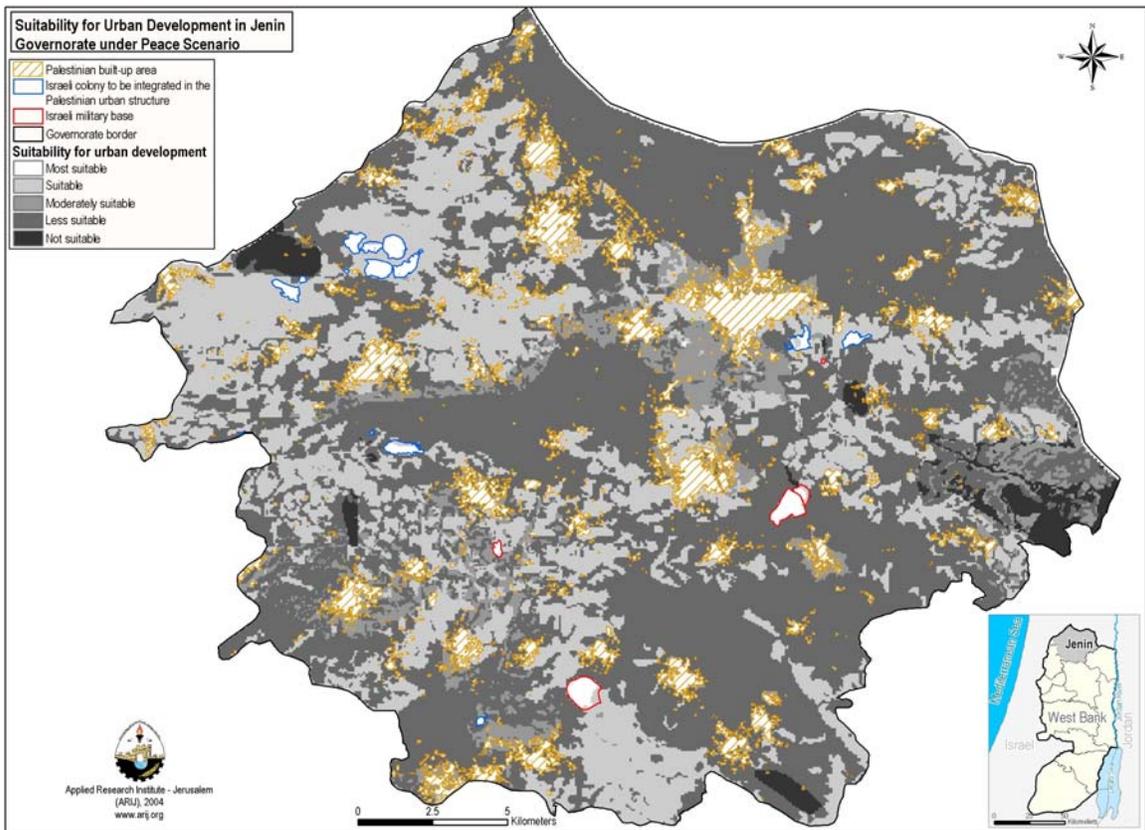
Map 3: Suitability for urban development in Hebron Governorate under current situation scenario



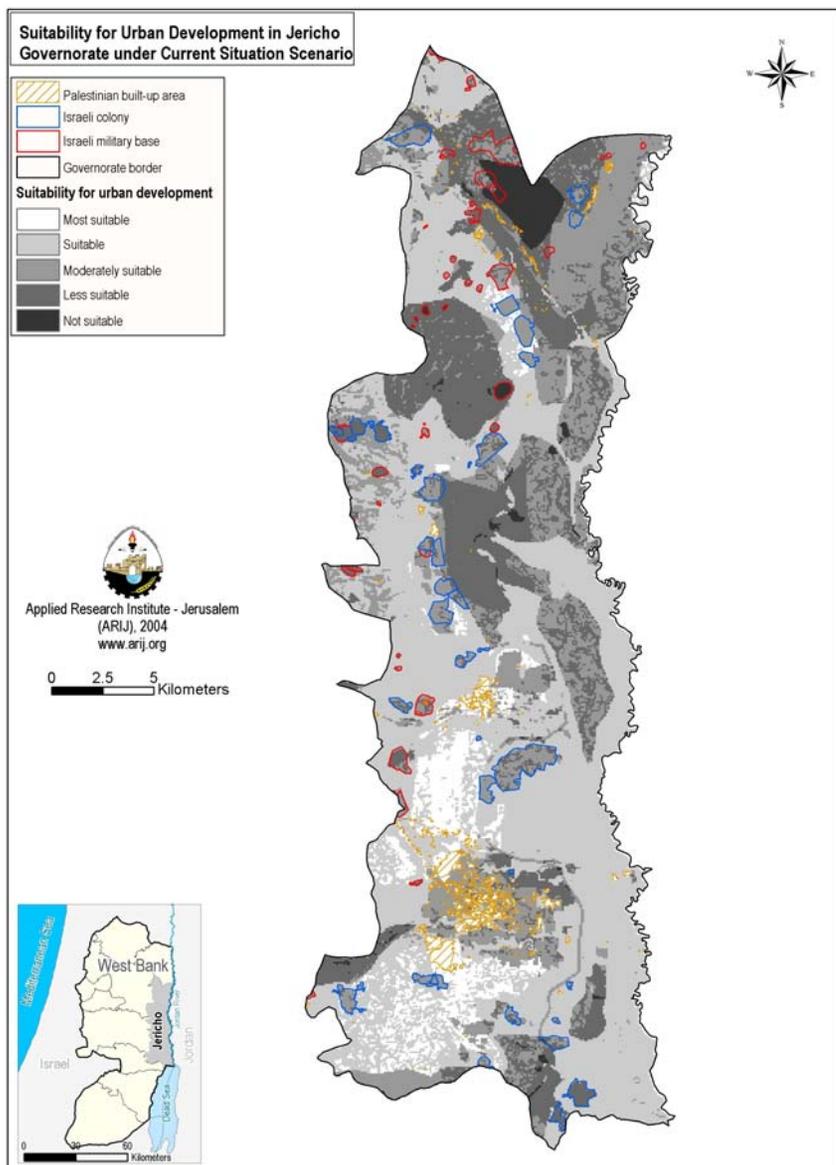
Map 4: Suitability for urban development in Hebron Governorate under peace scenario



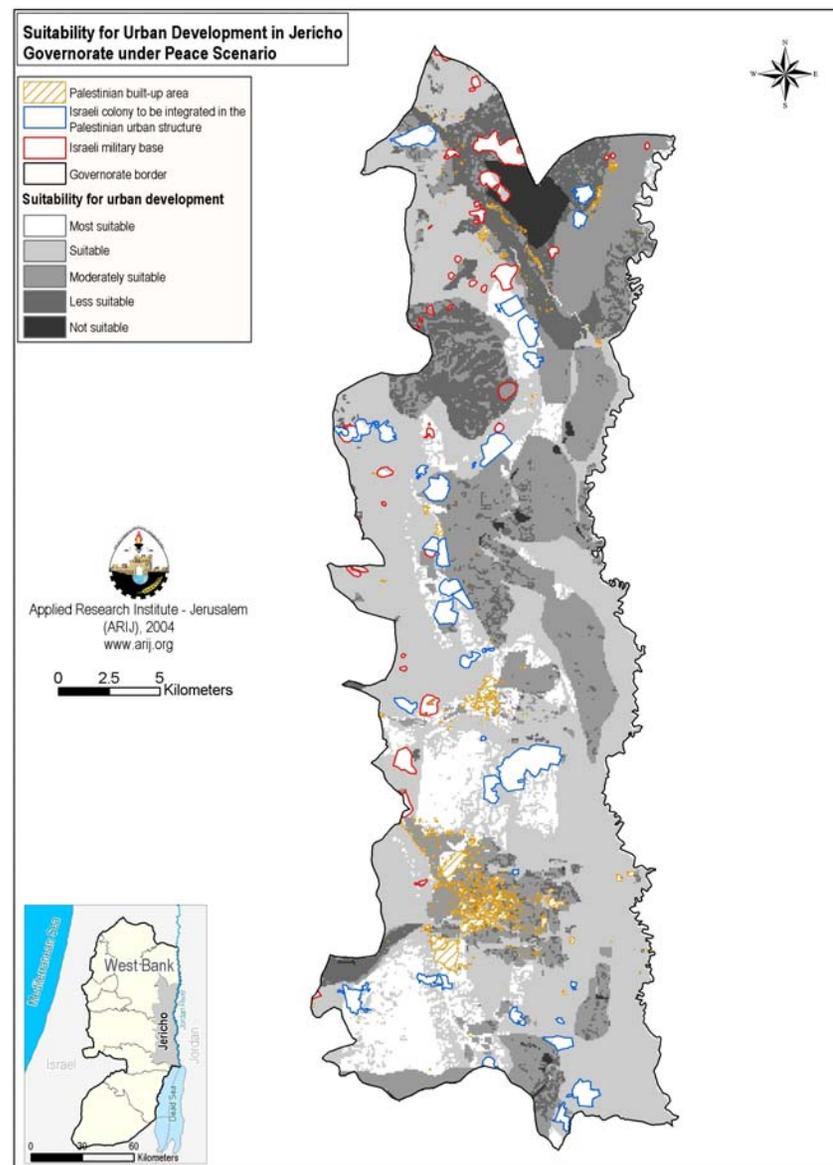
Map 5: Suitability for urban development in Jenin Governorate under current situation scenario



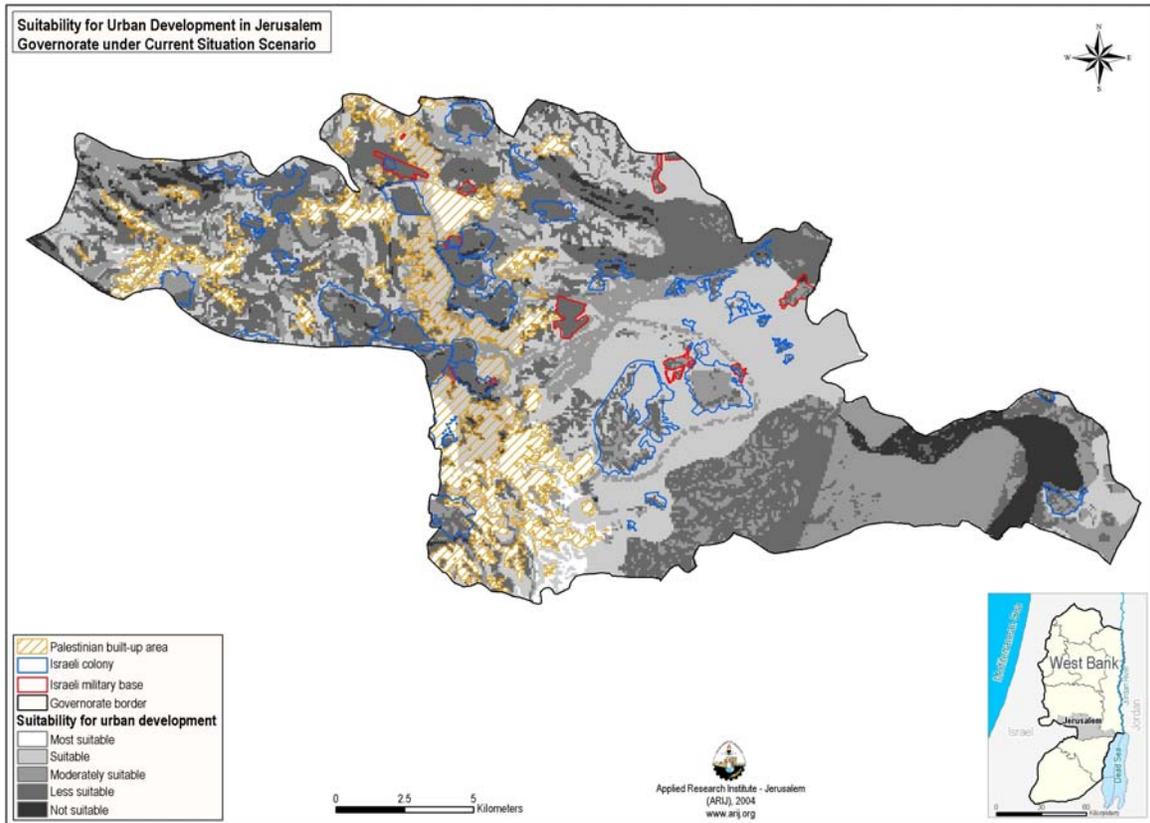
Map 6: Suitability for urban development in Jenin Governorate under peace scenario



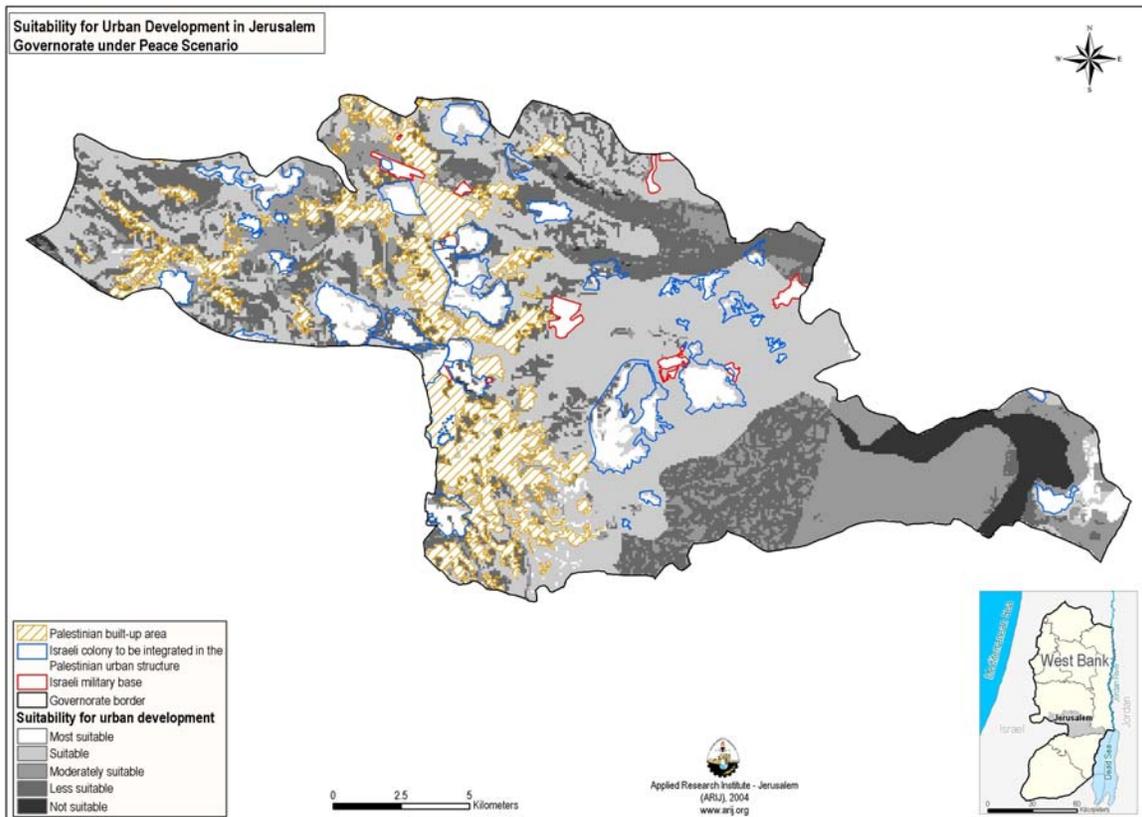
Map 7: Suitability for urban development in Jericho Governorate under current situation scenario



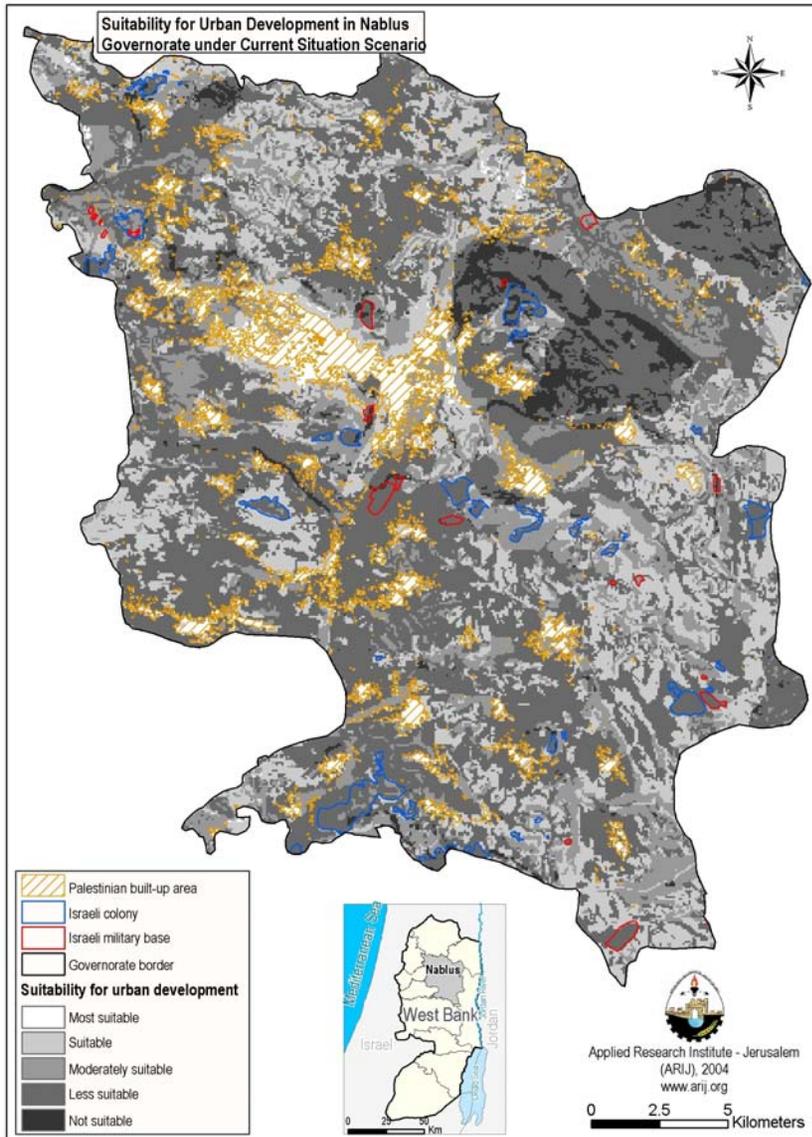
Map 8: Suitability for urban development in Jericho Governorate under peace scenario



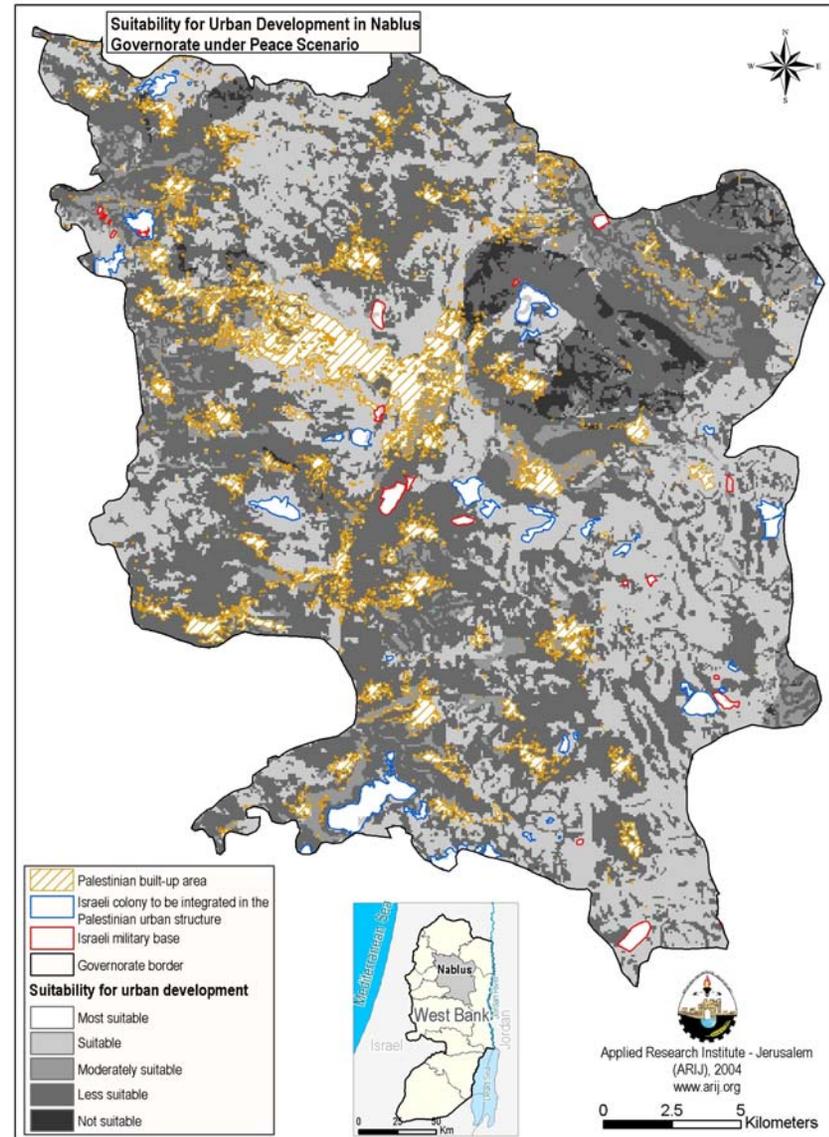
Map 9: Suitability for urban development in Jerusalem Governorate under current situation scenario



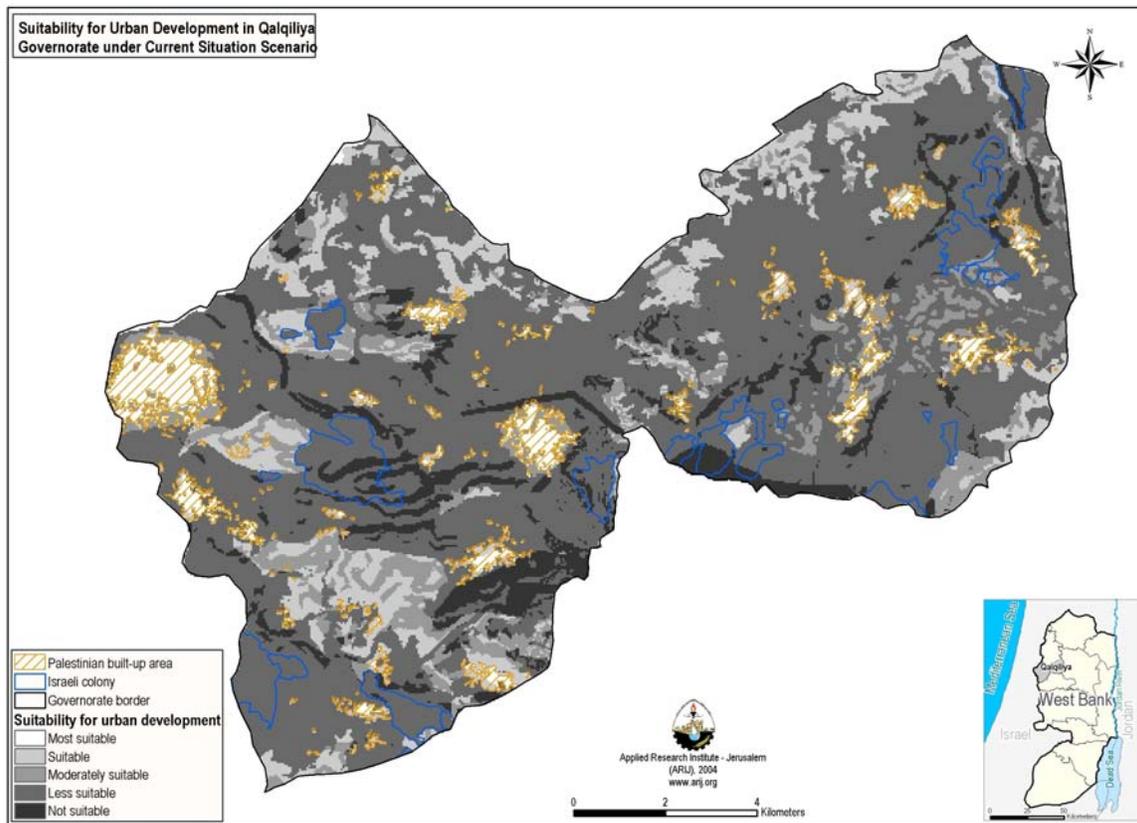
Map 10: Suitability for urban development in Jerusalem Governorate under peace scenario



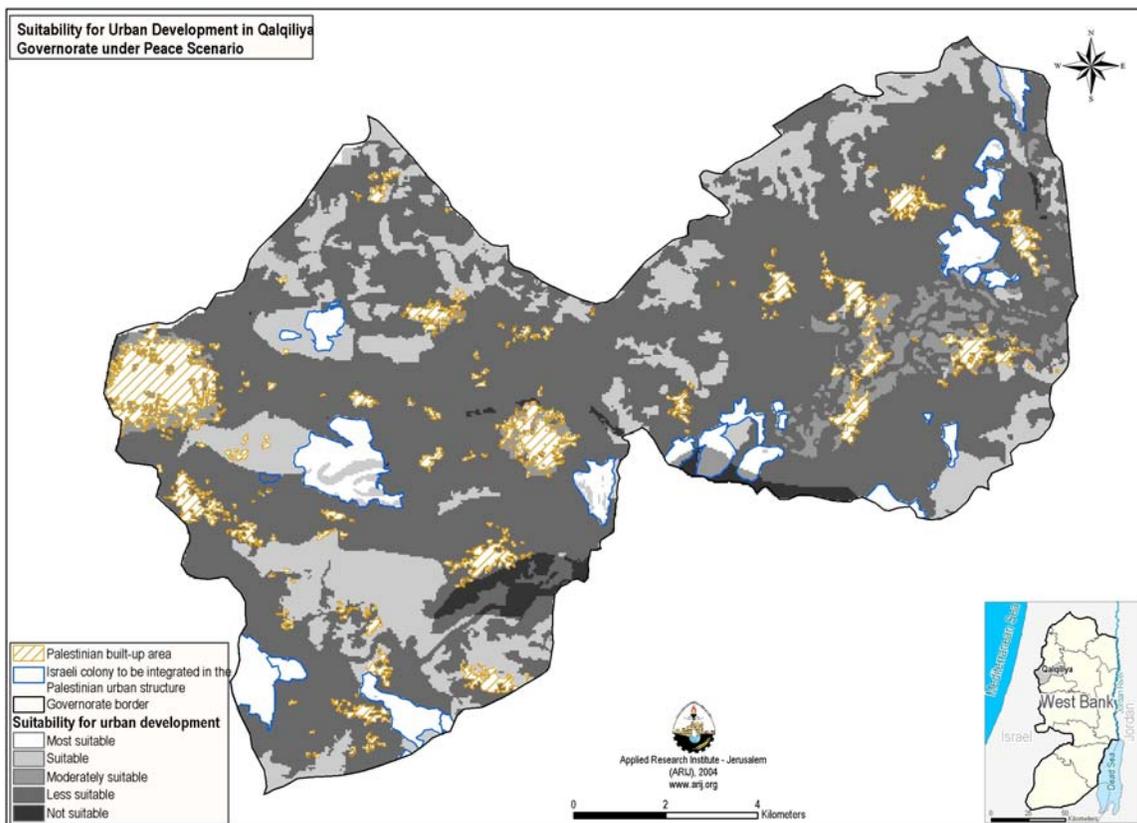
Map 11: Suitability for urban development in Nablus Governorate under current situation scenario



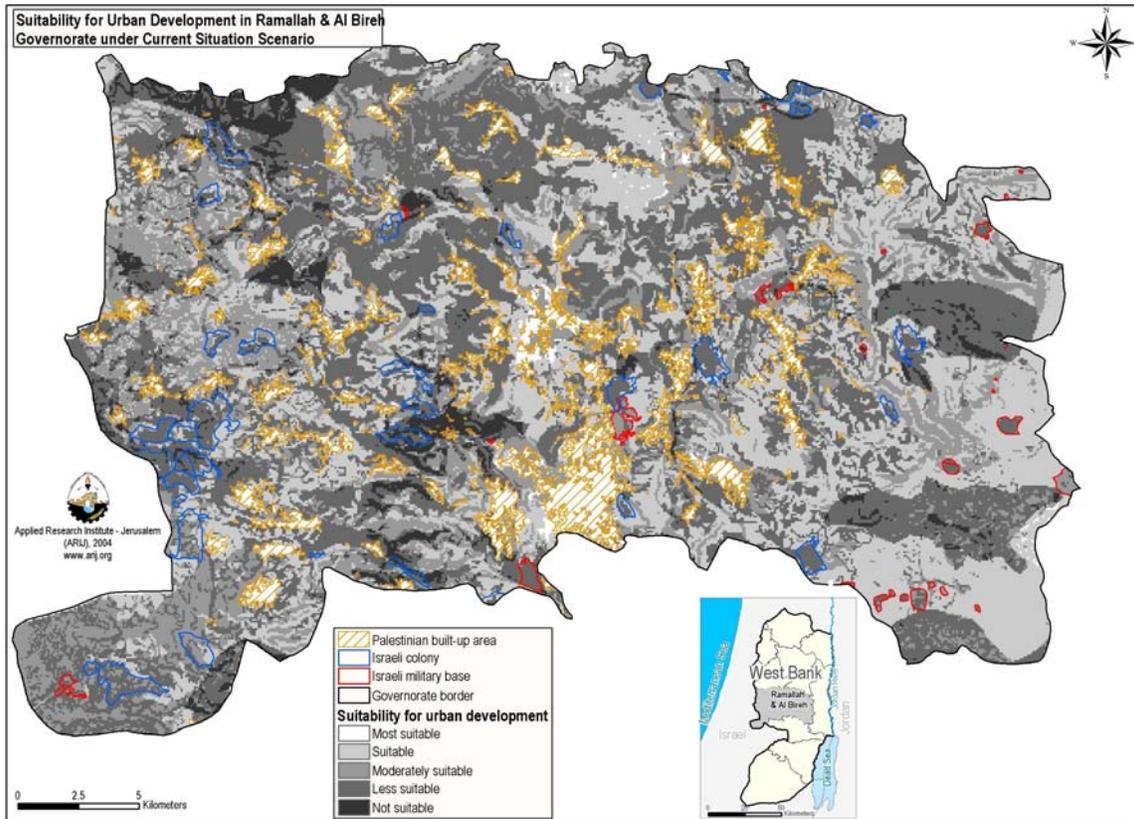
Map 12: Suitability for urban development in Nablus Governorate under peace scenario



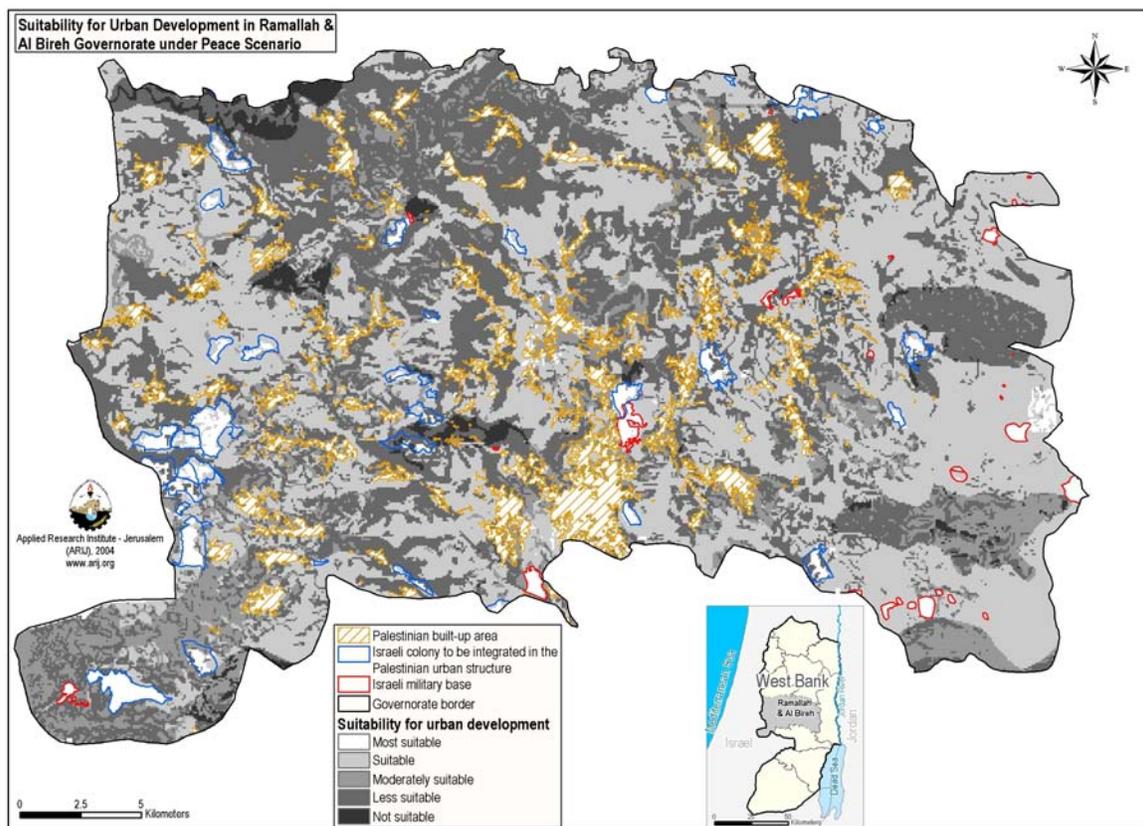
Map 13: Suitability for urban development in Qalqiliya Governorate under current situation scenario



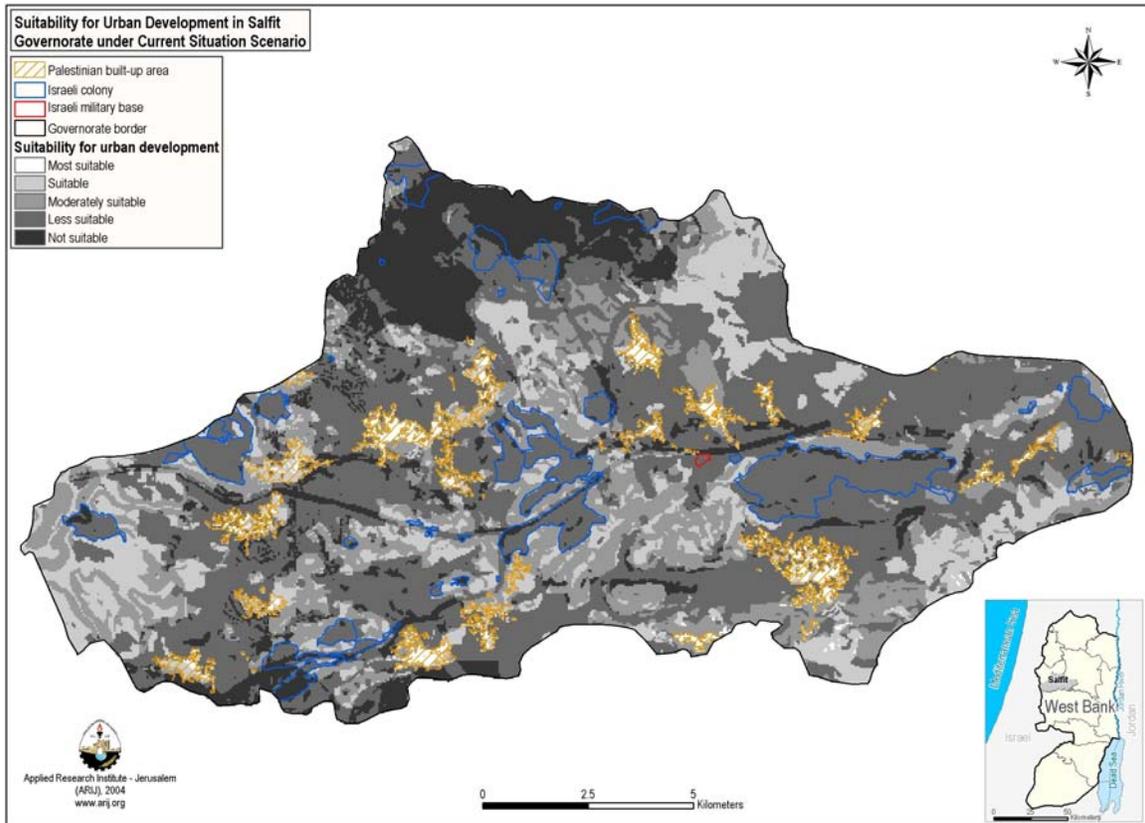
Map 14: Suitability for urban development in Qalqiliya Governorate under peace scenario



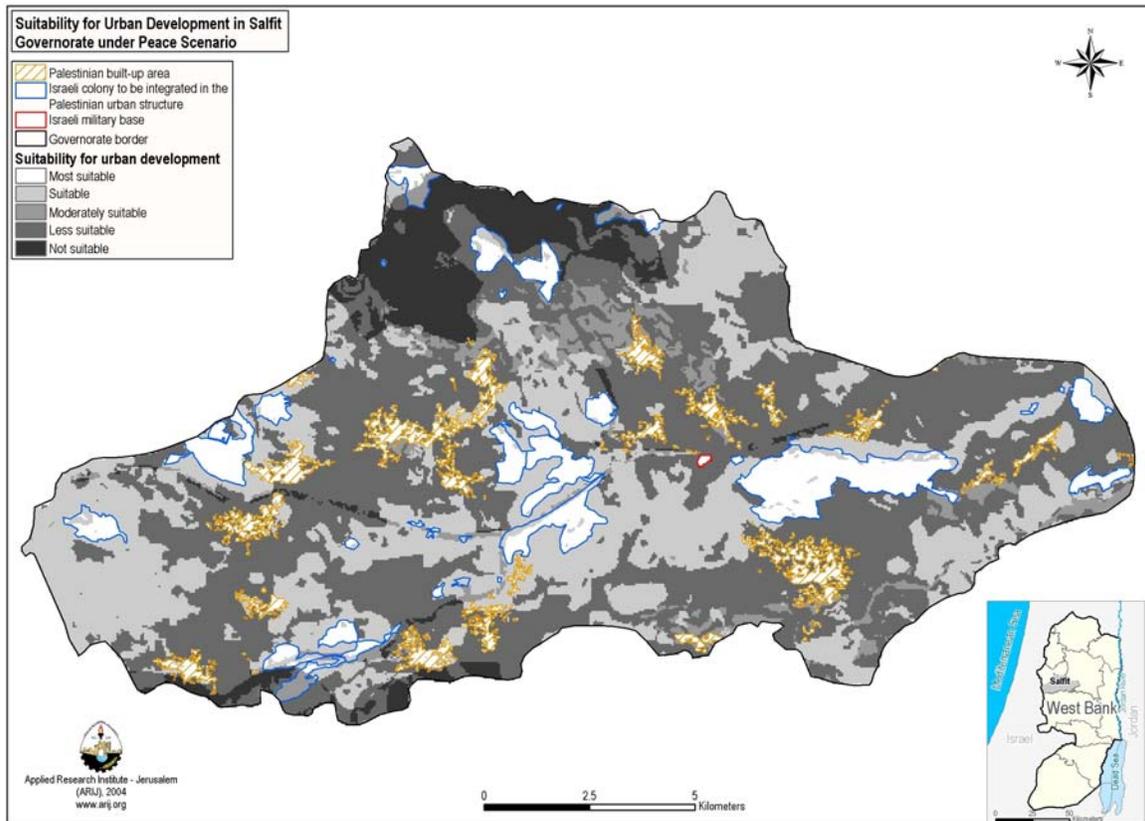
Map 15: Suitability for urban development in Ramallah & Al Bireh Governorate under current situation scenario



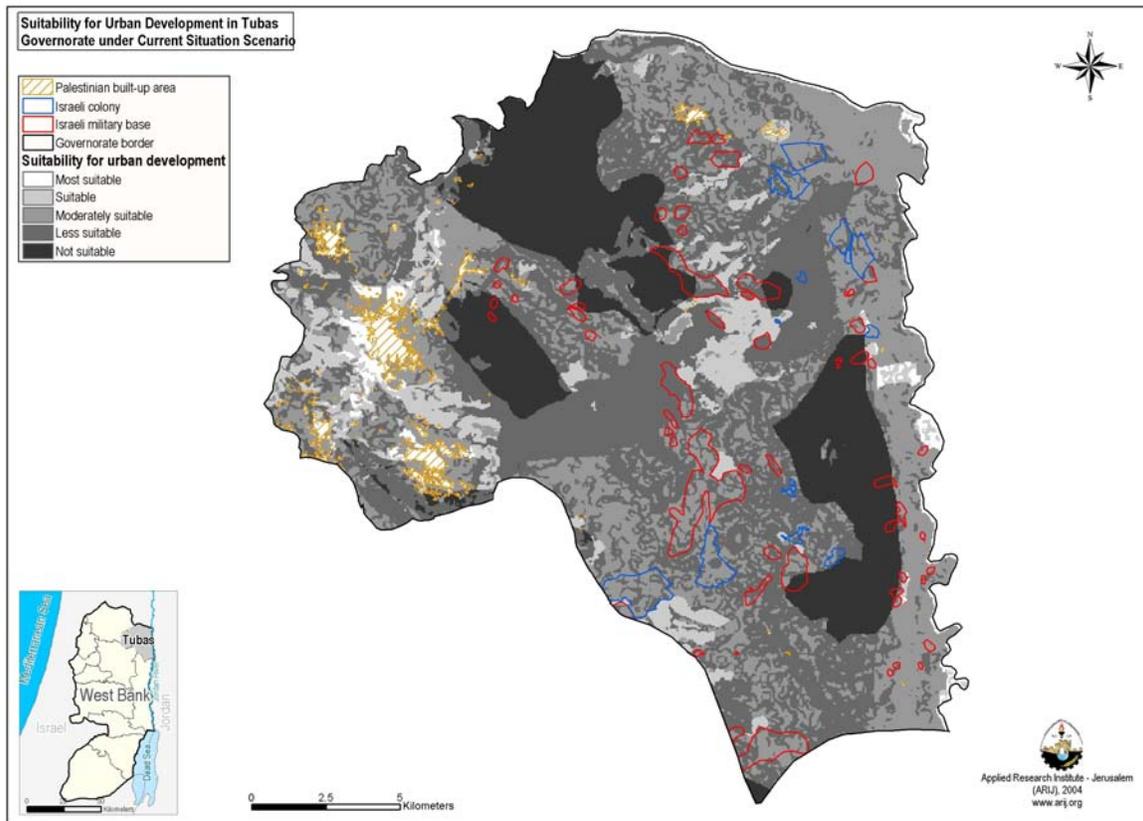
Map 16: Suitability for urban development in Ramallah & Al Bireh Governorate under peace scenario



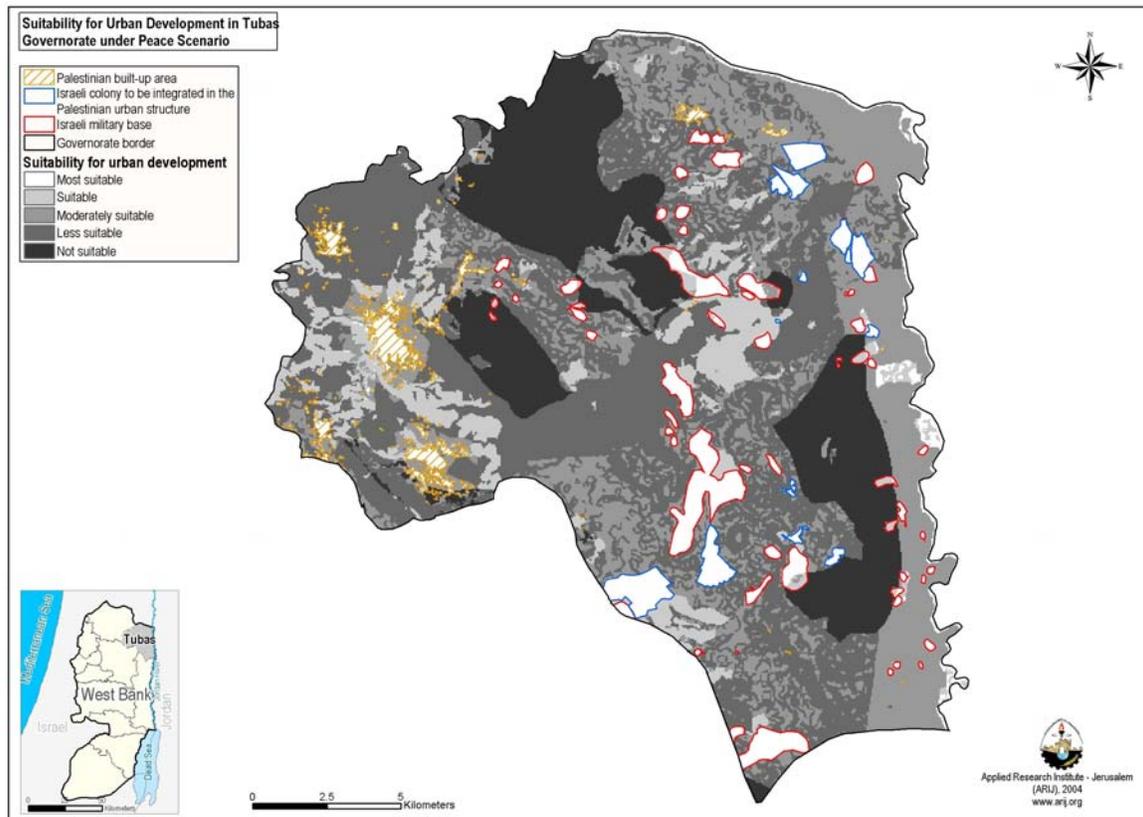
Map 17: Suitability for urban development in Salfit Governorate under current situation scenario



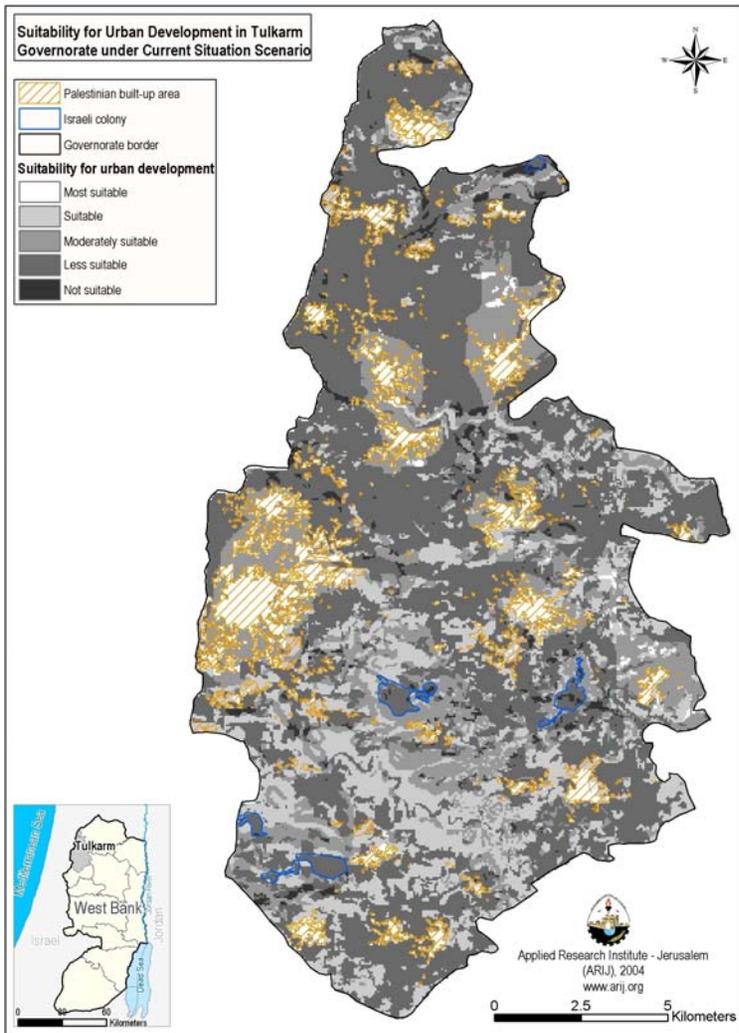
Map 18: Suitability for urban development in Salfit Governorate under peace scenario



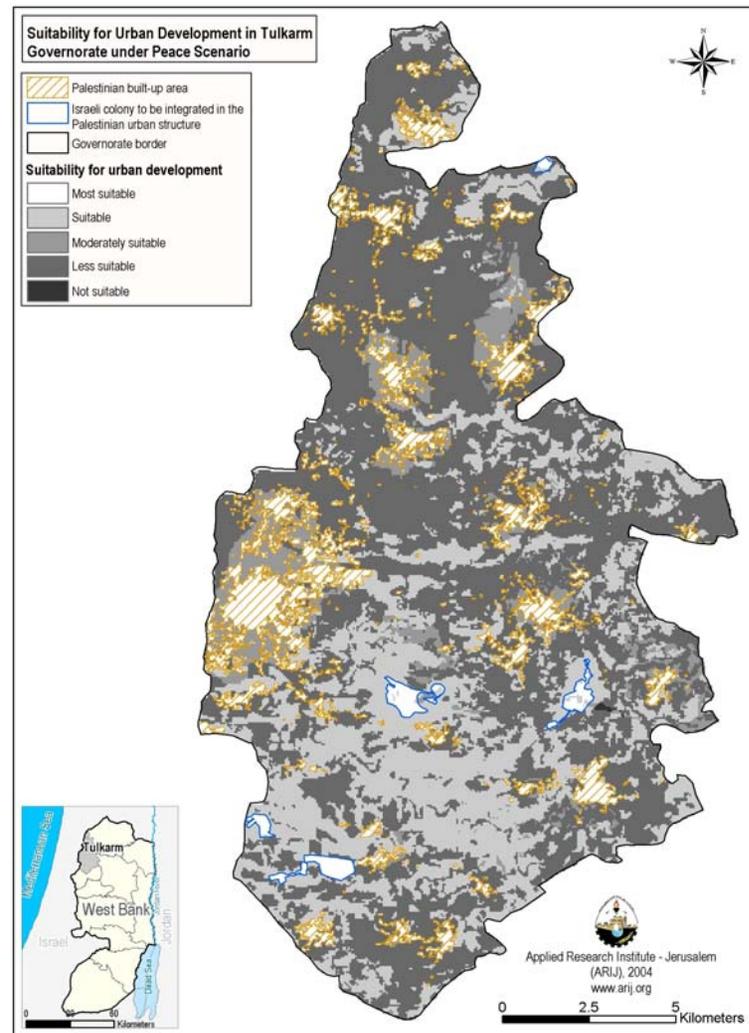
Map 19: Suitability for urban development in Tubas Governorate under current situation scenario



Map 20: Suitability for urban development in Tubas Governorate under peace scenario



Map 21: Suitability for urban development in Tulkarm Governorate under current situation scenario



Map 22: Suitability for urban development in Tulkarm Governorate under peace scenario

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