

# GEOGRAPHICAL ANALYSIS OF CRIMINOLOGICAL FACTORS THAT INFLUENCE CRIME INCIDENCE IN MADURAI CITY

**Saravanabavan V. \* Sheeba.V \*\*, Rakhi.U\*\* , Neethu,J.R\*\* Balu.C, \*\***

*\*Assistant Professor, Department of Geography, Madurai Kamaraj University, Madurai-625 021, TamilNadu*

*\*\*Post Graduate Project Fellow, Department of Geography, Madurai Kamaraj University, Madurai-625 021, TamilNadu*

## ABSTRACT

*Geography is known as spatial science because it has its own subject matter, and deals with place, location and space. Geography mainly studies on spatial analysis. It is much more related to space and location. Crime analysis is the systematic study of crime and disorder problems as well as other police related issues including socio demographic spatial and temporal factors to assist the police in criminal approaches, crime and disorder reduction, crime prevention and evaluation. The Study area Madurai is known as temple city and is well known for pilgrim tourism. The city is on the fast track of development in all the sectors of concern. So it is very urgent to consider the growing crime incidents among the growing population of the city. The main aim of the present study is to bring to light the spatio-temporal occurrence of crime incidents in Madurai city. The data collection both include primary and Secondary data with application of Statistical tool of Multivariate analysis known as Factor analysis. The society should be protected from increasing rate of crime by providing better education, good and well paid employment opportunities, better standard of living, well equipped police protection systems.*

**Key Words:** *Crime, Socio Economic, Ecological factors, Factor analysis ,*

## Introduction

Crime is an act harmful not only for some individual but also to the community or the public. Such acts are forbidden and punished by law. Legally crimes usually are defined as acts or omissions forbidden by law that can be pushed by imprisonment. Murder, robbery, burglary, rape, drunken driving, child neglect and failure to pay the taxes are all common examples.

The behavioral definition of crime focuses on, criminality, a certain personality profile that causes the most alarming sorts of crimes. (Cohen. L. and M. Felson 2006) To be classified as crime, the act of doing something bad must be usually accompanied by the intention to do something bad with certain exceptions. Crime happens in many forms and has different effects. The society is negatively affected due to increasing number of crimes. Major types of crimes that are usually seen in our society is Robbery, Theft, Snatching, and Murder. Crime activities are influenced by many factors. Many people are engaged in crime due to poverty or unemployment. (Sampson, Laub, and Wimer, 2009) The survey identified that most of the people are not taking any preventive measures against crime.

## Aim and Objective

The main aim of the present study is to bring out on the occurrence of crime incidents in Madurai city, the Causes of socio, Economic and Ecological factors and to analyze the reasons behind crime incidents

## Methodology

The collected data from the survey were suitably converted into variables drawn from the primary data. 600 Questionnaire are collected from respondents based on stratified random sampling procedure. The drawn variables are related to each other and linked together to explain the nature and purpose of the study. 27 variables are identified. It includes Age, Sex, Occupation, Educational status, Crime occurrence, influencing factors of crime etc...

The data was converted into standardized values which are in measurable form. It serves to draw comparisons and conclusions. The variables were then selected and tabulated to analyze the major dimension and also to explain the interrelationship between different variables. The data derived from the processing of variables was exposed to a multivariate statistical analysis. The factor analysis a well-known technique is used in the present study to identify the spatial analysis of crime in Madurai city.

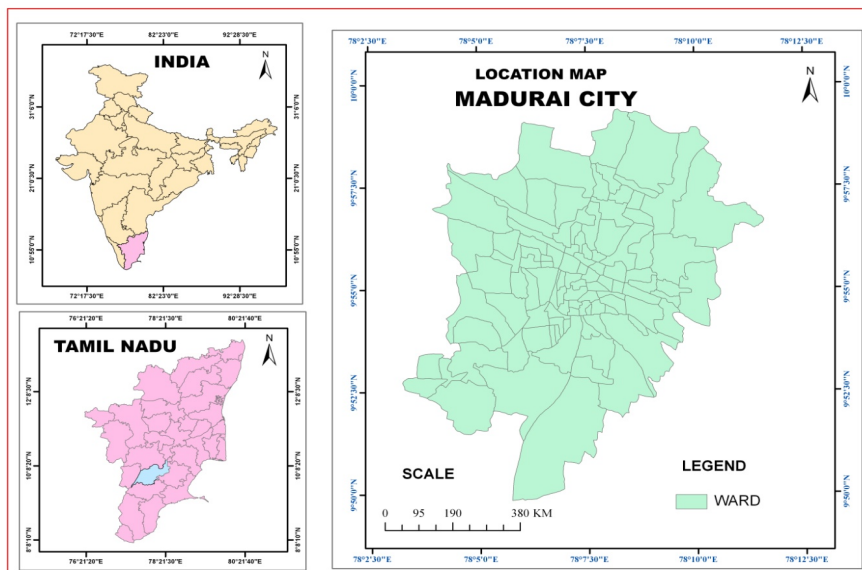


Figure 1. Location Map.

## Result and Discussion

The 27×27 correlation matrix of the present analysis has been reduced into 27×9 taking into account the factors with their Eigen value greater than unity. These factors analyzed and explained the simplified result and findings about the occurrence of crime in Madurai from factor loading. Table 1 explains the Eigen value and percentage variance explained by each factor. The nine factors identified by the varimax procedure registered more than 76% of total variance. Among these the first factor alone account for 19.10% of the total variance and qualified as the primary factor. The first factor with Eigen value of 2.93 explained 19.10% of variances. The second factor with an Eigen value of 1.98 explains 12.93% of variance and the third factor with an Eigen value of 1.57 explain 10.27% variance. Rest of the factors explains only less percentage variance.

The table of factor loadings represents the variables with their respective loadings. The variance accounted by each variable with respect to all factors. Each table shows the variables significant to the primary dimension. The identification of such variables with

significant loading is important since each factor has high influence on the factor analysis studies. Here a value of 3 and above is considered as limit and this value is used to separate the important and unimportant factors.

The factors found to be insignificantly loaded are not considered in the study so as to get a correct and meaningful interpretation of the data matrix (Sivasankar and Madha Suresh, 2012). Hence on the basis of significantly loaded variables and their relation with other factor, the dimensions have been identified and comprehensively named for interpretation and understanding.

The first dimension on types of occupation and crime occurrence explained a total variance of 19.10 with an Eigen value of 2.93. High positive factors loaded on occupation (.94) and other variables such as income status (.62), settlement type (.57), peak time for crime occurrence (.49), family type (.35) and level of police protection (.33). The negative factors are travelling time to the police station (-.49) and yearly variation in level of crime (-.42) (Table No. II).

Table 1. Factor loadings and dimensions on crime

SI No	Dimension Name	Eigen Value	%Of Variance	Cumulative %
1	Types Of Occupation And Crime Occurrence	2.93	19.10	19.10
2	Factors Determining Crime	1.98	12.93	32.04
3	Education Level	1.57	10.27	42.31
4	Frequency to Police Station	1.19	7.75	15.06
5	Crime Occurrence	1.08	7.08	57.14
6	Family Type	.86	5.66	62.80
7	Age And Crime	.78	5.09	67.90
8	Religion And Education	.64	4.20	72.10
9	Income Status	.63	4.10	76.20

Table 2. Dimension. 1 types of occupation and crime occurrence

Variable No	Variable Name	Factor Loading
4	Family Type	.35
7	Occupation	.94
10	Income Status	.62
12	Settlement Type	.57
13	Travelling Time To The Police Station	-.49
17	Yearly Variation In Level Of Crime	-.42
18	Level Of Police Protection	.33
25	Peak Time For Crime Occurrence	.49
<b>Eigen Value</b>		<b>:2.93</b>
<b>Percentage Of Trace</b>		<b>:19.10</b>

Eight variables found to be significant in explaining the first dimension. The first dimension and the variables loaded in the dimension explained the types of occupation and crime occurrence. A type of occupation of people decides the income status and then the settlement types of people. Settlement type will be decided based on the family type. Peak time for crime occurrence is the city is influenced by the level of police protection available in the society. If the police protection is high the yearly variation of crime will be negative. Since the police protection is less, crime is increasing year by year and the factor loaded is negative. Thus the types of occupation decided the occurrence of crime.

The second dimension factors determining crime explained a total variance of 12.93 with an Eigen value of 1.98. The high positive factor loaded on influencing factors for crime (.65) and other variables include occupation (.40) and family type (.31). The negative factors are type of crime occurred (-.87) and level of police protection (-.40) (Table No. III).

Five variables are found to be significant in explaining the second dimension. The second dimension and the variables loaded in the dimension explained the factors determining the crime and crime types. The occupation of the people and the family type are related to each other. The level of police protection is negatively loaded and thus the type of crime occurred is increasing. If the police protection is good crime can be reduced. All these factors influence the crime occurrence and its intensity and types.

The third dimension on education level explained a total variance of 10.27 with an Eigen value of 1.57. The high positive factors loaded on mode of transport (.74) and other variables such as influencing factors for crime (.65). Type of crime occurrence (.42). The negatively loaded factor is education level (-.32) (Table No. IV). Four variables are used to analyze this dimension. If the people are not well educated they will be unemployed. The mode of transportation used by the people will be public transportation. It influences the different types of crimes such as theft, snatching and robbery etc. The education of the people is an important influencing factor for crime.

The fourth dimension on frequency of police stations is explained by a total variance of 7.75 with an Eigen value of 1.19. The positively loaded factor is travelling time to police station (.35) and occurrence of crime in the area (-.31) (Table No. V).

Three variables are identified as significant to explain the fourth dimension. Occupation of the people affect the life of the people. The travelling time to the police station affects police protection of the area. If the police stations are distantly spaced the rate of crime will be increased. The number of police stations in an area is one of the determining factors of crime.

**Table 3. Dimension 2 factors determining crime**

Factors Determining Crime		
Variable No	Variable Name	Factor Loading
4	Family Type	.31
7	Occupation	.40
16	Type Of Crime Occurrence	-.87
18	Level Of Police Protection	-.40
24	Influencing Factors For Crime	.65
Eigen Value : 1.98		Percentage Of
Trace : 12.93		

Table 4. Dimension. 3 education level

Variable No	Variable Name	Factor Loading
9	Education Level	-.32
14	Mode Of Transport	.74
16	Type Of Crime Occurrence	.42
24	Influencing Factor For Crime	.65
<b>Eigen Value:</b>		<b>1.57</b>
<b>Percentage Of Trace:</b>		<b>10.27</b>

Table 5. Dimension. 4 frequency of police stations

Variable No	Variable Name	Factor Loading
7	Occupation	-.35
13	Travelling Time To Police Station	.35
15	Occurance Of Crime In The Area	-.31
<b>Eigen Value :</b>		<b>1.19</b>
<b>Percentage Of Trace:</b>		<b>7.75</b>

Table 6. Dimension. 5 crime occurrence

Variable No	Variable Name	Factor Loading
7	Occupation	.37
10	Income Status	-.34
12	Settlement Type	-.49
25	Peak Time For Crime Occurrence	.33
<b>Eigen Value :</b>		<b>1.08</b>
<b>Percentage Of Trace:</b>		<b>7.08</b>

The fifth dimension of crime occurrence is explained with a total variance of 7.08 and an Eigen value of 1.08. The positively loaded factor is peak time for crime occurrence (.33) and occupation (.37). The negatively loaded factors are settlement type (-.49) and income status (-.34) (Table No. VI).

Four variables are significantly identified to explain the fifth dimension. Income status of the people is negatively loaded. The income of the people determines the types of settlement. If the settlements are pucca and strong the protection of people from crime will be highly secure. It is found that crime incidents occurred at a particular time. The peak time for criminal activities is found to be an important factor for crime occurrence.

The sixth dimension of family type is explained with a total variance of 5.09 and an Eigen value of .86. Positively loaded is family type (.36) and education level (.36). The negatively loaded factor is settlement type (-.36). All the factors loaded for the variables are equal (Table No. VII).

Totally three variables were identified as significant to explain the sixth dimension. The education level of the people influences the settlements they build. In small families the education level will be high also. If the family is joint family they will be more courageous to face the crime than the nuclear family. So family type is found to be important in determining crime occurrence.

The seventh dimension of Age and crime is explained with a total variance of 5.09 and an Eigen value of .78. Here the positively loaded factor is age groups involved in crime (.31) and negatively loaded factor is mode of transport (-.30) (Table No. VIII).

Only two variables are identified as significant to explain Age and crime. Mode of transport used by the people will be different among different age groups. Young people use two wheelers and private mode of transport but old people use public mode of transport. Young people are involved in crime for money, and for other reasons. Age groups is identified as more influencing factor.

Table 7. Dimension 6 family type

Variable No	Variable Name	Factor Loading
4	Family Type	.36
9	Education Level	.36
12	Settlement Type	-.36
<b>Eigen Value :</b>		<b>.86</b>
<b>Percentage Of Trace :</b>		<b>5.09</b>

Table 8. Dimension 7 age and crime

Variable No	Variable Name	Factor Loading
23	Age Groups Involved In Crime	.31
14	Mode Of Transport	-.30
<b>Eigen Value :</b>		<b>.78</b>
<b>Percentage Of Trace :</b>		<b>5.09</b>

Table 9. Dimension 8 religion and education

Variable No	Variable Name	Factor Loading
6	Religion	-.37
9	Education Level	.28
<b>Eigen Value :</b>		<b>.64</b>
<b>Percentage Of Trace :</b>		<b>4.20</b>

The eighth dimension of Religion and Education is explained with a total variance of 4.20 and an Eigen value of .64. The positively loaded factor is education level (.28) and negatively loaded factor is (-.37)(Table No. IX). Two variables are identified as significant to explain the eighth dimension. Religion factors mostly influence the uneducated people. Religious belief leads to violence only when people do not know the importance and purity of religion. Educated will not be influenced by religious beliefs. Thus religion and education

equally influence on the rate of crime. The ninth dimension of this factor analysis income status is explained with a total variance of 4.10 and Eigen value of .63. The positively loaded factors are income status (.38) and type of crime occurrence (.32). (Table No. X). Two significant variables are identified to explain the ninth dimension. Less income people involve more in crime to sustain their lively hood. Sometimes criminals are paid well. Thus the type of crime will depend on the income status of the people. The income status of the people is found to be an important factor which influence crime.

Table 10. Dimension 9 income status

Variable No	Variable Name	Factor Loading
10	Income status	.38
16	Type of Crime Occurrence	.32
<b>Eigen Value :</b>		<b>63</b>
<b>Percentage of Trace: 4.10</b>		

## Conclusion

In our society criminal activities are becoming common now a days. Many people without any limit of age are involved in crime. The most influencing factors on crime are education level, unemployment, income status, the level of police protection. The criminal activities are given different dimensions. The society should be protected from the increasing rate of crime by providing better education, good and well paid employment opportunities, better standard of living, well equipped police protection systems. People should be made aware about the criminal activities and its negative effects on the society. People should be provided with a secure family by controlling the threat of criminal activity in the society.

## Reference

- Cohen. L. and M. Felson.**, 2006., "Social Change and Crime rate trends : A Routine Activity Aproach". American Sociological Review. Vol.44 - pg no- 588- 605
- Sampson, Laub, and Wimer.**, 2009., Does Marriage Reduce Crime "A Counterfactual approach to with in – individual casual of effects"- Journal of criminology – Vol I pg no:- 465-508
- Sivasankar S and Madha Suresh V.**, 2012., Urban Ecological Aspects of Property Crimes in Chennai City: A GIS Based Approach . Geographical Analysis International Journal Vol I Issue I July 2012