

Impact of Geographical Space and Urban Transformation on Woman In Society: A Study Of Ajmer City (Rajasthan)

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I. Introduction

Urban transformation initiatives are a multi-faceted and fast-paced process carried out in a country that can be unpleasant at times and glaring at others. This process alters not just the physical appearance and infrastructure of cities, but also the networks, lifestyles, living cultures, and social tissues of their residents. The fundamental basis of this study is that women are influenced differently by such processes than men as a social group, and that they are involved with various parameters. The study focuses on how and why urban transformation has added to the increase in crimes against women in the region. It attempts to identify the growth pattern of the Ajmer city with increasing urban culture contributing to slums, congested sections, the sprawl of vertical building leading to narrowing of lanes, and traffic increase especially in the old city region. One of the focuses of spatial criminal research throughout the years has been the identification of geographical variability within the standard geographic study units of the day. According to India's National Crime Records Bureau, 39 crimes against women were committed every hour in 2017, up from 9 in 2001 and 21 in 2007. In 2016, the rate of crimes against women per 100,000 females was 55.2, up from 41.7 in 2012. The scenario is scary and needs investigation and solutions for creating social well-being and well fare. According to the urbanization trend in the Rajasthan (Census report of 2011) the part of urban population in Rajasthan has inched up to 24.87 percent, whereas it was 23.38 per cent in 2001 and 15.06% in 1901. Number of towns in the Rajasthan increased to 297 in 2011 from, 216 in the census 2001 and 133 in the year 1901. The area or registration lot has long been the standard spatial unit of research within this writing. The accessibility of registration information for examination, such as with the crime percentage and area remainder considers discussed above, is one of the fantastic advantages of these units of inquiry. This flagship project work aimed to establish a strong relationship between growth trends, population increase and vertical expansion of a city and its declining quality of life, with respect to women in society. It suggests concrete policy framework and put forward strategies for safety enhancement in the society, keeping a balance between development and social welfare. This project will prove to be a mile stone in promotion and enhancement of woman safety and security in Ajmer city.

II. Objectives

Crime and Geography are interrelated to each other in every possible way, as per Mayhew (2009)- Geography of crime refers to the studies which analyse crime, with its effects, the crimes, and the criminals, to understand the interaction with society and space. This study focuses on establishing a profound relationship between geographical space, city urbanization and its impact of women in society. The major objectives are-

1. To understand, interpret and examine the socio-economic changes in Ajmer city leading to various types of crimes in Ajmer city.
2. To investigate and evaluate using a variety of research field-based techniques using GIS and Remote sensing such as Hot Spot Analysis and Kriging to ear mark the picks and pockets of crime centers.
3. To examine and evaluate the factors responsible for the change of Crime trends and occurrence in the Ajmer city.

Study Region

Ajmer District is a district in Rajasthan, India's westernmost state. The district headquarters are at the city of Ajmer. Ajmer has a population of 542,321 people (2011 census), divided into three groups: Hindus, Muslims, and Jains. Nagaur District to the north, Jaipur and Tonk districts to the east, Bhilwara District to the south, and Pali District to the west define the city, which is located in the heart of Rajasthan.

Table 1: Study area information

Latitude	26°23'21.14"N To 26°31'20.37"N
Longitude	74°35'0.19"E To 74°41'15.91"E
City	Ajmer
District	Ajmer district

State	Rajasthan
Country	India
Area	66.61 km ²

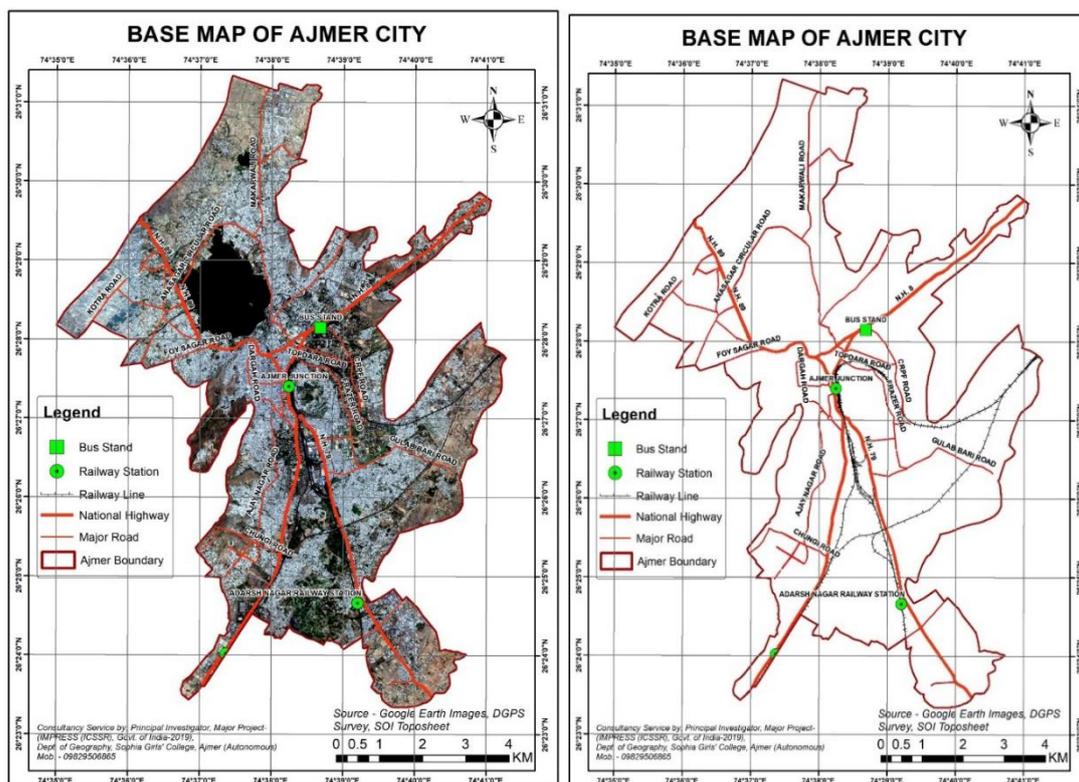


Figure 1.1 Base map of Ajmer city

Demographic Characteristics

According to the 2001 census, the population of Ajmer was 4.85 lakh, up 20% from 1991. Ajmer's current population is believed to be around 542,321. As indicated in Table, the city's population has increased by more than threefold in the last six decades, from 1.47 lakh in 1941 to 5.42 lakh in 2011.

Table 2: Population Growth of Ajmer

Year	Population	Average Decadal Growth	Growth rate (%)
1941	147,258	-	-
1951	196,633	49,375	33.5
1961	231,240	34,607	17.6
1971	264,291	33,051	14.3
1981	375,593	111,302	42.1
1991	402,700	27,107	7.2
2001	485,197	82,497	20.5
2011	542,321	57,124	11.8

(Source: Census of India – 2011)

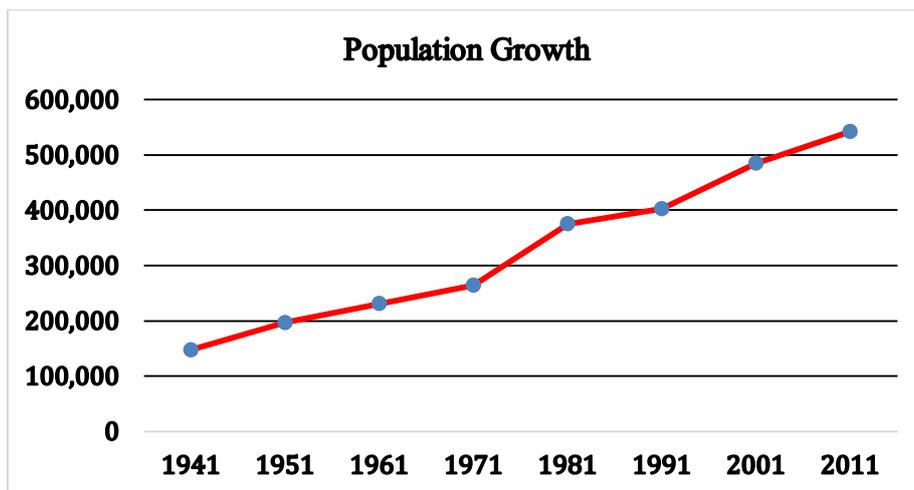


Figure 1.2 Population Growth of Ajmer City

III. Methodology and Database

Topographical maps, satellite images, census data, and crime statistics specifics are among the data needed for this investigation. Survey of India topographical maps were used to map the extent of the urban area as it remained in 2011. For this study, secondary data was gathered from multiple sources and used to map the range of crime locations using Landsat Images data.

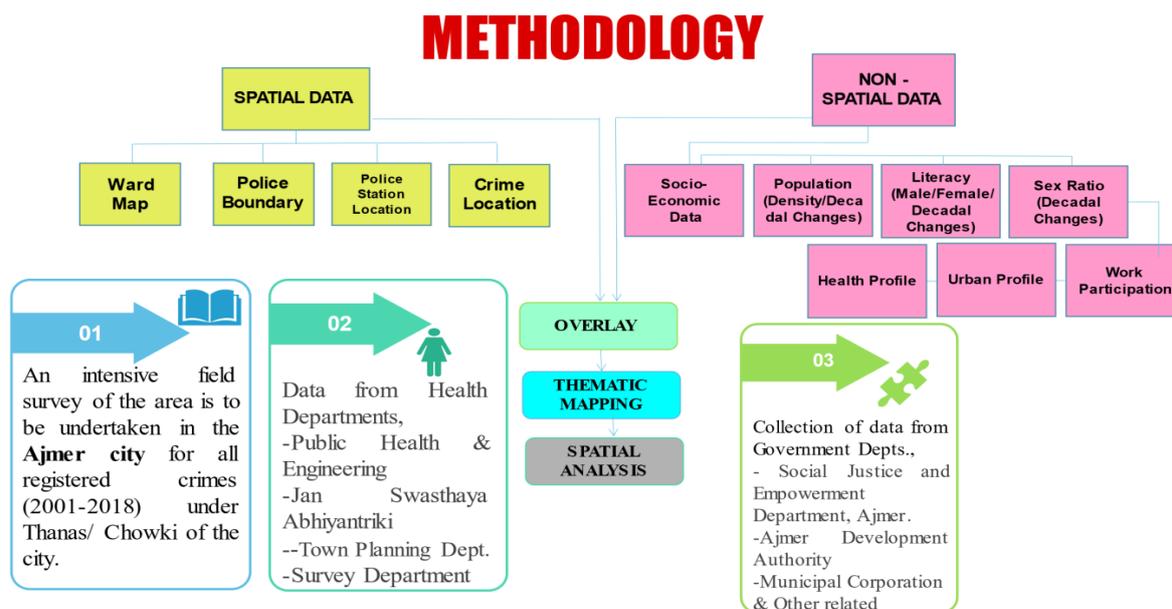
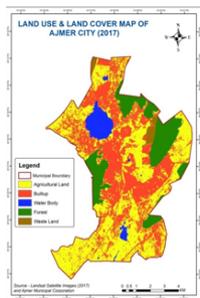
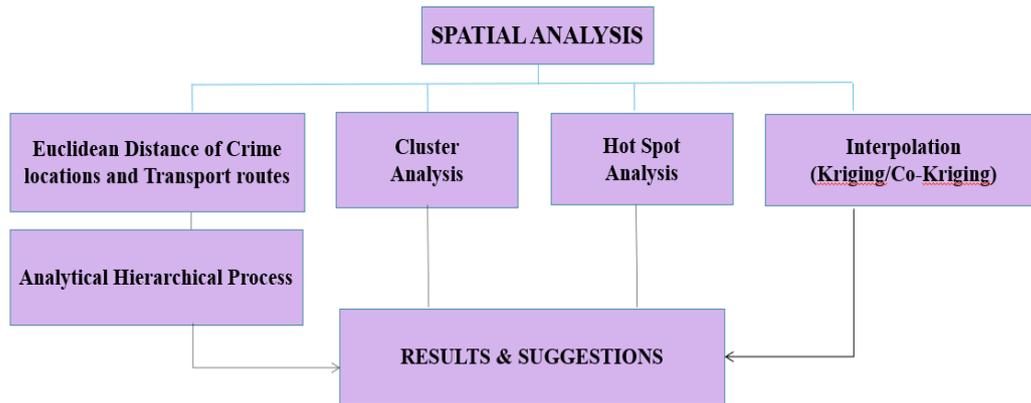


Figure 1.3 Methodology Framework

The research focused on studying the city's urban characteristics and growth trends while keeping the concept of geographical space in mind. An comprehensive field survey of the region was conducted in the Ajmer city under the Major Project sponsored by ICSSR (Impress Scheme), Govt. of India on 'Impact of Geographical Space and Urban Transformation on Woman in Society: A Study of Ajmer City (Rajasthan). The study was undertaken for all registered crimes (2009-2019) under 9 Thanas and Chowkis of the city, using ward-by-ward maps from the ADA and Town Planning Department and also from Survey Department. The Mahila Thana was also investigated and approached for collecting relevant data.



-Geospatial techniques will be used as a tool to identify factors that are contributing to urban sprawl, population distribution, by mapping and providing solution for societal welfare through getting Clusters and Hotspots.

-Kriging, Cluster analysis, Weighted overlay will be implied for seeking analysis.

-Statistical software along with other , techniques using SPSS will be implied

-An overall socio economic study will be undertaken to evaluate the factors responsible for increase in crimes against women.

By mapping and providing solutions to societal welfare through Clusters and Hotspots, geospatial techniques was used as a tool to identify factors that contribute to urban sprawl, population distribution, and by using geospatial techniques to identify factors that contribute to urban sprawl, population distribution, and by using geospatial techniques to identify factors that contribute to urban sprawl, population distribution, and by using geospatial techniques to identify factors. Tools such as Kriging and Hot Spot analysis were used to obtain productive results. An over-all socio-economic study was undertaken to evaluate the factors responsible for increase in crimes against women.

IV. Discussion

The research work is an outcome of ICSSR (Impress) New Delhi sponsored project which focuses on analysing the environmental implications and challenges aroused due to urban sprawl. The case study focuses on how geospatial tools are being used to reduce crime in the area. Such perceptive investigation mediations assist city police in improving spatial crime planning and defining the boundaries of area of interest zones in order to better crime regulation. This small-scale investigation intends to aid and benefit local police in the development of observation plans and crime control methods. The investigation's main goal was to identify crime-prone zones through crime planning, with the likelihood of an occurrence being established by the frequency of previous crime regions, as well as the city's changing metropolitan profile. This investigation aided in the accessibility of spatial crime problem regions, allowing police to create a better observation plan and planning in order to restrict crime occurrences and conduct preventive moves in a short time period based on least distance maps. Such analytical mediations provided Ajmer city police with a geographical dynamic framework for improved observation booking on a transient premise. Police officials follow close suspects and increase surveillance in the impacted areas based on information obtained.

The research paper uses crime mapping as a tool to identify crime prone zones, suggesting zones with a high possibility of, based on a spatial understanding of the region, criminal events have been reported.

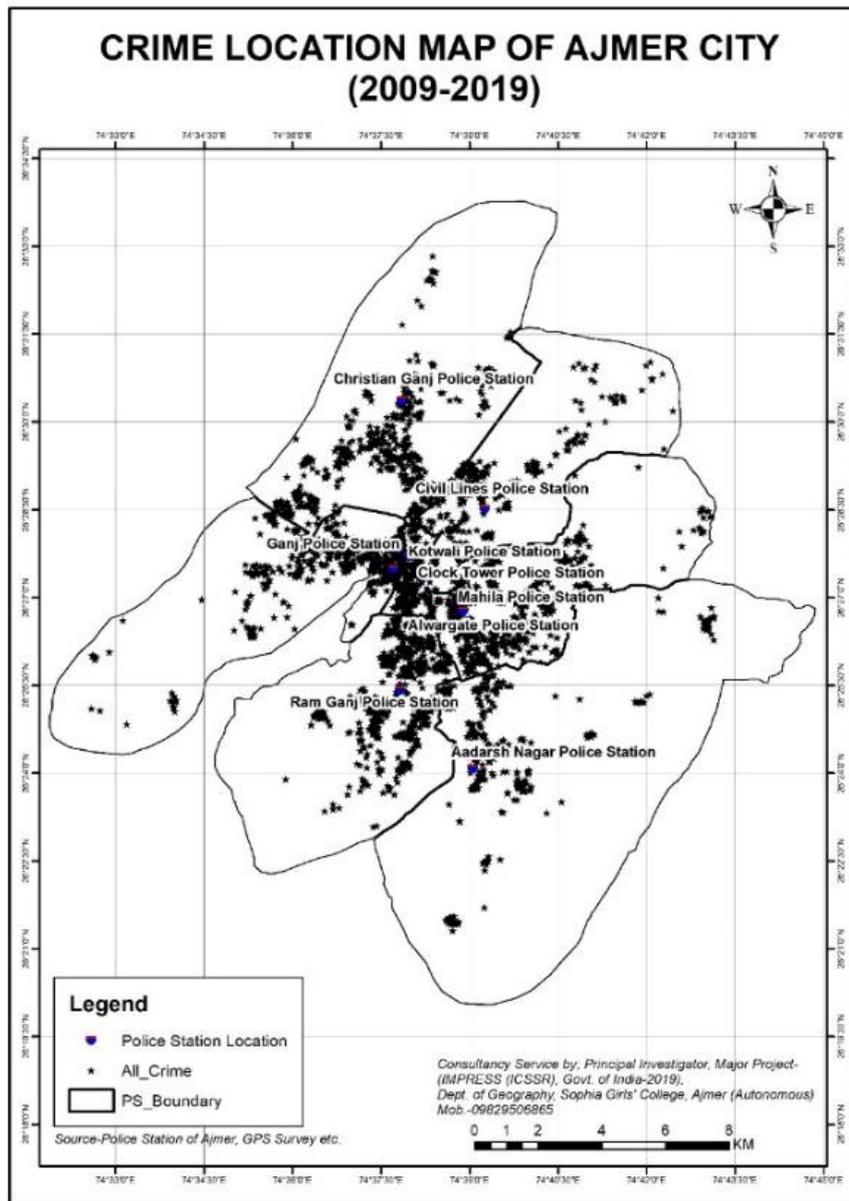


Figure 1.4 Crime Locations in Ajmer with Police boundary

The above map presents a detailed layout of the crime occurrence in the region. It helps to identify vulnerable picks and crime hotspots in an area that has been heavily influenced by rising urbanization. Attempts were made to generate Euclidean distances of crime locations from Police Stations and key roadways in order to analyze the pattern of crime incidence along transportation routes. The goal of this study was to see if there was a link between the sex ratio and rape incidents in Ajmer, as well as how the dependent variables interacted. Within the city's police station bounds, crimes in various police stations have been mapped in. It's important to note that the police station boundaries, as shown in figure by the brown lines, encompass both the city's urban and rural profiles and are located outside of the city limits.

Hotspot Analysis was applied as a useful method for interpreting data using the Inverse Distance Weighted tool. By grouping points of occurrence into polygons or converging points that are in close proximity to one another based on a computed distance, this tool employs vectors to discover the locations of statistically significant hot spot and cold spot centres in your data. When similar high (hot) or low (cold) values are found in a cluster, this group feature appears. The hotspot concentration, as illustrated in Figure 1.5, is limited to the city's northwestern and central areas. With 99 percent confidence, it has higher values in the ancient city zone, and 95 percent and 90 percent confidence on the city's outskirts.

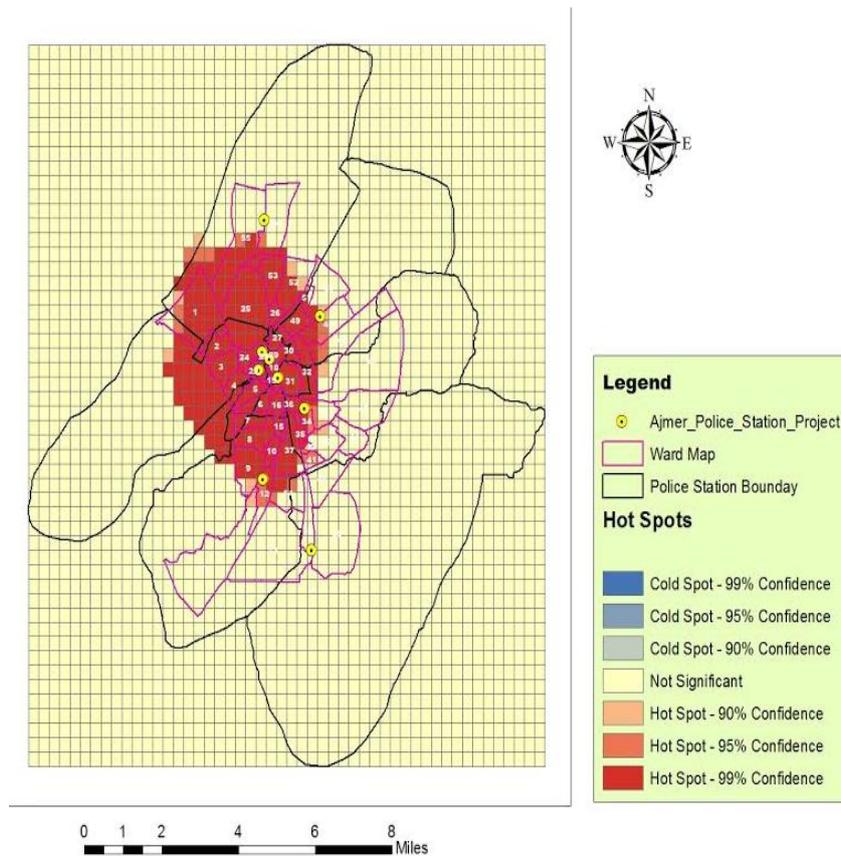


Figure 1.5 Hot Spots of Crimes in Ajmer City

Ground truthing survey helped to confirmed the conclusions of the hot spot research, revealing the facts of the overcrowded regions of Dargah, Ganj, Kotwali, Purani Mandi, Madar Gate, Nala Bazar, and Kutchery Road, which have a high frequency of crimes. The high non-working population, high illiteracy, people who work primarily for a day wage, and low-per-capita street/footpath vendors have all been recognised as contributing reasons in such crime occurrences. The consumption of locally produced liquor and narcotics was another supportive field finding.

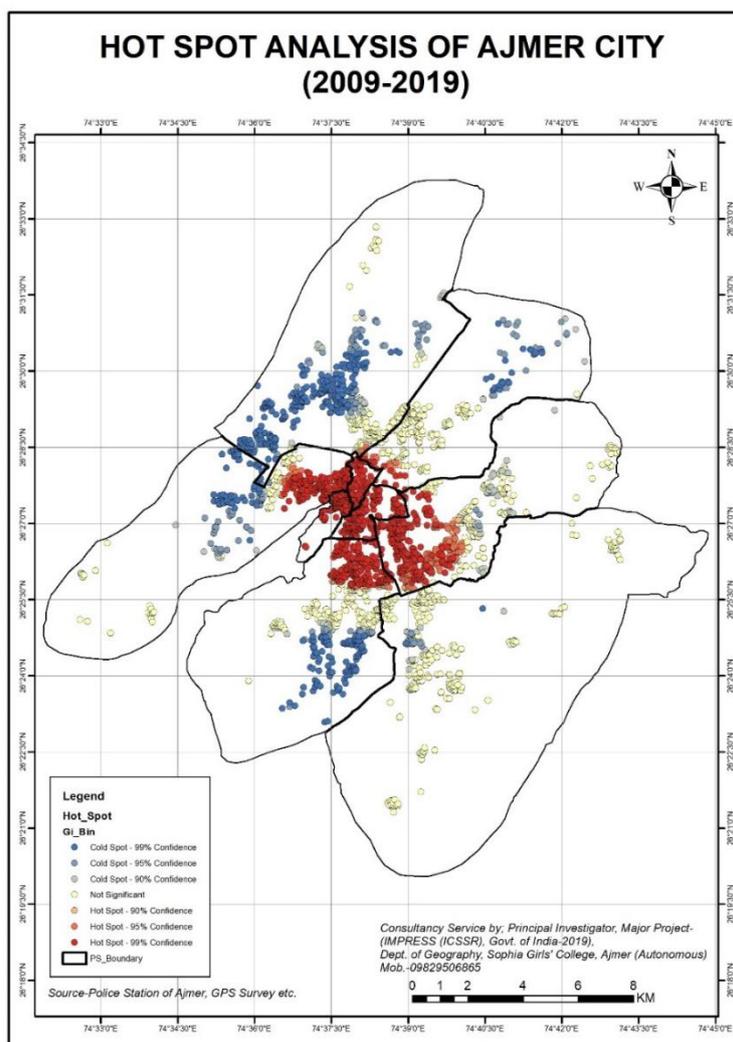


Figure 1.6 Hotspot analysis of Crimes in Ajmer City

The hot spot tool works by finding each feature's placement within the context of its surrounding features. Features with a high value are intriguing, but they may or may not constitute statistically significant hotspots. Features must be of high value and additional features with similarly high values to be statistically significant hot spots. A feature's and its neighbors' local sums are compared proportionally to the sum of their features. One of the main purposes of crime mapping and designating high-crime-prone zones in the city was to establish tactics for better surveillance planning so that police officers could handle crime effectively. Time scheduling maps were also created and made available to policing departments with ready-to-use data sets. The research is furthered by predicting shifts in host spots and crime-prone zones for specific crimes, as well as gender-sensitive crime investigation. Using GIS-enabled crime mapping technologies, future actions, responses, and preventions can be efficiently planned.

In figure 1.6 , the primary hot spots, or areas with a high number of Crime Incidents surrounded by less crime prone zones with a high number of Crime Incidents, are shaded red. Cold spots, or locations with a low number of Crime Incidents that are surrounded by other areas with a low number of Crime Incidents, are coloured in blue. There are no statistically significant clusters in the beige tinted areas. The following diagram shows how hotspot analysis was used in crime mapping in Ajmer, Rajasthan, India.

The Kriging approach is a geo-statistical interpolation technique that uses both the distance and degree of variation in known data points when estimating values in unknown places. It's a multi-step process that includes data exploration, variogram modelling, surface development, and (optionally) variance surface exploration. On the original data set, Using a fish net, the standard kriging methodology was used on all crime locations within the Police Thana border Kriging's major purpose was to predict the value of a function at a given point.

Ordinary Kriging was used to construct likelihood maps for crime incidences based on recorded incidents, demonstrating that crime is more prevalent in the north west and central city (Fig. 1.7). The chance of recurrence in nearby wards gradually decreased, with low values in the perimeter zone.

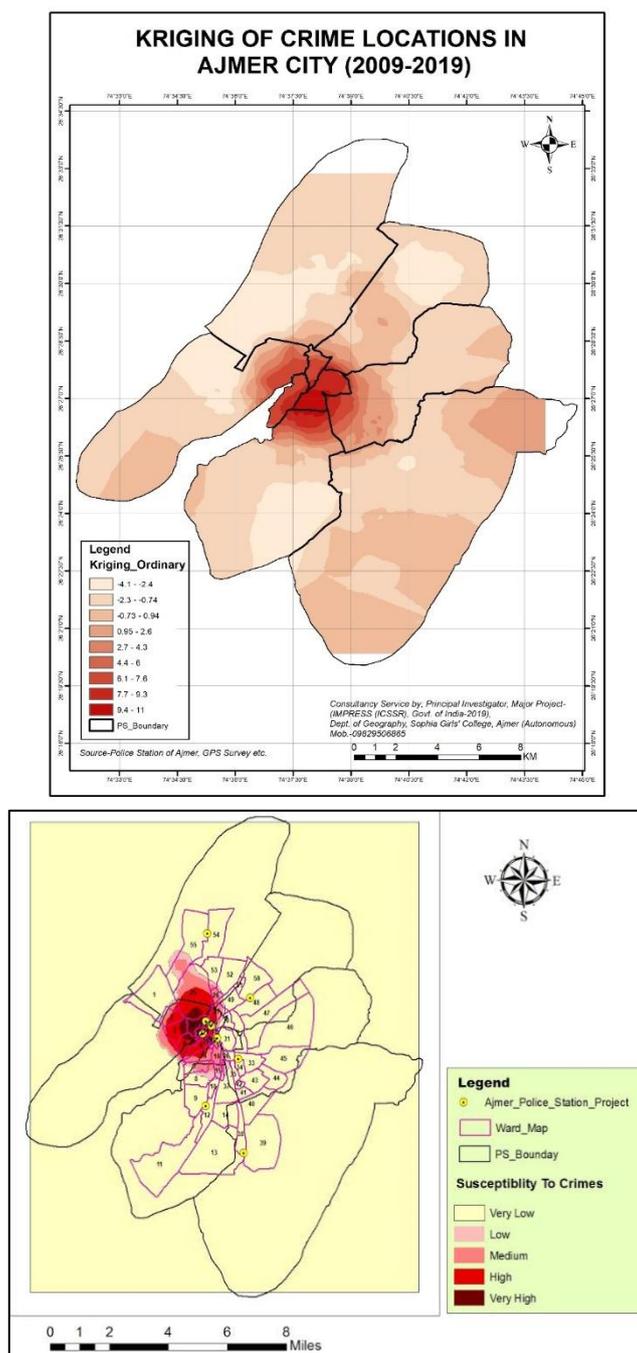


Figure 1.7 Crime Susceptibility - Ordinary Kriging using interpolation technique

Furthermore, the Co-kriging methodology was employed, which necessitates a higher level of estimate, including the discovery of correlations between each dependent variable and the independent variable. For further prediction, the Co-Kriging methodology is employed with the primary variable of crimes, as well as socio-economic variables with a strong association with the primary variable.

Table 3: Correlation Coefficient of Crime/non-spatial data

S. No.	Non-Spatial Attribute	Correlation Coefficient
1.	Illiteracy as a variable	0.991974628

2.	Non-Working Population as a variable	0.938512548
3.	Sex Ratio as a variable	-0.279543878
4.	Population segregation	0.964581285

With the exception of sex ratio, which was found to be strongly associated, all crimes were linked to non-spatial variables such as population and illiteracy and also non-working population, and sex ratio. Illiterate population, non-working population, and gender ratio were used as dependent variables, while aggregate crime occurrences for 2011 were used as the independent variable. The findings show a strong link between crime and the number of people who are illiterate or unemployed. However, there was a strong negative association between the sex ratio and the number of rape cases reported.

In the Dargah, Ganj, Christian Ganj, and Clock Tower city centre regions, the Co-kriging technique resulted in the creation of three "High Crime Susceptible Districts". Hundreds of pilgrims move in and out of the core city region, particularly wards 55 in the north, 15 and 16 (south-central), and the rest in 3,5,21,22,23,24, 25, 26 wards. Wards 55, 2, 8, 10, 36, 17, 18, 29, and 27 were mostly affected by 'Medium Crime Susceptibility.' The risk of crime is low to very low in the surrounding areas The Alwar gate and Kotwali police stations, which are located in the city's least sex ratio sector, recorded the most rape incidents. The Co-Kriging approach identified three crime-prone zones in the city: the central city region, the north-west region, and the south-west region along the city's major roadways. According to the results of the interpolation approach, crimes are more likely to occur in wards 2,3,5,6,20,22,24, and 25 in the city's north west and central areas. In the surrounding wards 15, 16, 26, and 55, the frequency of incidence gradually decreases. In the periphery, it even drops to dangerously low levels.

V. Conclusion

The Project work aimed at improving the city's welfare and quality of life should establish ways to restore the city's economic viability and safety for all that has been lost over time. As a result, Smart City and Safe City concepts should be geared at ensuring social stability and safety for all members of society. Modern cities should be constructed in a manner that is compatible with the environment in which our people live in peace and security, is free of depression and disasters, and complies with planning regulations. The research work suggests concrete policy framework and put forward strategies for safety enhancement in the society, keeping a balance between development and social welfare. This project certainly proves to be a mile stone in promotion and enhancement of woman safety and security in Ajmer city.

The goal of urban transformation is not just to increase the number of people living in cities or to grow the size of cities. In terms of industry structure, employment, living environment, and social security, it is about a total shift from country to urban style. Women must be incorporated as a distinctive social category in the urbanization process, which will necessitate policy reform. The project helped to suggest policy measures for city expansion keeping in mind the importance of geographical space, urbanization trend, and the direct/indirect beneficiaries of the same. The present urbanized societies need to have reforms for woman safety and security and opportunity of equal participation. Urban politics, which is the result of political forces colliding with social conditions, must be realised through a multi-stakeholder planning and design process that addresses the need for reshaping. For security enhancement, a sustainable planning strategy would secure the engagement of many segments of society, non-governmental organisations, as well as the public and commercial sectors.

Law enforcement agencies use crime analysis to minimize, avert, and solve criminal problems by using factors that identify the potential crime area for decision support. Alcohol outlets, cultural facilities, commercial structures, bars, and marginalized housing colonies all entice crime; depots-transport, gardens, and majestic stands, on the other hand, severely deflect. The majority of the city is under construction or utilized for residential purposes, according to the Ajmer City Master Plan. The comparison of Land Use Land Cover (LULC) maps below demonstrates how the city's urban profile has changed from 1989 to 2019, and how it has expanded into a congested urban agglomeration with the emergence of tiny jammed alleyways, crowded markets, slum neighborhoods, and wasteland. As a result of these changes, the kind and pattern of criminal activity in the region has changed considerably. The city has undergone a difficult urban evolution process due to a shift in occupational sector and a focus on tertiary and quaternary services rather than agriculture. Many social and economic difficulties in the region have been exacerbated by urban developments such as skyrocketing residential prices, complex road networks, and traffic congestion in the historic city center zone.

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