

An Industrial Zone in the Bethlehem Governorate

1. Introduction

Knocking on the economic constraints, Bethlehem Governorate was directly affected by the Segregation Wall as it caused severe damages to the Palestinian agricultural sector and to Palestinian farmers as a result of land confiscation and the constraints imposed on mobility and marketing. Moreover, Israel maintains control over Palestinian trade and tourism leading to the exponential increase in the poverty levels. In tandem to this, the rise in land prices and reduction in investment opportunities caused the plummet rate in the employment enrollment, as in 2005 60.7% of the Bethlehem Governorate's population who are within working age (15 years and above) were outside of the labor market (PCBS, 2005).

However, the brokered Palestinian National Authority's (PNA) Development and Reform Plan in 2007, acknowledged the vital important of industrial assets, such as the industrial zones to help improve productive capacity in the medium term, through what became to know later as the "Industrial and Services Capacity Development" program (PNA-Development and Reform Plan, 2007). Such a program is considered important as it will help fueling the economic productivity in the Bethlehem Governorate and reducing the current negative impacts of unregulated economic activities, especially in the urban and semi-urban areas of the governorate.

2. Goals and Objectives

The readily *Overarching Goal* of the proposal to develop an environmental sound industrial zone, in the Bethlehem Governorate is to fuel the economic development and consequently economic stability, which is considered an indispensable condition for achieving peace and prosperity, for the Palestinian people and to the region.

Specific Objectives

1. Encouraging innovative cooperative businesses ventures at the local level, by providing competitive advantage with more efficient service networks.
2. Support employment and commercial development towards a fair-trade market.
3. To set aside industrial uses from urban hinterlands in order to reduce the environmental and social impacts of urban industrial activities.

3. Site Selection of the Industrial Zone

A sensitive suitability analysis for locating an industrial zone in the Bethlehem Governorate was conveyed using a spatial GIS-based model. The analysis aims to help the decision makers at both the local and regional levels to avoid any unwanted side effects of unplanned industrial development. This was achieved through considering a multi-criteria evaluation matrix that included those areas that are presently under Israeli jurisdiction with a particular consideration for

development of the environmental, social, and economic factors, so as to conceptualize a clear picture of the anticipated impacts on future spatial planning under such a transitional political context.

Several map layers of data - such as water sensitive areas, built-up areas, and grade slopes - were incorporated into a suitability modeling scenario. The Arc/GIS Spatial Analyst Tool was used to perform the spatial analyses. The analyses consistently categorized five potential areas for industrial zone developments in the area of Bethlehem, based on the extent to which they indicated suitability for optimum available choice. The five categories are: most suitable, suitable, moderately suitable, less suitable, and least suitable. They were assigned a value of 1-5 with 5 being the most suitable. The following table illustrates this.

Table (1): Matrix of Multi- Criteria Evaluation	
Factor	Rating
Built-up Areas	Inside the built-up areas = 1, and Outside the built-up areas = 5
Factor	Rating
Geopolitical Classification	Area (A) = 1, Area (B) = 5, Area (C) = 2, and Nature Reserves = 2
Factor	Rating
Land Use/Land Cover	Arable land, permanent crops, forests, heterogeneous agricultural areas, plastic houses, and permanent crops = 1, Industrial, commercial and transport unit/Artificial non-agricultural vegetated areas = 2, Pastures = 3, Mine, Dump and construction sites / shrub and/or herbaceous vegetation associations = 4, and Open spaces with little or no vegetation = 5
Factor	Rating
Segregation Wall	"Buffer Zone" of 200 meters at the two sides of the wall = 1, and Else = 5
Factor	Rating
Settlement Masterplans	Inside the settlement = 1, and Outside the settlements = 5
Factor	Rating
Bypass Roads	"Buffer Zone" of 150 meters at the two sides of the road = 1, and Else = 5
Factor	Rating
Water Sensitive Areas	The area of the Bethlehem Governorate was zoned into five zones (1-5) Relying on the Water Sensitivity Map of the West Bank

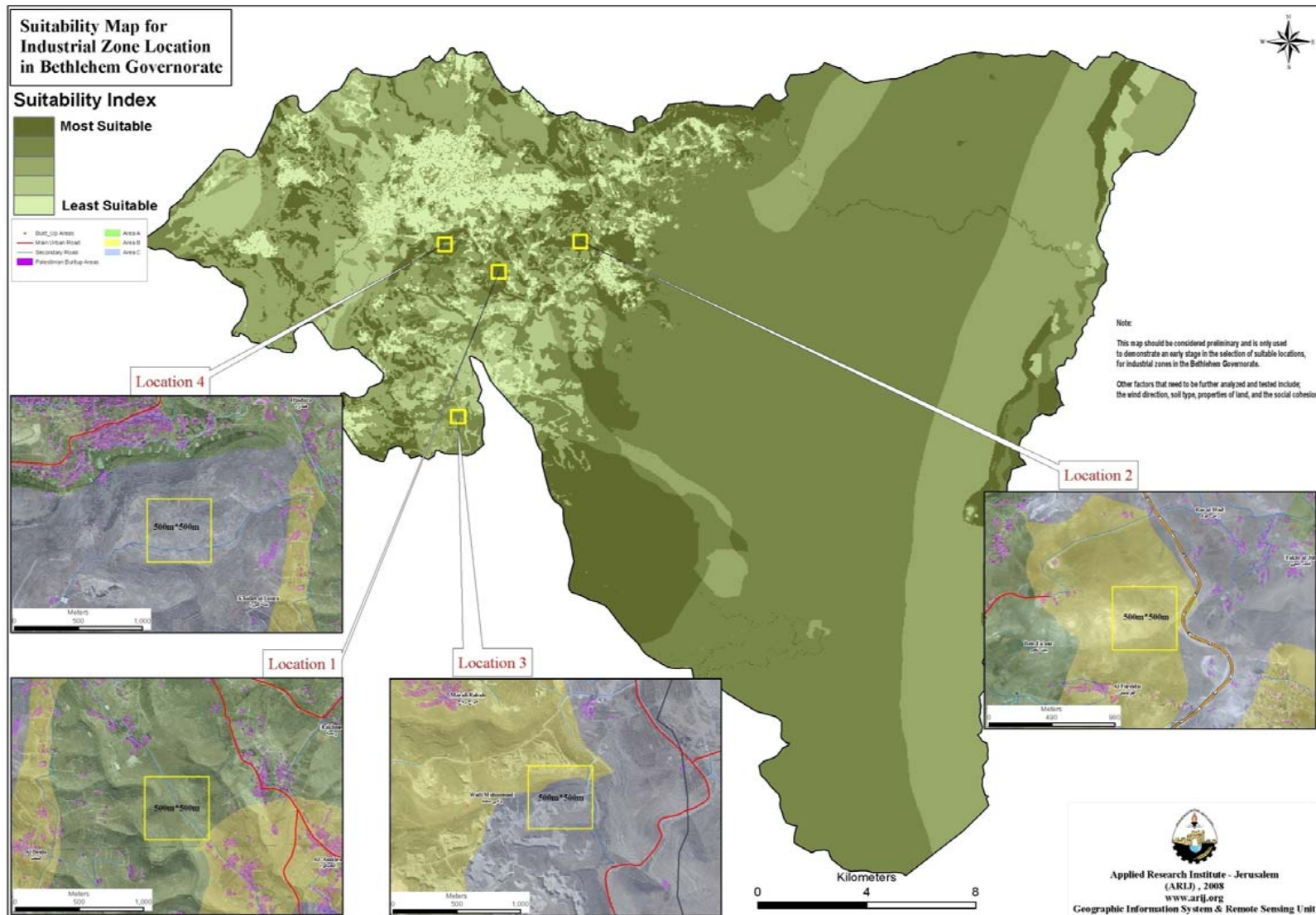
	published by the Ministry of Planning in 1998
Factor	Rating
Slope	Slope and aspect models for Bethlehem Governorate were derived from the Digital Elevation Model (DEM) of the West Bank.
Factor	Rating
Heritage Sites	"Buffer Zone" of 100 meters around the heritage sites of the Bethlehem Governorate = 1, and Else = 5

The spatial analysis map calculator was used to weigh and combine the individual map layers and produce a suitability model (see table 2). For instance, the used map calculator expression for scenario 1 was: $([\text{Built-up Areas}] \times 0.30 + [\text{Geopolitical Classifications}] \times 0.03 + [\text{Land Use/Land Cover}] \times 0.30 + [\text{Segregation Wall}] \times 0.01 + [\text{Settlement Master Plans}] \times 0.03 + [\text{Bypass Roads}] \times 0.01 + [\text{Water Sensitive Areas}] \times 0.15 + [\text{Slope}] \times 0.05 + [\text{Heritage Sites}] \times 0.12)$.

Both the built-up area and the Land Use/Land cover are weighted most heavily in this model because it should have the most influence in the model. The output of the map calculator is the suitability model. The table aside summarizes the weighting schemes used for the suitability model. The suitability model is displayed on a shaded scale of one to five, five being the most suitable and one being the least suitable (see map 1).

Factor	Factor Weight
Built-up Areas	30%
Geopolitical Classification	3%
Land Use/Land Cover	30%
Segregation Wall	1%
Israeli Settlement Masterplans	3%
Bypass Roads	1%
Water Sensitivity	15%
Slope	5%
Heritage Sites	12%

Map (1): Suitability Map for Proposed Industrial Zone Location in Bethlehem Governorate



The results from the model analysis should be considered preliminary and demonstrate the usefulness of the spatial suitability analysis technique, therefore the embedded maps just demonstrates the preliminary selection of the location for the developments of Palestinian industrial zones in the Bethlehem Governorate. The proposed locations of the industrial zone were carefully selected based on commercial viability, equitable geographic distribution, and proximity to the adequate infrastructural lines. However, further analysis and testing phase of the wind direction, soil type, properties of land, and the social cohesion is considered crucial for the final selection of the location of the industrial zone.

After discussing the results of this suitability analysis with the stakeholders and decision makers in the Bethlehem Governorate, a consensus was reached on selecting the proposed location no. 1 as a first priority and location no. 2 as a second alternative. Therefore, the ARIJ team conducted several site visits to the proposed locations to test the soil type and wind direction and the results turned positive. Further investigation to the land properties concluded a positive result, as both the proposed most suitable locations are largely owned by Al-Awqaf, which could be easily leased by the Palestinian Cabinet in favour of the public use for ten decades or so. Concerning the social cohesion in the vicinity of the proposed industrial zone, it was evident that minor mitigation measures, including the upgrade of new secondary road alignments may preserve and maintain the social fabric in the area.

4. Functions and Facilities of the Industrial Zone

1. Light Industries: comprising arts and crafts of textile, clothing, embroidery, olive wood, mother of pearl, and others. Bethlehem is well known for producing such light industries, which are considered a tangible add value to the economic of Bethlehem Governorate.
2. Furnishing Industries, such as saloons, beds, desks and others, for the use of domestic households or larger facilities, including hotels and companies.
3. Pharmaceutical Industries: Beit Jala Pharmaceutical Manufacturing Company that was founded in 1958 – formerly Jordan Chemical Laboratory – is the only of its kind in the southern part of the West Bank and among other four pharmaceutical factories in the West Bank territory.
4. Vehicle's Auto Body/Repair Industry
5. Innovative Green Industries:
 - I. Energy Saving Cells
 - II. Small Wastewater Treatment Plants
 - III. Organic Food's Composting Units
6. Media Entertainment Center, which would provide a wireless “free internet” service to the urban and semi-urban population of the governorate.
7. An Agro-Touristic Site, to serve as a touristic, cultural, environmental, and educational center for the local community and tourists/visitors.

However, the industrial zone should be provided with a set of facilities and services, including: Infrastructure and Maintenance, Administration and Liaison Building, Open Spaces, Gardening and Cleanliness, Bank Services, Communications, Parking and Transport, Security, Residential Complexes for the Security, Child-Care Centers, Clinic, Petrol Station, Food Court and Coffee Shop, Water and Electricity, among others.