



RESEARCH ARTICLE

IMPACT OF THE GEOPOLITICAL FACTORS ON PALESTINIAN SETTLEMENTS PATTERN AND THEIR COMMUNICATION BY USING GEOGRAPHIC INFORMATION SYSTEM (GIS): JERUSALEM DISTRICT CASE STUDY

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ABSTRACT

Human settlements provide a special focus for most human activity, and therefore also strongly impact on the local land cover, water quality, and biodiversity. Set-up a development strategy and providing policy-relevant guidance therefore requires a detailed and accurate evidence base documenting the spatial distribution of populations, settlements and their inter-connectivity. Location of human settlements is determined by local amenities, economic factors, and communications. Political transformations and instability conditions are among the most important factors affecting social, economic, and environmental aspects of the world, especially in the countries and regions which witnessed wars and political problems. The Occupied Palestinian Territories (OPT) have witnessed many political transformations and events since the occupation by the Israeli Army of the Palestinian Land in 1967. Analyzing the spatial patterns of settlements can contribute to greater understanding of land use changes, ecological processes, and cultures. The impact of the Geopolitical factor on the human settlement pattern and their communication received little attention. Therefore, this study aims to explore the distribution of Palestinian settlements and their communication in Jerusalem district under the political crisis such the popular uprising. This study adapted quantitative methods that including descriptive and cartographic approaches in the Geographic Information System (GIS) environment for addressing the primary and secondary data. Geovisualization and geoprocessing process, especially, map overlapping analysis between different thematic maps to present distribution of human settlements and the geopolitical factors. Geopolitical factors which including Israeli settlements, segregation wall, and military checkpoints impacted negatively on Palestinian settlements and their inter-connectivity in Jerusalem District under the political crisis such the popular uprising. These factors led to convert the Palestinian communities into islands in the Israeli colony ocean in Jerusalem district and isolate the Palestinian communities from each to other especially, under the political crisis. This effort will contribute in the urban planning, scientific field and the body of knowledge, especially, in the association between urban planning and political science fields. Palestinian need to transition from reaction status into the action status and play more significant role in the game by preparing an alternative plan and scenarios to meet the Israeli process in general and especially under political crisis and future popular uprisings. Therefore, Palestinian policy makers, urban and regional planners, and researchers need to pay more planning and research efforts to help the Palestinian communities meet their needs under the political crisis and wars.

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INTRODUCTION

Geography plays a significant role in the development process (World Bank, 2009). The global population exhibits greater spatial variability both in settlement patterns and in impact on Earth's ecosystems (Small, 2004). Also, human settlements provide a special focus for most human activity, and therefore also strongly impact on the local land cover, water quality, and biodiversity (Gude, Hansen, Rasker, and Maxwell, 2006).

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Therefore, human settlement acts as the most fundamental link between people and the Earth, and reflects the interaction of people with the surrounding environment (Fragkias and Seto, 2009; Lin *et al.*, 2012). They are thus influenced to a large extent by topography, water accessibility, and transportation proximity (Carrion-Flores and Irwin, 2014; (Robinson, Murray-Rust, Milicic, and Rounsevell, 2012). Location of human settlements is determined by local amenities, economic factors, communications (Mueser and Graves, 1995; Sevenant and Antrop, 2007). Three spatial features impact the economic development of a region: the density (e.g. agglomeration, scale economies), the distance (e.g. spatial mobility and access) and

division (e.g. the spatial integration of economies). Improving access to people and markets is a key driver for development and plays a significant role in poverty reduction (Linard, Gilbert, Snow, Noor and Tatem, 2012). Spatial communication is a strategy for doing away with the expensive and exclusionary land-use patterns of apartheid. It seeks to enhance the efficiency of the city by placing residential development closer to job opportunities, and reduce the costs of development by exploiting surplus bulk infrastructural capacity (De la Paix, Lanhai, Anming, Habiyaemye, Theoneste and Paul, 2011). Transport infrastructures and access patterns are heterogeneous in space, population distributions and accessibility between populations should be estimated at levels of spatial detail that are similar or finer than the scales of this heterogeneity. Set-up a development strategy and providing policy-relevant guidance therefore requires a detailed and accurate evidence base documenting the spatial distribution of populations, settlements and their inter-connectivity (Linard *et al.*, 2012). Development in rural communities depends on access to markets for buying and selling goods, to water and fuel, and to various social and economic services such as education, healthcare or banking (Gude *et al.*, 2006; Lin, Hong, Chiang, Liu and Chu, 2012). The lack of a reliable transport system forces rural populations to spend a significant amount of time in travelling to meet their basic needs and increases the transport costs incurred to access these services (Carruthers, Krishnamani and Murray, 2009; Sevenant and Antrop, 2007).

Political transformations and instability conditions are among the most important factors affecting social, economic, and environmental aspects of the world, especially in the countries and regions which witnessed wars and political problems. Urban development and expansion trends are impacted by these conditions while all of these changes and crises effecting urban land use change and spatial structure of the urban environment (Nuissl and Rink, 2005; Xiao, Shen, Ge, Tateishi, Tang, Liang, and Huang, 2006; Raddad, 2015). The Occupied Palestinian Territories (OPT) have witnessed many political transformations and events since the occupation by the Israeli Army of the Palestinian Land in 1967. According to Samara, (2005) The Israeli military administration controlled the urban development process until 1995, prior to the establishment of the Palestinian Authority, which started to control urban development issues in some of the Palestinian urban localities. After the occupation of the Palestinian Territories by the Israeli army in 1967 the physical planning system was under the Israeli military administration. The Israeli Army with the planning organizations, amended the laws and plans as well as set a new military law in the Palestinian territories to achieve the political goals of the Israeli government. All of those laws and plans aimed to monitoring of the Palestinian urban development and control on more lands in the occupied Palestinian territories (Samara, 2005).

The Israeli land policy in the Palestinian Territories focused on land expropriation for the construction of Israeli colonies on Palestinian lands. Two primary goals guided the expropriation of Palestinian land for the colonization project: expansion and separation from the Palestinian population (Applied Research Institute-Jerusalem - ARIJ, 2007a). In 1993, the Palestine Liberation Organization PLO signed the "Oslo I" Accords accepting just 22% of the Mandate (Historical) Palestine (the West Bank, including East Jerusalem city and the Gaza Strip),

as the basis for a Palestinian State, with Jerusalem as its Capital and The "Oslo II" Interim agreement, signed in Washington in September 1995. According to this agreement The Occupied Palestinian Territories OPT was divided into three areas "A", "B" and "C" with different control levels between the Palestinian and Israeli. The distribution of areas "A", "B" and "C", has scattered the OPT into isolated cantons, which are physically separated from each other and from the Gaza Strip. It was also agreed upon to having a safe passage, linking the Gaza Strip with the West Bank, but the Israelis did not allow it to function (ARIJ, 2007b). The Israeli Government started on the 16 th of June 2002 the construction of a massive Segregation Wall between the West Bank and Israel, the Segregation Wall consists of 8-12 m high concrete partitions with military watchtowers with 250 m intervals See Figure (4).

The Segregation Wall will isolate 555 km<sup>2</sup> of Palestinian land (approximately 9.8% of the total West Bank area). It will enclose 103 Israeli settlements, accommodating 408,000 Israeli settlers, which forms about 85% of the Israeli settler population in the West Bank. The Wall will also increase the number of isolated Palestinian localities to 59 and acts to isolate Palestinian communities and undermine territorial contiguity between the Palestinian villages and cities. And limitation of Palestinian urban expansion in the west bank (ARIJ, 2005). Analyzing the spatial patterns of settlements can contribute to greater understanding of land use changes, ecological processes, cultures, and lifestyles, etc. Many recent case studies have been conducted to analyze the spatial patterns of human settlements. Previous studies focused on the area, density and shape of human settlements However, Impact of the Geopolitical factor in the human settlement pattern and their communication received in the research context little attention. Therefore, this study aims to explore the distribution of Palestinian settlements and their communication in Jerusalem District under the political crisis such the popular uprising.

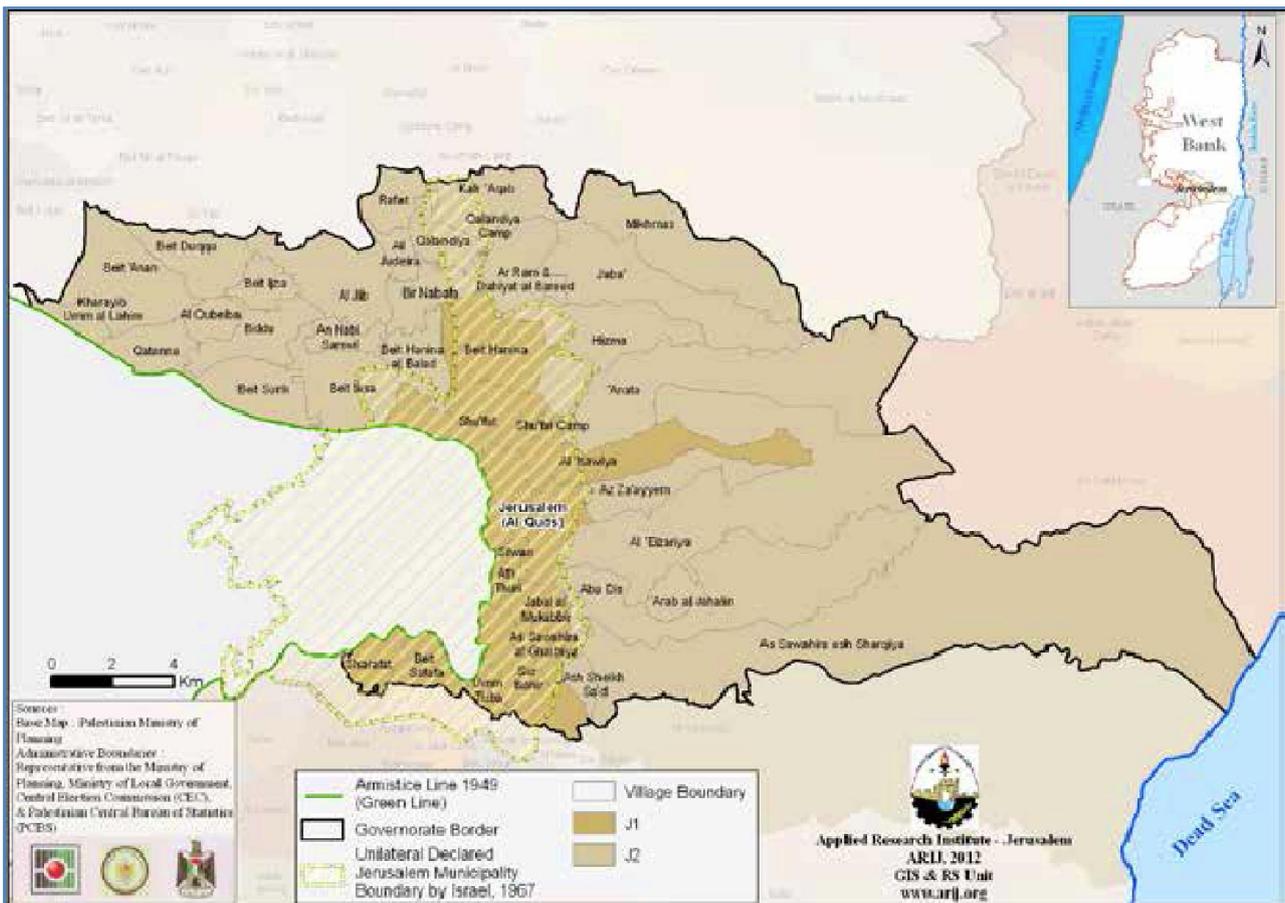
### **Study Area**

Jerusalem district is located in the middle of the West Bank (Figure 1). The West Bank, which occupies an area of 5856 km<sup>2</sup>. Jerusalem district covers about 344.45km<sup>2</sup> and the elevation varies from 209m above sea level in the southeast, to 859m above sea level in the west. It has a mixed subtropical, semiarid climate with warm, dry summers and cool, rainy winters. Jerusalem district consists of 44 administrative localities with one municipality: Jerusalem City (ARIJ, 2014). According to the Palestinian Central Bureau of Statistics (PCBS) Palestinian communities, 86.38% of the Jerusalem district population live in urban areas, 11.19% in rural areas, and 2.43% in refugee camps. (PCBS, 2009a). The total population of Jerusalem district is estimated to have grown to 363,649 in 2007, an increase of approximately 10.6% from the 1997 census (PCBS, 2009a; PCBS, 1999). There are an estimated 300,000 Israeli settlers in Jerusalem district, occupying a total of 40.428 km<sup>2</sup> (ARIJ, 2014). Jerusalem district divided into two areas (J1 and J2) after the occupation of the West Bank by Israel in 1967 (see Figure 1). First area (J1) which was annexed forcefully by Israel following its occupation of the West Bank in 1967 and the second area (J2) that Includes Jerusalem district except that part of Jerusalem which was forcefully annexed by Israel following its occupation of the West Bank in 1967. (ARIJ, 2014).

**MATERIALS AND METHODS**

This study adapted quantitative methods that including descriptive and cartographic approaches. spatial secondary data used in this study by collecting a maps from the Palestinian ministry of local government, such as West bank districts, West bank Roads, Palestinian localities, Israeli settlements, segregation wall, and military checkpoints. Also, Arial photo 2010 used as a base to create a new map such as Palestinian Agglomerations and units in Jerusalem district. Non spatial secondary data obtained from Palestinian government and non government organizations such as the Palestinian Central Bureau of Statistics (PCBS) and Applied Research Institute-Jerusalem (ARIJ) to comparing with the spatial data and maps.

hand, there are 28 of Palestinian localities which are located in the J2 area with 138,233 people. After the occupation of the Jerusalem district in 1967 Israeli government illegally and unilaterally annexed Jerusalem area J1 to the Israeli state and implemented its colonization project with a particular focus on Jerusalem and its surrounding areas in J2. All Israeli practices against Palestinian localities such as building and expanding illegal Israeli settlements, constructing bypass roads, and constructing the Segregation Wall in the Jerusalem district aimed to isolate the East Jerusalem city from the rest of the Jerusalem district and the West Bank and turn it into a city featuring a Jewish majority. Map Overlapping approach in GIS used to show the Israeli colony system in Jerusalem district.



(ARIJ, 2014)

**Figure 1. Study Area**

Many previous studies used spatial and non spatial data in the Geographic Information System environment for addressing the distribution of human settlements and urban development (Small, 2004; Gude *et al.*, 2006; Old, 2001; Synder, Distasio, and Hathout, 2006; Raddad, 2016). Therefore, this study used the Geographic Information system (GIS) capabilities in the geovisualization and geoprocessing process, especially, map overlapping analysis between different thematic maps to present distribution of human settlements and the geopolitical factors.

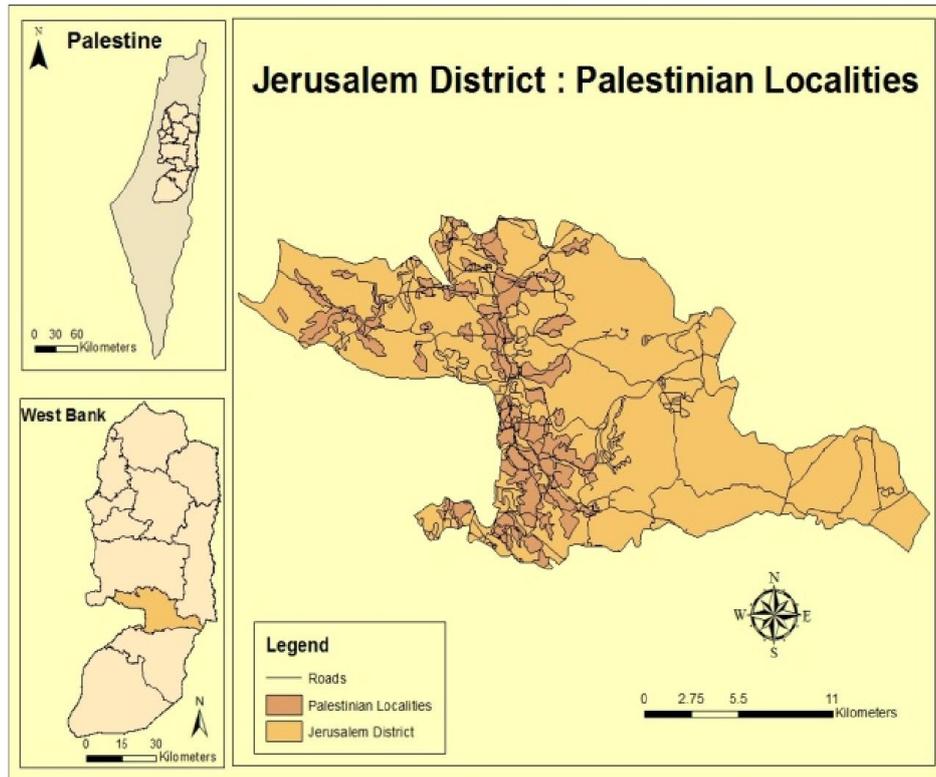
**RESULT AND DISCUSSION**

Jerusalem district is divided into 38 localities identified within 44 main administrative boundaries. 10 of Palestinian localities are located in the J1 area (Figure 2) with 229,362 people, other

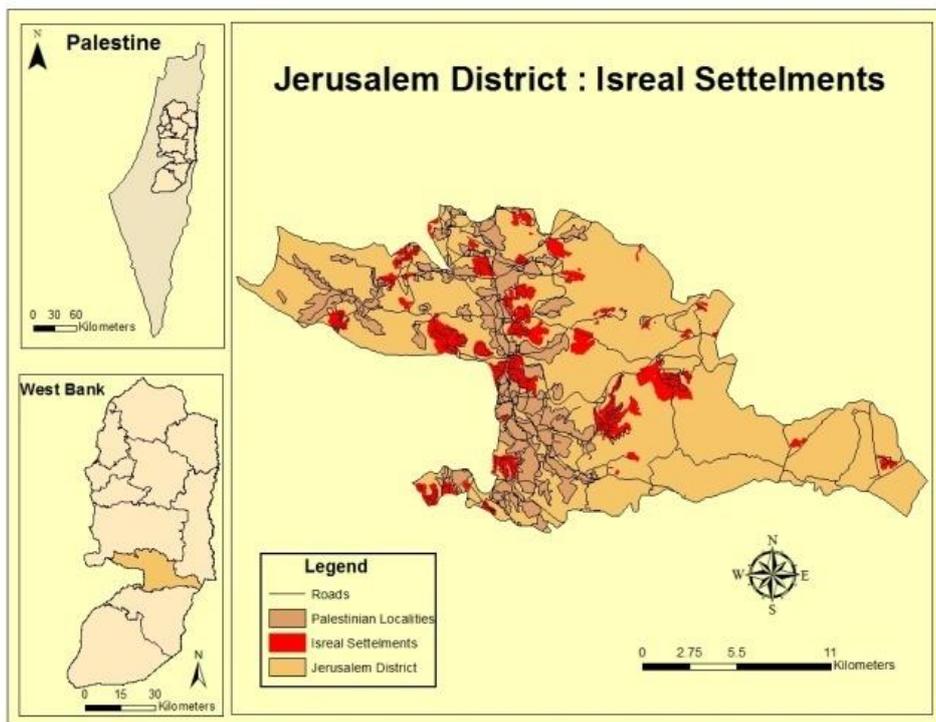
After the war 1967 until 1999 Israeli established 37 settlements in Jerusalem district (Figure 3), 18 Israeli settlements in J1 area and 19 Israeli settlements in J2 area, additionally, 11 of Israeli settlements' Outposts in Jerusalem district as shown in map3. There are an estimated 300,000 Israeli settlers in Jerusalem Governorate, occupying a total of (40.428 km<sup>2</sup>) of land. 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 consists of 8-12 m high concrete partitions with military watchtowers with 250 m intervals (ARIJ, 2004). In order to create Israeli settlement continuity around Jerusalem, Israel established a Segregation Wall as shown in (Figure 4). Segregation Wall divided into three main parts Existing Sections 86.2 km, Planned Sections 45 km, and Under Construction 9.3 km When completed, the 140.5 Km Segregation Wall will encircle Jerusalem

Governorate and separate it from the West Bank. In Jerusalem district, Israel established more than 43 military checkpoints which divided into Checkpoint, Earthbound, Roadblock, and Road Gate as shown on (Figure 5). The military checkpoints distributed across all Jerusalem district and control on all the main roads in the Jerusalem district. The main finding in this study as shown in (Figure 6), is integrated all physically Israel settlements, segregation wall, and military checkpoints converted the Palestinian communities into islands in the Israeli colony ocean in Jerusalem district.

This status puts the Palestinian communities' front three main types of isolations, first one isolate the east Jerusalem city in the J1 area from rest Palestinian communities in J2 area, second one isolate the Palestinian communities in J2 area each to another, Third one isolate the Palestinian communities in Jerusalem district from the rest the west bank districts especially, Ramallah in the north, Jericho on the east, and Bethlehem in the south. Therefore, during the Political conflict events such as popular uprising the Palestinian communities in Jerusalem district will lose any communication chance



**Figure 2. Palestinian Localities**



**Figure 3. Israel Settlements**

between them and with other Palestinian communities in the West Bank. Jerusalem district witnessed like this situation during the second uprising which called (Intifada Al Qsa) between 2000 and 2004. This situation led to a direct negative effect on all socioeconomic aspects in the Palestinian community during the war and political crisis in the Jerusalem district such as access the Palestinian people to their health services, education services, and their jobs. In the future, the real problem is Israel can during 24 hours close all military checkpoints in Jerusalem district and implemented isolate plan and prevent the Palestinian to move freely in the Jerusalem district.

In the urban planning context, political context, and community management context the Palestinian will face a real challenge during and future popular uprising a political crisis. Therefore, Palestinian policy makers and planners need to pay more efforts to prepare alternative plans to face this situation. This study suggests using regional and sub regional planning and management approach by dividing the Jerusalem district into three main sub regions based on map overlapping analysis in Figure 6 and establish a sub region plan for each agglomeration to meet their basic services need during the future political crisis. For example, Southeastern Jerusalem Region (SEJR) (Figure 7) including Az Za'ayem, Al

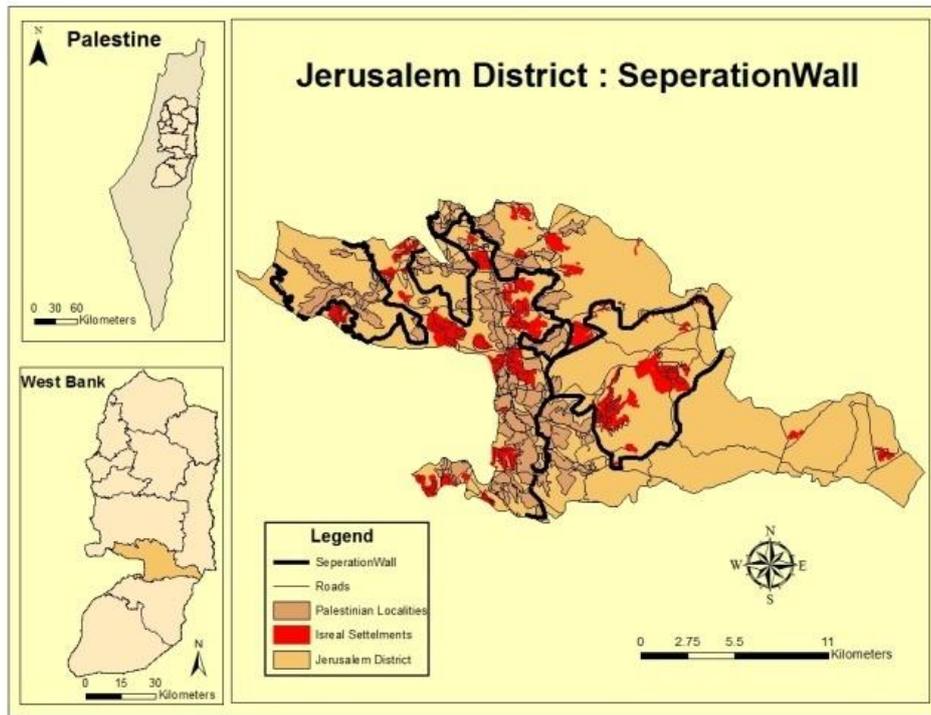


Figure 4. Separation Wall

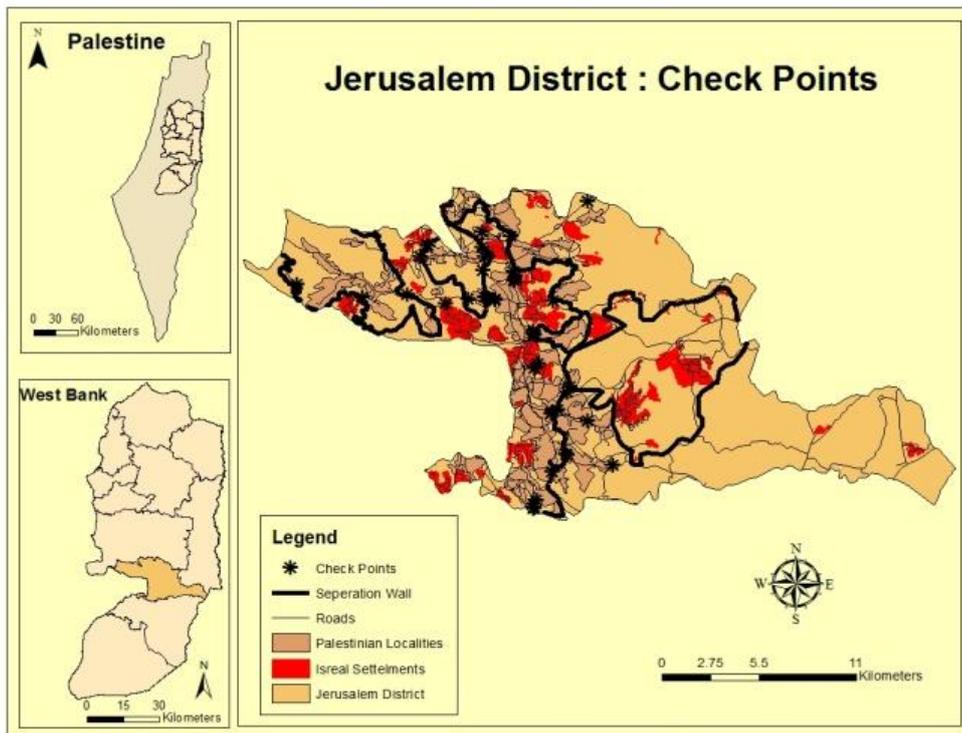


Figure 5. Military Check Points

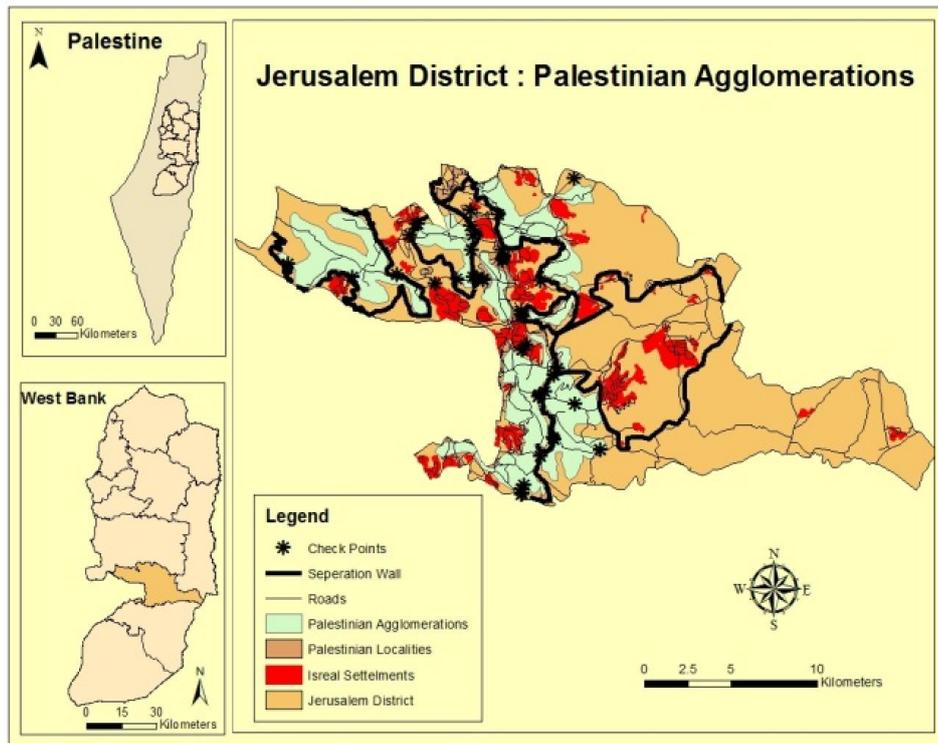


Figure 6. Palestinian Agglomeration

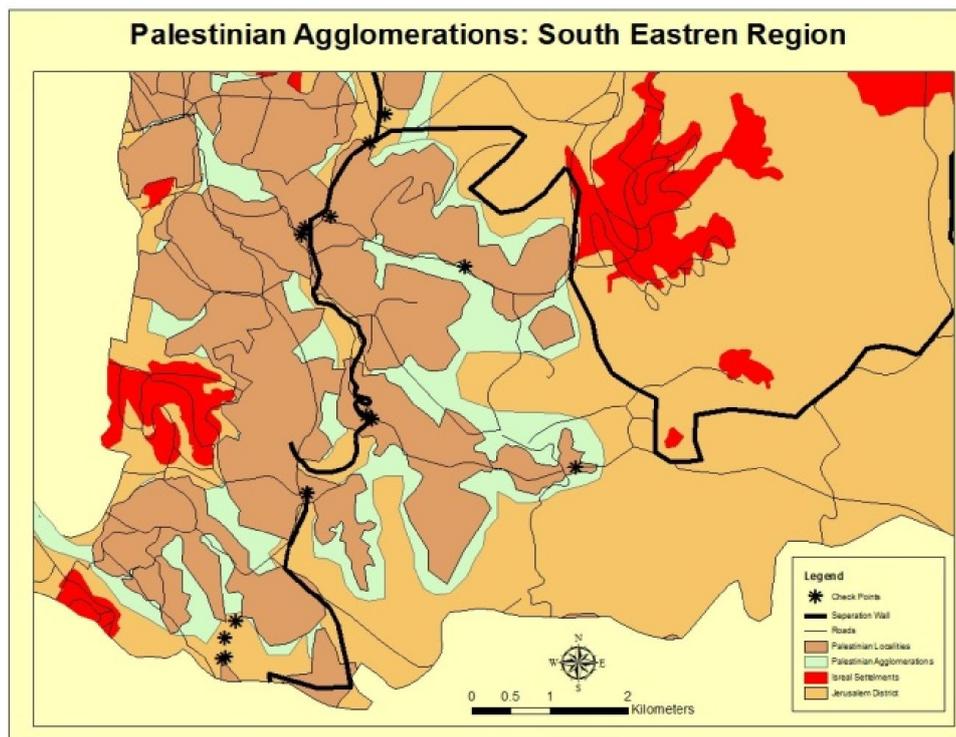


Figure 7. Southeastern Region

'Eizariya, Abu Dis, 'Ara al Jahalin, As Sawahira ash Sharqiya, and Ash Sheikh Sa'd with more than 40260 Palestinian people. Palestinian policy makers and community leaders in the Southeastern Jerusalem Region can work together to prepare an emergency plan and develop a sub regional development plan and ideas to meet the people needs, especially, in education and health sectors for example, establish a local hospital under the Palestinian health care system in Jerusalem district. Palestinian policy makers, urban and regional planners, and researchers need to pay more planning and research efforts in this aspect.

**Conclusion**

Geopolitical factors which including Israeli settlements, segregation wall, and military checkpoints impacted negatively on Palestinian settlements and their communication in Jerusalem District under the political crisis such the popular uprising. These factors led to convert the Palestinian communities into islands in the Israeli colony ocean in Jerusalem district and isolate the Palestinian communities from each to other especially, under the political crisis. This study will give us more understanding about impact the geopolitical

factor in the distribution of human settlements and their communication as well as this effort will contribute in the urban planning, scientific field and the body of knowledge especially, in the association between urban planning and political science fields. Integrated spatial and non spatial data in the Geographic Information system (GIS) environment showed important role and power capabilities in the geovisualization and geoprocessing process, especially, map overlapping analysis between different thematic maps to present the human settlements and geopolitical factors. Palestinian needs to move from reaction player into the action player in the game by preparing an alternative plan and scenarios to meet the Israeli process in general and especially under political crisis and future popular uprisings. Therefore, Palestinian policy makers, urban and regional planners, and researchers need to pay more planning and research efforts to help the Palestinian communities meet their needs under the crisis.

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