

Analysis of Spatial Patterns for Urban Crimes in the Informal Settlement Area of Islamabad in Zanjan

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Abstract

Islamabad is a large informal habitat in Zanjan and it is dealing with several problems from different aspects of structure, land use, service-provision systems, and demographic, social and cultural issues. The purpose of this study is to analyze the urban crimes committed in Islamabad both from structural and spatial aspects and also to explain the facilitators for the occurrence of offences in this area. This study applies a descriptive-analytic method. To identify the spatial distribution pattern of crimes in Islamabad, graphic-based statistical models have been used including Mean Center Test and Standard Deviation Ellipse; and to identify the urban crime hot spots, the Nearest Neighbor Index (NNI) and Quatric Kernel Density Estimation Interpolation Technique were used. The findings of this study reveal that the spatial distribution of the crimes under investigation in this area follows a centralized and clustered pattern. The committed crimes in this area mostly include violence and villainy, drug abuse and drug trafficking. There is also a direct relation between the population density in this area and crime rate, so that the relative population density in this area is 6 times more than the mean population density in other areas of Zanjan and the crime rate is also higher than other areas of the city to the same proportion. On the other hand, the high rate of residential land use and the lack of some other land uses needed by the citizens, have influenced the geographic distribution, type and rate of crimes as well as spatial patterns of crimes in this area.

Keywords: Urban Crimes, Islamabad, Zanjan

Introduction

The world has experienced a high level of urbanization in the 21st century. Only 10 percent of the world population lived in the cities in 1900. This increased to 29% in 1950. And now, more than a half of the world population is living in urban areas. Such a rapid rate of urbanization within a short period of time has been mostly experienced in the developing countries. The urbanization process in the developing countries with the increasing number and size of the cities and their capacity for settlement in such a rapid rate has resulted in some phenomena such as informal economy and informal housing in the suburbs. A feature of such informal settlements is the existence of low-quality houses and the lack of appropriate infrastructures that cause the residents of such areas to face lots of problems. Due to the immigration of the villagers from different parts of the province, Zanzan has faced a remarkable population growth as well as physical development in the last few years. The establishment of the informal settlement of Islamabad (Safarabad) in northwestern Zanzan is an unpleasant consequence of such immigration. The studies reveal that the informal settlement of Islamabad suffers from a high crime rate. It seems that other than personal, social, economic and cultural factors, the existence of some structural problems and shortages in Islamabad have provided the grounds and opportunities for committing crimes to a greater degree in this area of the city. That's why many crimes are committed in this area. So, considering the undeniable influence of environmental factors in the occurrence of social offenses, this study tries to investigate the role of structural problems in the occurrence of urban crimes in Islamabad of Zanzan and to answer the following questions

- How are different types and rates of crimes spatially distributed in Islamabad?
- Is there any relation between population density and type and size of land uses in Islamabad and the type and rate of the crimes committed in this region?

Literature Review

The study of crime committing and the place of crime in 1993 by Brantingham and Brantingham focuses on discovering the interaction between offender and the structural and social environments that are selected as the target of their crime (Kalantari, 2001: 89). Their theory is that crime is the result of interaction between people and movement in the urban perspective of time and place (criminals and victims). Also, there should be four major factor for a crime to be committed: 1) law; 2) offender; 3) target; 4) place (Chung, 2005: 10). In this regard, Brantingham believes that traditional criminology is seeking to find the criminal and his/her incentives in committing a crime. However, crime can be studied without taking personal and individual incentives of a criminal into consideration. Rather, the crime and the environmental conditions of committing it can be focused (Brantingham & Brantingham, 1990: 14-49). Environmental criminology includes the study of crime, murder, harm and offence so that the cause of it is first related to special places, and then to the methods that individuals and organizations use forms their activities using spatial place-based factors (Bottoms & Wiles, 1997: 305). Crime Prevention through Environmental Design (CPTED) includes structural environment design and management in order to minimize the opportunities for committing crime, murder and offence. Moreover, this notion is based on this assumption that criminals and offenders enter a process of logical decision-making prior to committing a crime. Indeed, the CPTED theories include the methodology of replanting and redesigning the environment based on which architects and urban planners may decrease the chance of fearing crime and

offence in order to improve the quality of life (Atlas, 1999: 11). Generally, CPTED focuses on the grounds where the crime happens and the techniques that will decrease the vulnerability of the environment (Salehi, 2009: 129-130). This notion is continuously being revised and evaluated and it is established based on four main strategies including territorial integrity, natural supervision, protection of activities and control of accesses (Cozens, 2002: 132). The highly influential theory of "Broken Windows" suggested by Wilson and Kelling focuses on the subject of crime prevention through focusing on the residents' awareness of suspected behaviors, environmental protection and its consequences (Wilson & Kelling, 1982: 29-38). According to the Defendable Space theory, the kind of urban design can also help the criminal in selecting crime place as well as committing the crime (Newman, 1973: 3). Another significant issue to be taken into consideration is the fact that geographic distribution of crimes is influenced by the variables of time and place of committing crime, the criminal and the victim. The studies show that due to their specific structural construction and social, economic and cultural features of residents and users, the potential and opportunity for crime is greater in some places of the city. On the other hand, crime rate is low in some urban areas due to the existence of preventive factors (Kalantari et al, 2009: 79-80). In fact, crime is not evenly distributed in the city. The idea of crime spots has been increasingly focused during the last few years (Nasar & Fisher, 1993: 187-206; Lupton, 1999: 1-15).

The term "crime spot" was first used by Sherman, Gartin, and Burger in 1969 in order to analyze the offence based on site features. This term refers to a place or geographic area where the offence rate is very high. The limits of this area may include a section of a city, a neighborhood, several neighboring streets or even a residential house or complex. Some have defined "crime spot" as small areas with a high predictable crime rate at least within one year (Kalantari et al., 2009: 80).

Some researchers have considered the existence of some occupancies as effective in the formation of crime spots. Sherman, Gartin and Burger have referred to such a relation between the occupancy and the formation of crime spots (Sherman, 1989: 27-55).

In this regard, Wisbird and Eck have referred to four essential concepts that influence the formation of crime spots:

- A) The presence of the facilities needed for an offence to happen;
- B) Site Features such as easy access, unavailability of guards and patrols, lack of appropriate management of sites, and the presence of some facilities encourages the criminals to commit crime in certain places;
- C) Crime Targets or the existence of properties and assets that are the offenders' favorites;
- D) The presence of a higher number of offenders and sufficient incentive and ability to commit crime is another effective factor in the formation of crime spots (Eck et al, 2009: 160).

Offence Diminishing Center in UK defines crime spots as follows:

A geographic area where the frequency of offence is higher than normal (average), or where the occurrence of offence is more frequent compared to the crime distribution in the whole region. According to this definition, a crime spot is a certain area where hosts a high portion of the total crime in the whole area (Kalantari & Tavakoli, 2007: 4)

Based on the above-mentioned definition, a crime spot is an area where the mean frequency of offence is more than the surrounding area. This place can be a house, a street corner, a shop or any other place (Sherman, 1989: 27-55).

Research Method

This study applies a descriptive-analytic method. Comprehensive graphic-based statistical methods including Mean Center and Standard Deviation Ellipse have been used to help us identify and understand spatial patterns of crimes in the informal settlement area of Islamabad, and the methods of Nearest Neighbor Index (NNI), Quatric Kernel Density Estimation Interpolation Technique in Geographic Information System (GIS), and the software of Case & Crime Analysis were used to facilitate the identification of urban crime hot spots. The statistical population includes all the crimes committed within a period of one year in the city of Zanjan.

Informal Settlement of Islamabad

Zanjan is a city with 1400-year history of civilization and urbanism (Abbasi, 2009). The informal settlement area of Islamabad (Safarabad) has been constructed in the Northeastern Zanjan as a result of wide-spread immigration of the villagers since 1970s. Although this district includes only 1.8% of the total area of Zanjan, it has hosted 11.2% of the whole population of the city, i.e. equal to 39439. With an average household size of 4.1 and the relative density of 422 persons per hectare and the net residential density of 588 persons per hectare, this region is one of the most crowded areas in Zanjan.

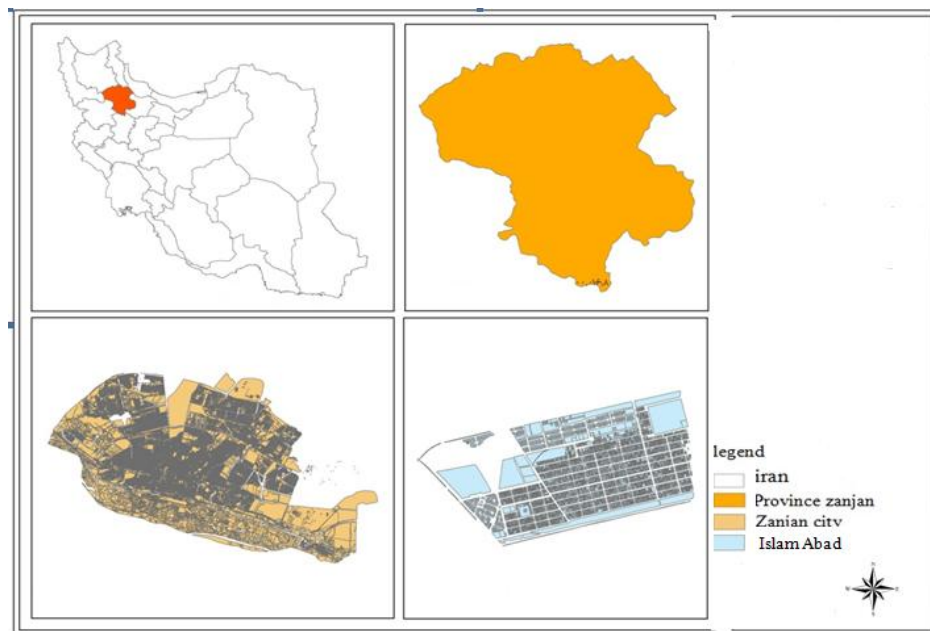


Figure 1. Political Situation of Islamabad

Findings

Mean Center and Standard Deviation Ellipse for the Crimes Committed in Islamabad

The Mean Center for all crimes committed in Islamabad is located in the geographic center of this area, especially the intersection of Homayoun Road and Ayatollah Shahid Madani St. The standard deviation ellipse for all crimes covers East-West direction of Islamabad. This shows that the spatial distribution of crimes is a northwest-southeast direction. On the other hand,

the standard deviation ellipse for all crimes shows a high crime distribution in Eastern Islamabad. This is due to the existence of a high number of main roads (Shahid Mohammadlou St., Shahid Bagheri St., Shahid Abedini St., and Shahid Najafi St.) in Eastern Islamabad.

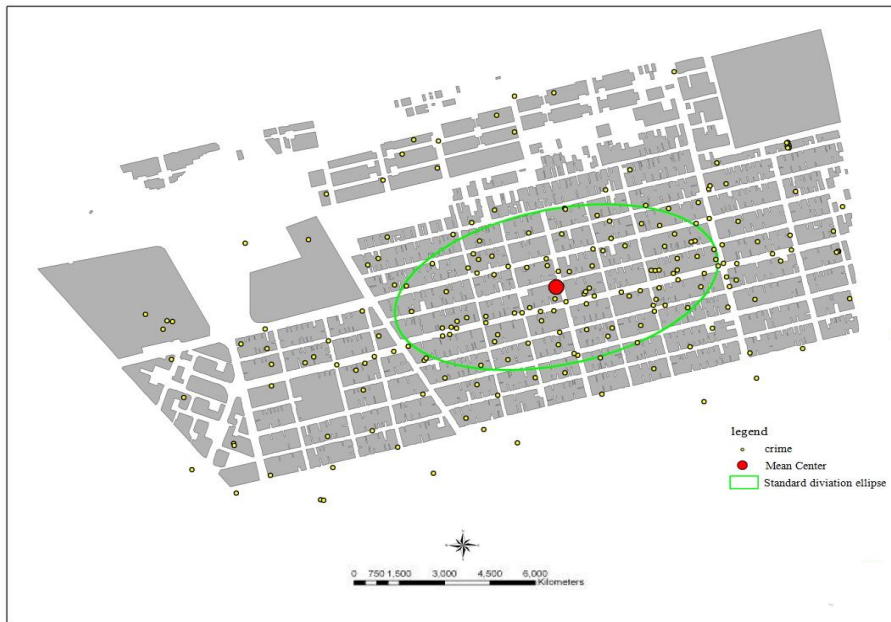


Figure 2. Mean Center and Standard Deviation Ellipse of Crime in the Islamabad

Clustering Test

The result of the Nearest Neighbor Index test for the crime distribution pattern in Zanjan is 0.29. Accordingly, the total crimes are statistically distributed in a cluster, since the Nearest Neighbor Index less than one indicates that the crime data has a clustering format. The analysis of the Z value for these crimes, i.e. -83.1, proves that the spots of the total crimes in Zanjan are spatially distributed in a cluster format. Z value can be used to ensure the accuracy of the Nearest Neighbor Index. The larger the negative value of Z, the more accurate the Nearest Neighbor Index is. This shows that there are certain areas in Zanjan where the criminals act. This follows a centralized pattern; on the other hand, many areas of the city are considered as crime cool spots. The Nearest Neighbor Index is 0.46 in the crime distribution for Islamabad. The study of Z value of these crimes, i.e. -18.28, proves that the spatial distribution of the spots related to all crimes in Islamabad follows a clustered pattern.

Kernel Density Estimation

The study of the distribution of crime hot spots for all crimes in Zanjan reveals that Islamabad is one of the most important crime hot spots in Zanjan. A precise analysis of crime hot spots in Islamabad shows that the center of this spot is close to the geographic center of the area, especially the intersection of Hodayoun Road and Ayatollah Shahid Madani St. The commercial and residential landuses on Shahid Madani St. that passes through Islamabad in a East-West direction, seems to be the reason behind the formation of such a pattern in the region. On the other hand, one of the reasons for the high frequency of crimes in Islamabad is the absence of

police stations in this area of the city. This indicates an opportunity for committing crimes in the central part of this area compared to other parts.

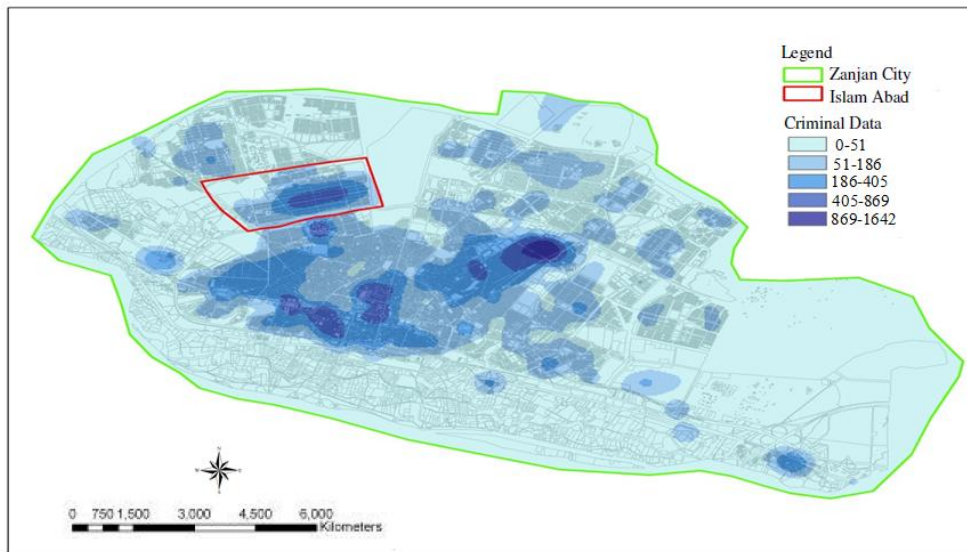


Figure 3: Spatial distribution of the hot spots for all crimes committed in Zanjan and Islamabad, Using Kernel Density Estimation

Discussion & Conclusion

Based on the findings of this study, one of the most important crime hot spots in Zanjan is located in the informal settlement area of Islamabad and the spatial distribution of the crimes under investigation in Islamabad follows a clustered and centralized pattern; that is to say special parts of the neighborhood are the hot spots and many other parts are considered as cool spots. According to the last census in 2006, Islamabad has a population of 39439 people that includes 11.2% of the whole population of Zanjan. However, this area covers only 1.8% of the total area of Zanjan. So, a major feature of this neighborhood is its high density of population. Hence, the informal settlement area of Islamabad is one of the densest neighborhoods of Zanjan. The investigation of the relative density of population in Islamabad shows that 422 persons are living in every hectare of this area, while the relative density of population in Zanjan is 69 persons per hectare. In other words, the relative population density in Islamabad is 6 times more than the mean population density in Zanjan and this feature has turned this area to one of the most crowded neighborhoods in Zanjan. Other than the relative population density, the study of the net residential density in Islamabad reveals that Islamabad is much denser than Zanjan, as the net residential density in Islamabad is 588 persons per hectare, while it is 343 persons per hectare in Zanjan. So, the net residential density in Islamabad is 245 persons, i.e. 1.7 times, more than the net residential density in Zanjan. Therefore, the gross and net residential density in Islamabad is much higher than other areas of Zanjan. Similarly, the crime rate in this neighborhood is higher than other neighborhoods in the city to the same proportion. So, there is a direct relation between the increase of the population density in this area and the increase of social offenses. The highest percentage of the Islamabad area is allocated to residential landuses, so that 45.7% of the total area of the neighborhood is covered by residential spaces, while this rate is 17.6% for Zanjan. Therefore,

residential landuses are 38.51% higher in Islamabad compared to the whole city. More than 11% of the lands in Islamabad are allocated to multiple residential landuses. This is 2.4% for Zanjan. So, the residential and multiple residential landuses in Islamabad are about three times more than Zanjan. This indicates there is an imbalance in allocating residential landuse in this area. On the other hand, other landuses needed by the residents and related to residential landuse are not formed in this area and many service-providing landuses needed for the population do not exist in the neighborhood or they are not sufficient at all. Among such landuses, one can refer to health centers, urban installations and facilities, cultural centers and police stations. The reason for the structural imbalance in this neighborhood is that only 3.69% of the landuses in this area is allocated to higher education, 0.23% to senior high school education, 0.98% to junior high school education, 0.39% to elementary education, 1.59% to other levels of education, 0.5% to employment and training centers; while, the educational landuse covers 4.2% of Zanjan's area. The high relative population density in Islamabad indicates the need of its residents for more educational institutes. On the other hand, out of the total area of Islamabad, only 0.12% belongs to health-related landuses, and 0.01% to urban facilities the lack of which is visible in Islamabad. A more significant fact concerning the type and size of landuse allocation in Islamabad is the lack of some necessary landuses so that some urban landuses related to recreation and leisure time activities including cultural landuses do not exist in this neighborhood, while the cultural landuse covers 0.2% of the city's total area. It seems that the absence of police stations in this area is an effective factor for the high frequency of crime rate in Islamabad. Map 3 illustrates the distribution of police stations in Zanjan and the location of Islamabad with respect to these stations. As it can be observed there is no police station in Islamabad and its percentage is zero in this area; while, 4 percent of the total area of Zanjan is allocated to police stations. The absence of police stations in this neighborhood has rendered the role of the police forces ineffective and it has minimized an appropriate control of police forces over the area and as a result, the crime opportunities increase so that the criminals can commit their crimes in an easier and more effective way and yet after that they can disappear.

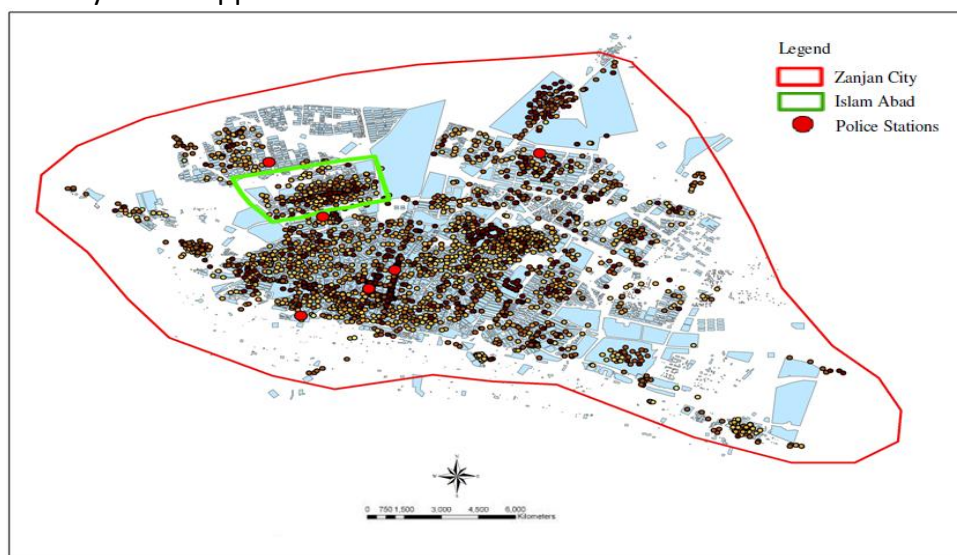


Figure 4. The Distribution of Police Stations in Zanjan and the Situation of Unofficial Settlement Area of Islamabad.

Hence, the type and method of using urban lands can influence the creation of grounds and situations for committing a crime. On the other hand, some other spatial features can be crime-preventive. So, some strategies can be effective in controlling crimes and improving security in the unofficial settlement area of Islamabad. These factors include: construction of pass ways in Islamabad to facilitate easy and immediate access of police and security forces; walling and fencing the deserted buildings and lands; establishment of recreational centers, stadiums, libraries, parks and many other recreational places for the residents to spend their leisure time; purification of unpleasant activities and improving tourism, reception and cultural roles; designing uniform patterns in the texture of the neighborhood and removing the defenseless urban areas.

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