THE EFFECT OF ALTITUDE AND GEOGRAPHIC AREA ON CRIMES IN SATARA DISTRICT.

[1]Miss Kulkarni Amrita Ashok, [2]Dr. Vinod R. Veer, [3]Mr. Rahul Waliv

[1]Research Student, [2]Head & Associate Professor, [3]Asst. Prof

Department of Geography, Shivaji University, Kolhapur, Maharashtra, India

Abstract:

The kind of relief and terrain on which settlements prevail forms physical environment that affects decision making power of offenders. Physical set up has its impression on chances of victimization. Many scholars have studied effect of physical characteristics on crime. This research is an attempt to find out effect of altitude as a physical characteristic and also effect of geographical region on occurrences of crime. Chi-Square technique has been used to assess the available data. It is concluded that there exist no relation between altitude and crime. While testing relation in geographical area and crime it showed dependency of both variables. Crimes are dominant at plain region and traced less in hilly region.

Index Terms: environmental criminology, offenders, victims, altitude, geographic area

Introduction:

Incidence of crime has spatial connection. Altitude and slope of location plays important role in crime occurrences. Specific crimes like burglary are occurred at places with higher income households but with lower safety features.

The kind of relief and terrain on which settlements prevail forms essential physical environment that influences decision making power of offenders and concludes into crime causation. Physical situation of an area can facilitate or hinder criminal activities. Many researchers have studied influence of water bodies on the spatial distribution of crimes. Peeters and Elffers (2010) found that the vicinity of water bodies in The Hague, The Netherlands, had little impact on crime causation while Clare, Fernandez and Morgan (2009) found that Swan River in Perth, Australia diminished the probability of choice of specific zones for theft. Vegetation also sheds its impact on crime count. In Chicago Kuo and Sullivan (2001) found significantly less events in residential areas encompassed by vegetation than in areas encompassed by infertile land. Similarly distance and direction are progressively imperative determinants in the choice of appropriate target zone for a criminal in specific types of crime like property crime.

Earlier Social Disorganization Theory of Shaw and McKay (1942) explained that criminal act is prevalent in geographic unit that has social and physical incivilities. In 1980s environmental criminology focused imperative role of place in criminology. Researchers of environmental criminology give more importance to place. Residing at a greater or lower altitude can increase or decrease crime count. Brantigham and Brantingham (1981) in their work explained four dimensions of crime as law, offenders, target and place. Property crimes are space related. Crime pattern theory of Brantingham and Brantingham exhibits that offences are well on the way to happen where places observed by the offenders to achieve attractive targets meet with an area or surroundings that are well known to the offender. Places with higher accessibility are more suitable and selectable as a target for crime.

In present research researcher has made an attempt to find out relation between altitude and crime. For this crime against women are considered. Does the elevation affect the crime count was the focus of research.

Study region:

Area of Satara district is spread over 10480 sq.km. The study area extends from 17°5' to 18°11' North latitude and 73°33' to 74°57' East longitudes. Physiography of a region has remarkable variation that is hilly areas in the west, plains of river Krishna at the center and plateau regions towards the east. In terms of physical geography Satara district lies at an altitude of between 450-1137 meters above mean sea level. It is surrounded by mountain ranges of Sahyadri. Eastern plateau region is a part of Deccan plateau. Such an undulating topography makes study region ideally suited to examine the effect of altitude on crime incidence. Study region has 81% of its population living in rural region and 19% lives in urban. Female population shares near about half of its total population. There are 1719 villages in the study region. Random sample of 350 villages has been selected for analyzing effect of altitude. To study the crime head wise association with divisions data of seven police divisions of 2011 and 2015 has been used.
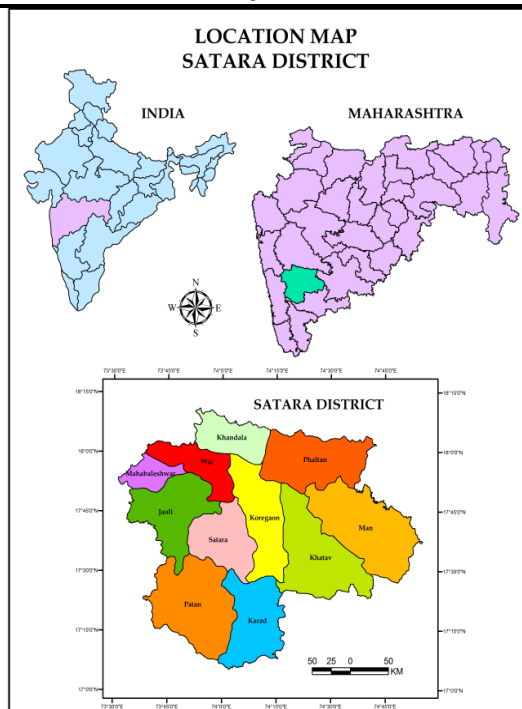
Fig. 1: Location Map

Objectives:

1.   To find out effect of elevation of a place on crime at a place.
2.   To find out effect of specific region on crime at a place.

Data base:

Study is based on both primary and secondary data. Study region has seven police divisions. There are 28 police stations in the district. Primary data has been collected by all police stations in the study region. Village wise data of crime against women has been collected by these police stations. Under this crimes against women like domestic violence, rape, molestation, kidnapping, murder, attempt to murder, victims of POCSO were reported. Data of fifteen years (2001-2015) has been considered for number of crimes in each division. Random sample of villages has been selected. These villages are spread over all police divisions. Sample covers entire study region. Elevation in meters of 350 villages is gauged with the help of Google Earth.

To know the effect of specific region on crime region wise data of each crime head has been collected. This data is transformed into crime rate by using following formula.

Crime against women in the division/ Total female population * 100000

Crimes like murder and attempt to murder, Rape and molestation, POCSO and prostitution, were referred combine depending on their severity.

Methodology:

Chi-square test for independence was used to know the effect of altitude on crime. For Chi square analysis data was divided into two categories, villages with altitude less than seven hundred meters with number of crimes less than ten and greater than ten and villages with altitude greater than seven hundred meters with number of crimes less than ten and greater than ten. Region wise data of each crime head is also assessed by Chi-Square Test.

Crime and Altitude:

Null hypothesis H_0: No relation between altitudes of village and number of crimes

Table 1
Observed frequency

Observed Frequency			
Altitude	$10 >$	$10 <$	Total
$700 >$	170	45	215
$700 <$	116	19	135
Total	286	64	350

Based on observed frequency values of expected frequency have been calculated.

Table 2
Expected frequency

Expected Frequency			
Altitude	$10 >$	$10 <$	Total
$700 >$	175.6857	39.31429	215
$700 <$	110.3143	24.68571	135
Total	286	64	350

Chi-square calculations:-

$$x^2 = \sum \frac{(f_i - e_i)^2}{e_i}$$

=   0.184005

Chi square values based on observed and expected frequency have been calculated using above mentioned formula and presented in the following table.

Table 3
Computation of Chi-square

Chi Square Table			
Altitude	$10 >$	$10 <$	**Total**
$700 >$	0.184007	0.82228	**1.006287**
$700 <$	0.293048	1.309557	**1.602605**
Total	**0.477054**	**2.131837**	**2.608891**

Tabulated chi-square value = 3.841459
Observed chi-square value = 2.6089
As observed Chi-Square is less than Tabulated Chi-Square we accept H_0 at 5% Level of Significance.

Crime and Region:

        Many criminologists and scholars of environmental behaviorology have admitted that crime is a space related term. Therefore present research has made an attempt to find out relation between crime and region. Crime head wise distribution of crimes in each division is given in table below.

Null Hypothesis H_0: there is no relation in type of crime and region.

Table 4
Observed Frequency

Division	Domestic Violence	Rape and Molestation	Murder And Attempt to Murder	Kidnapping	Other	Total
Karad	4.46	8.12	3.24	5.68	3.66	25.16
Patan	7.12	14.22	3.23	5.18	1.94	31.69
Mhaswad	6.3	20.16	2.1	6.72	7.14	42.42
Koregaon	7.49	25.83	0.62	1.25	2.5	37.69
Phaltan	5.77	14.45	3.37	6.26	6.25	36.1
Wai	8.12	13.13	2.49	6.25	10.63	40.62
Satara	26.45	32.26	4.21	9.46	3.16	75.54
Total	65.71	128.17	19.26	40.8	35.28	289.22

Table5
Expected Frequency

Division	Domestic Violence	Rape and Molestation	Murder And Attempt to Murder	Kidnapping	Other	Total
Karad	5.716283798	11.14984164	1.675477491	3.549298112	3.069098956	25.16
Patan	7.199882097	14.04365984	2.110329161	4.47047922	3.865649678	31.69
Mhaswad	9.63770901	18.79873937	2.824871032	5.984150474	5.174530115	42.42
Koregaon	8.563065832	16.70260459	2.509886592	5.316893714	4.59754927	37.69
Phaltan	8.201822142	15.99798423	2.404003872	5.092593873	4.403595879	36.1
Wai	9.22875389	18.00105594	2.705003803	5.730226125	4.954960238	40.62
Satara	17.16248323	33.47611438	5.030428048	10.65635848	9.214615863	75.54
Total	65.71	128.17	19.26	40.8	35.28	289.22

Table 6
Computation of Chi-Square

Division	Domestic Violence	Rape and Molestation	Murder And Attempt to Murder	Kidnapping	Other	Total
Karad	0.27609703	0.823324732	1.460915287	1.2790953	0.113767607	3.9532
Patan	0.000886285	0.002214227	0.594060306	0.112609792	0.959250577	1.669021
Mhaswad	1.155907636	0.098572062	0.186004249	0.090484778	0.746555104	2.277524
Koregaon	0.134469395	4.987805733	1.423040922	3.110768312	0.956969177	10.61305
Phaltan	0.721029892	0.14978482	0.388164316	0.267611575	0.77418734	2.300778
Wai	0.133207062	1.318099676	0.017089305	0.047147333	6.499764833	8.015308
Satara	5.025960788	0.044178789	0.133806144	0.134311699	3.978285562	9.316543
Total	7.447558088	7.423980039	4.203080529	5.042028789	14.0287802	38.14543

Calculated Value: 38.145

Tabulated Value: 36.415

As calculated Chi-Square is greater than Tabulated Chi-Square we reject the H_0 at 5% level of significance.

Conclusions:

This research examined the influence of elevation on crime. And found that there is no significant relation between altitude and crime. The highest altitude of the region is 1137 meters and lowest is 450 meters. But altitude being a physical characteristic does not affect crime count in the Satara district context. The research also focused on association between region and crime and it found that region and crime are dependent. Crime changes area wise. Highest crimes are observed in Satara division followed by Mhaswad and Wai division. Rape and molestation shows highest frequency whereas murder and attempt to murder has low frequency. Highest crimes are observed in Satara division and lowest in Patan division. Satara division lies in the central part of the district comprising plains of River Krishna. This plain region provides facilities to the offenders to commit crime. Plain terrain of a region makes it more accessible which is also a cause that makes the region selectable for crime. On the other hand Patan division lies in the western hilly region of the study area. Hilly region being less accessible hinders the choices of offenders to commit the crime. Besides this many other social factors like population density, unemployment, and literacy could be used to explain crime counts in the region.

Reference:

1. Brown, B. B., & Altman, I. (1981). Territoriality and residential crime: a conceptual framework. In P. J. Brantingham and P. L. Brantingham (Eds.), Environmental criminology (pp. 55-76). Prospect Heights, Ill: Waveland Press.
2. Cahill, M. E., Mulligan, G. F. (2003). The determinants of crime in Tucson, Arizona. Urban Geography, 24, 582-610
3. Felson, M. (2002). The topography of crime. Crime Prevention and Community Safety, *4*, 47-51.
4. Peeters, M. P., & Elffers, H. (2010). Do physical barriers affect urban crime trips? Crime Patterns and Analysis, 3, 38-49.