Socio-Demographic Determinants of Crime; A Geographic Analysis of Population, Literacy and Property Crime incidence in Nagaon District, Assam

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ABSTRACT:
Property crime exhibits considerable spatial variation because opportunities for offending, population concentration and socio-economic conditions differ across geographical areas. This study examines the relationship between population growth, literacy and property crime across police station jurisdictions in Nagaon district, Assam. Official crime records and population and literacy data obtained from the Census of India were used to construct police station-level indicators. Population data from the 2001 Census were related to property crimes recorded during 2001–2010, while 2011 Census data were used for the subsequent period. Pearson's correlation coefficient and descriptive comparative analysis were employed to evaluate the associations between the selected socio-economic variables and overall and category-specific property crime. The results reveal substantial spatial variation across police station jurisdictions. Population growth had a weak positive association with property crime growth ($r = 0.38$), indicating that jurisdictions experiencing rapid population increase generally tended to record higher crime growth, although important exceptions were observed. Literacy also showed a weak positive association with overall property crime ($r = 0.23$). Crime-specific analysis revealed weak positive associations for theft and burglary, while dacoity, robbery, extortion and theft in dwelling houses displayed weak negative relationships with literacy. These findings indicate that population and literacy alone cannot adequately explain the spatial distribution of property crime. Local employment conditions, accessibility, urban functions, policing, reporting practices and community-level circumstances may exert greater influence. The study demonstrates the importance of analysing crime at the police station level and cautions against interpreting socio-economic indicators as direct causes of criminal behaviour

Keywords: Crime, socio-economic correlates, population, literacy, Property crime

Introduction

Property crime represents an important dimension of public insecurity because it directly affects household assets, commercial activities, livelihoods and perceptions of safety. Offences such as theft, burglary, robbery, dacoity and

extortion impose economic losses on individuals and institutions while also generating wider social consequences. However, property crime is not distributed uniformly across space. Its incidence varies among urban centres, rural settlements, transport corridors and administrative jurisdictions because social, demographic and economic conditions influence the availability of targets, movement of people, guardianship and opportunities for offending.

Socio-economic explanations of crime generally focus on the relationship between criminal activity and factors such as population growth, poverty, unemployment, education, inequality and urbanisation. Rapid population increase may place pressure on employment, housing, infrastructure and public services. It can also increase the number of potential offenders, victims and suitable targets within a geographical area. Larger and more densely populated settlements may provide greater anonymity and a wider range of opportunities for offences against property. Nevertheless, population growth does not automatically produce crime. The effects of demographic expansion depend on local employment conditions, social organisation, policing, community vigilance and the capacity of institutions to manage population-related pressures.

Education and literacy are also frequently examined in relation to crime. Higher literacy may improve employment prospects, social awareness and access to legitimate opportunities and may therefore reduce involvement in criminal activity. At the same time, areas with comparatively high literacy may also be more urbanised, commercially developed and institutionally connected. Such areas may contain more valuable property, greater mobility and stronger crime-reporting systems. A positive statistical association between literacy and recorded property crime should therefore not be interpreted as evidence that literacy causes crime. Instead, it may reflect the influence of other characteristics associated with socially and economically developed areas.

The spatial relationship between socio-economic development and crime is therefore complex. The same demographic or social variable may produce different outcomes in different geographical contexts. A rapidly growing population may correspond with higher crime in one police station jurisdiction but not in another. Similarly, a jurisdiction with high literacy may record elevated property crime because of urban concentration, commercial activity or more efficient reporting, whereas another highly literate area may experience relatively low crime because of stronger guardianship and institutional control. Such variations demonstrate the need for disaggregated analysis below the district level.

Police station jurisdictions constitute useful units for analysing local crime patterns because crime records are commonly registered and maintained within these administrative boundaries. District-level statistics often conceal important internal variations by combining areas with contrasting demographic, economic and locational characteristics. Police station-level analysis makes it possible to identify such differences and assess whether relationships observed at an aggregated level remain valid across smaller spatial units. Despite its significance, this scale of analysis remains comparatively limited in studies of crime in Assam.

Nagaon district provides an appropriate setting for such investigation because it contains police station jurisdictions with diverse settlement structures, population characteristics, levels of literacy, transport connectivity and economic functions. Some jurisdictions include urban and commercially active centres, while others are predominantly rural. These variations create different opportunity structures and socio-economic environments within the same district. The preliminary analysis indicates that population and property crime did not increase proportionately in every police station jurisdiction. For example, Samaguri recorded high population and crime growth, whereas Jammunamukh experienced substantial population growth but comparatively limited growth in property crime. Such contrasting

patterns suggest that the relationship between demographic change and crime is neither uniform nor deterministic.

Against this background, the present study examines the relationships between population growth, literacy and property crime across police station jurisdictions in Nagaon district. It seeks to determine whether these socio-economic indicators explain the observed spatial variation in property crime and whether their associations differ across individual property crime categories. By using police station jurisdictions as the units of analysis, the study contributes to crime-geographical research in Assam and demonstrates the importance of examining local context when interpreting statistical relationships between socio-economic conditions and recorded crime.

Review of Literature and Theoretical Context

Property crime is influenced by the interaction of demographic conditions, socio-economic structure, criminal opportunities and the effectiveness of formal and informal guardianship. Earlier ecological research established that crime is spatially uneven and that its concentration is associated with neighbourhood characteristics such as economic deprivation, population instability and weak social organisation (Shaw & McKay, 1942). Social Disorganisation Theory therefore provides an important basis for understanding why similarly populated areas may exhibit different levels of crime. Sampson et al. (1997) later extended this perspective through the concept of collective efficacy, demonstrating that social cohesion and residents' willingness to exercise informal control can reduce crime even in structurally disadvantaged communities.

Routine Activity Theory offers a more direct explanation of property crime. Cohen and Felson (1979) argued that crime occurs when a motivated offender, a suitable target and the absence of capable guardians converge in time and space. Population growth may increase mobility, anonymity and the number of potential targets, while urban and commercial development may expand opportunities for theft, burglary and other property offences. However, population increase should not be regarded as a direct cause of crime because its effect depends on employment conditions, policing, accessibility and community surveillance.

Literacy and education are generally expected to reduce criminal involvement by improving legitimate employment opportunities and strengthening social awareness. Nevertheless, their relationship with recorded property crime may not always be negative. Areas with higher literacy may also be more urbanised, commercially active and better connected, thereby containing more valuable and accessible targets. They may also have greater awareness of legal procedures and consequently higher levels of crime reporting. Thus, literacy may represent broader socio-economic development rather than exerting an independent causal influence on crime. Strain Theory further suggests that crime may arise when socially valued economic aspirations are not matched by legitimate opportunities for their achievement (Merton, 1938). Educational expansion without sufficient employment opportunities may create frustration and economic strain. However, aggregate police station-level data cannot establish that educated or unemployed individuals are responsible for recorded offences; such explanations must therefore be treated cautiously.

Situational Crime Prevention complements these structural approaches by emphasising the immediate environment of offending. Measures such as street lighting, surveillance, secure property, regular police patrol and community vigilance can increase the effort and risk involved in crime and reduce its expected rewards (Clarke, 1980). Variations in these conditions may explain why areas with similar population and literacy characteristics experience different levels of property crime. Empirical studies increasingly demonstrate that socio-economic relationships with crime vary geographically. Tavares and Costa (2021), in their municipal-level study of property crime in Portugal, found that the effects of demographic and socio-economic variables differed significantly across space, indicating that a single general relationship cannot adequately

explain local crime patterns. In India, Jaishankar et al. (2004) demonstrated the usefulness of GIS-based crime analysis in Chennai and showed that geographically referenced data can identify localised patterns of property crime and their associated social and physical conditions.

Despite these developments, police station-level studies of the socio-economic correlates of property crime remain limited in Assam. Existing research has largely focused on aggregated crime patterns, crimes against women, juvenile delinquency and other broader dimensions of criminality. The present study addresses this gap by examining the relationships of population growth and literacy with overall and category-specific property crime across police station jurisdictions in Nagaon district. The study draws primarily on Routine Activity Theory while incorporating insights from Social Disorganisation Theory, Strain Theory and Situational Crime Prevention to interpret spatial variations without treating socio-economic indicators as direct causes of crime.

The present study adopts an integrated theoretical framework rather than relying on a single explanation of property crime. Routine Activity Theory provides the principal framework because it explains how demographic growth, mobility and socio-economic development may increase the convergence of offenders, targets and inadequate guardianship. Population growth is interpreted as a factor that may expand exposure, mobility and opportunity, while literacy is treated as an indicator associated with broader socio-economic transformation rather than as a direct cause of crime. Social Disorganisation Theory complements this approach by explaining why the effects of population growth and economic change may vary across police station jurisdictions. Rapid demographic change, weak community networks and limited informal social control may reduce the capacity of residents to regulate local behaviour. Collective efficacy further clarifies how social cohesion, mutual trust and community intervention may protect some areas even when they face socio-economic pressure. Strain Theory is used cautiously to interpret the possible role of unemployment, limited livelihood opportunities and unmet economic expectations. It provides a plausible explanation for why demographic or educational advancement may not automatically reduce property crime. However, because the study uses aggregate data, strain is treated as a contextual interpretation rather than direct evidence concerning individual motivation. Situational Crime Prevention provides the practical dimension of the framework. Differences in street lighting, surveillance, accessibility, police patrol and household security may explain why areas with similar socio-economic characteristics record different property-crime outcomes. Taken together, these perspectives suggest that property crime results from the interaction of structural pressures, opportunity conditions, community organisation and guardianship.

Study Area

Nagaon district is situated in the central part of Assam, India, and occupies a strategically important geographical position between Upper and Lower Assam. The district extends approximately between 25°45'N and 26°45'N latitude and 92°33'E and 93°50'E longitude, covering an area of about 3,973 km². It is bounded by Sonitpur district to the north, Karbi Anglong district to the south, Golaghat district to the east, and Morigaon and Hojai districts to the west. Owing to its central location, the district functions as an important transport and commercial corridor, with National Highway-27 and several state highways facilitating movement of people and goods.

According to the 2011 Census of India, Nagaon had a population of 2.82 million, making it one of the most populous districts in Assam. The district exhibits considerable spatial heterogeneity in terms of settlement pattern, population density, literacy, economic activities and accessibility. While Nagaon Sadar, Hojai and Lumding represent relatively urbanised centres, a large proportion of the district remains predominantly rural and dependent on agriculture and allied activities. Such diversity provides varying socio-

economic and environmental conditions that may influence opportunities for property crime.

The district was selected because it has consistently recorded a comparatively high incidence of property crime within Assam and displays substantial variation in crime across police station jurisdictions. These variations provide an appropriate setting for examining whether socio-economic characteristics, particularly population growth and literacy, are associated with differences in property crime at the local level. The unit of analysis in the present study is the police station jurisdiction rather than the district as a whole. Police stations represent the basic administrative units responsible for crime registration and law enforcement and therefore provide a more meaningful spatial framework for analysing local variations in property crime. The analysis covers 22 police station jurisdictions existing in Nagaon district during the study period.

Data source and Methodology

The study is based entirely on secondary data obtained from official government sources. Property crime data were collected from the Crime in India reports published annually by the National Crime Records Bureau (NCRB) and supplemented with records obtained from the Office of the Superintendent of Police, Nagaon. Five categories of property crime were included in the analysis: theft, burglary, robbery, dacoity and extortion.

Socio-economic variables were derived from the Population Census of India (2001 and 2011). Population growth and literacy rate were selected because they are widely recognised indicators of demographic and socio-economic development and have frequently been examined in studies of crime and spatial inequality. Population data from the 2001 Census were used in conjunction with crime data for the period 2001–2010, whereas 2011 Census data were used for analysing crime during 2011–2020, reflecting the availability of the most recent census information.

The analysis was undertaken at the police station level, as police stations constitute the operational units for crime recording, investigation and law enforcement. District-level statistics often conceal substantial local variation; therefore, police station jurisdictions provide a more appropriate spatial scale for examining socio-economic differences in crime occurrence. A total of 22 police stations were included in the analysis.

The dependent variable is the property crime rate, represented by overall property crime and its five constituent categories: theft, burglary, robbery, dacoity and extortion.

The independent variables include:

- Population growth (%)
- Literacy rate (%)

Population growth was calculated using decadal census data, while literacy refers to the total literacy rate reported in the 2011 Census. These variables were selected because demographic growth and educational attainment are frequently regarded as contextual factors that influence criminal opportunities and socio-economic conditions. The study employs descriptive statistical techniques together with Pearson's product-moment correlation coefficient to examine the relationship between socio-economic variables and property crime across police station jurisdictions.

Initially, descriptive analysis was used to compare spatial variation in population growth, literacy and crime among police stations. Scatter plots with fitted regression lines were prepared to visualise the relationships between variables.

The strength and direction of association between socio-economic variables and property crime were assessed using Pearson's correlation coefficient (r), expressed as

$$r = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum (x_i - \bar{x})^2 \sum (y_i - \bar{y})^2}}$$

where x and y represent the paired observations of socio-economic variables and property crime, respectively. Correlation coefficients were interpreted according to both their magnitude and direction. Positive values indicate that the

variables tend to increase together, whereas negative values indicate an inverse relationship. Given the exploratory nature of the study, the correlation analysis is used to identify patterns of association rather than to establish causal relationships.

Results and discussion

Population Growth and Property Crime

Population growth is frequently regarded as an important contextual factor influencing crime because it affects the concentration of people, the availability of potential targets and the intensity of socio-economic interactions. To examine whether demographic change influenced property crime in Nagaon district, the percentage growth of population across police station jurisdictions was compared with the corresponding growth in property crime. The analysis reveals considerable spatial variation in both variables. Police stations experiencing rapid population growth did not uniformly record higher increases in property crime. For instance, Samaguri Police Station recorded the highest population growth (143.5%) and also experienced substantial growth in property crime (69.43%), suggesting that rapid demographic expansion may have increased opportunities for offences against property. In contrast, Jamunamukh Police Station registered population growth exceeding 100%, whereas property crime declined by approximately 10%, indicating that demographic growth alone cannot explain local crime patterns. Similarly, Kaliabor Police Station experienced relatively modest population growth but continued to record comparatively high levels of property crime.

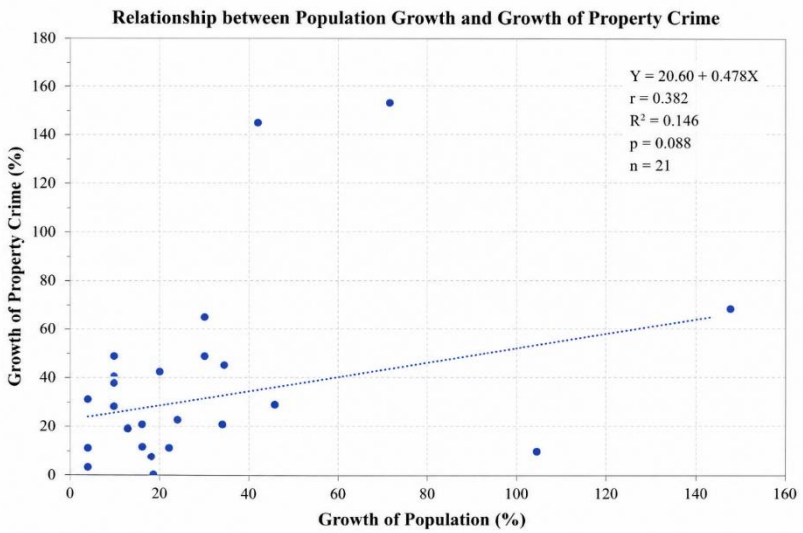

Fig 1: Relationship between population growth and property crime

Pearson's correlation analysis yielded a coefficient of r = 0.38, indicating a weak positive association between population growth and property crime across police station jurisdictions. Although jurisdictions with higher population growth generally tended to experience higher levels of property crime, the relationship was not sufficiently strong to suggest that population growth was the principal determinant of crime variation. Considerable deviations from the overall trend demonstrate that other contextual factors influenced crime patterns.

These findings are consistent with Routine Activity Theory (Cohen & Felson, 1979), which argues that increasing population and mobility expand opportunities for crime by increasing the convergence of offenders, suitable targets and limited guardianship. However, the weak association observed in the present study suggests that demographic growth interacts with other socio-economic and institutional conditions rather than operating independently. Variations in policing, accessibility, economic opportunities, reporting practices and community vigilance may therefore explain why

some rapidly growing jurisdictions experienced comparatively low crime growth while others became more crime-prone. The findings also support the argument of Tavares and Costa (2021) that socio-economic determinants of property crime exhibit considerable spatial heterogeneity. Similar demographic conditions may therefore produce different crime outcomes depending on local geographical and institutional contexts.

Literacy and Property Crime

Literacy is widely regarded as an indicator of socio-economic development and is generally expected to contribute to crime reduction by enhancing educational attainment, employment opportunities and social awareness. Nevertheless, the relationship between literacy and property crime is not necessarily straightforward because highly literate areas often possess greater economic activity, commercial development and reporting efficiency. The present analysis indicates that the overall relationship between literacy and property crime is relatively weak. The Pearson correlation coefficient of $r = 0.23$ demonstrates a weak positive association, suggesting that police station jurisdictions with higher literacy levels also tended to record slightly higher levels of property crime.

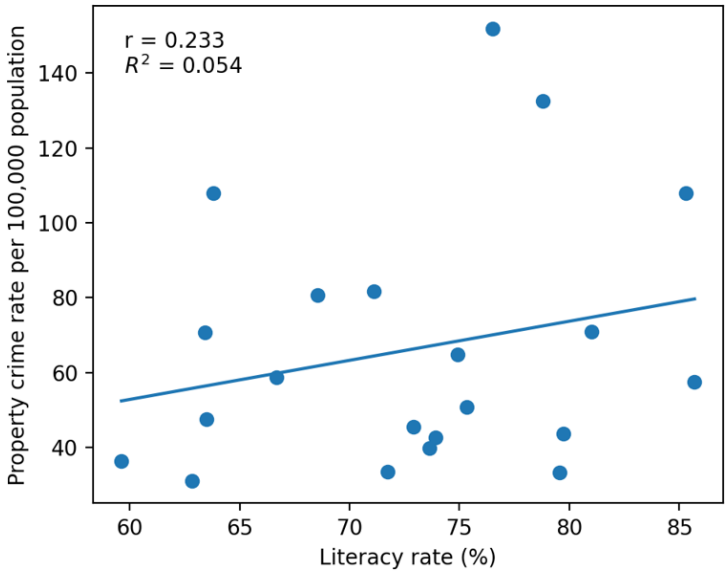

Fig 2: Relationship between literacy rate and property crime

The scatter plot further demonstrates substantial dispersion around the regression line, indicating that literacy explains only a small proportion of the spatial variation in crime. Police stations such as Nagaon Sadar exhibited both relatively high literacy and high property crime, whereas other jurisdictions with comparable literacy levels experienced considerably lower crime. These variations indicate that literacy alone is not an adequate predictor of recorded property crime. The observed positive relationship should not be interpreted as evidence that education increases criminal behaviour. Instead, literacy probably reflects broader socio-economic development. More literate jurisdictions generally possess higher commercial concentration, improved transport connectivity, increased ownership of valuable assets and stronger public awareness regarding crime reporting. Consequently, they may record higher levels of officially registered crime despite possessing comparatively favourable socio-economic conditions.

These findings are compatible with spatial crime research indicating that socio-economic indicators frequently function as proxies for broader contextual processes rather than direct causal variables (Tavares & Costa, 2021). They also support the proposition that crime

opportunities depend not only on offender characteristics but equally on the spatial organisation of economic activities and the availability of suitable targets.

Literacy and Individual Categories of Property Crime

To determine whether literacy exhibits similar relationships across different forms of property crime, separate correlation analyses were undertaken for theft, burglary, robbery, dacoity and extortion.The analysis demonstrates that the direction and strength of association vary considerably among crime categories. Theft and burglary displayed weak positive relationships with literacy, whereas robbery, dacoity and extortion exhibited weak negative associations. The weak positive association observed for theft and burglary may reflect the concentration of residential areas, commercial establishments and movable property within more developed police station jurisdictions. Higher levels of literacy are often accompanied by greater household wealth, increased consumer goods ownership and stronger reporting practices, thereby increasing both opportunities for theft and the likelihood that offences are officially recorded.

Conversely, the weak negative associations observed for robbery, dacoity and extortion suggest that these offences are less strongly associated with literacy and may instead be influenced by other social, economic and geographical conditions. These offences frequently involve greater organisation, planning or interpersonal confrontation and therefore cannot be explained solely by area-level educational characteristics. The magnitude of all correlation coefficients remains relatively low, indicating that literacy contributes only marginally to explaining the spatial distribution of individual categories of property crime. The findings therefore reinforce the argument that property crime is a multidimensional phenomenon influenced by a combination of demographic, economic, environmental and institutional factors.

The correlation analysis reveals that the relationship between literacy and the individual categories of property crime is generally weak and varies according to the nature of the offence. Theft records the highest positive correlation with literacy, with a Pearson's coefficient of $r = 0.35$. This indicates that police station jurisdictions with comparatively higher literacy levels tend to record somewhat higher rates of theft. However, the coefficient of determination of approximately $R^2 = 0.12$shows that literacy explains only about 12 per cent of the spatial variation in theft. The remaining variation is therefore attributable to other demographic, economic, locational and institutional factors.

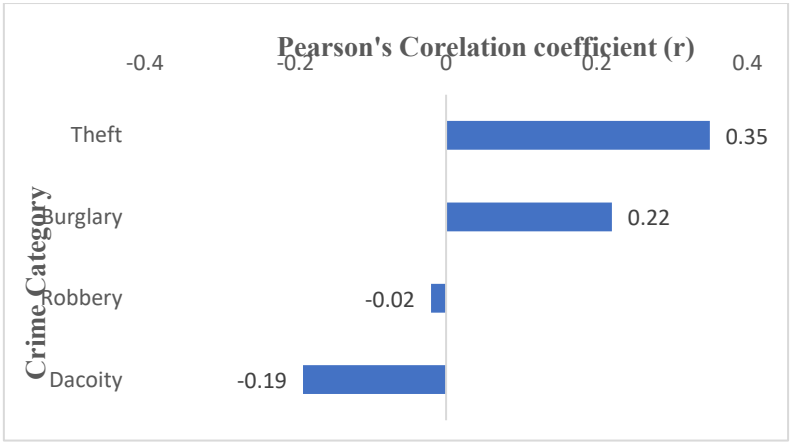

Fig 3: Correlation between Literacy and Individual Categories of Property Crime

Burglary also exhibits a weak positive relationship with literacy ($r = 0.22$). Its coefficient of determination is approximately 0.05, indicating that literacy accounts for only about 5 per cent of the variation in burglary. The positive direction should not be interpreted to mean that literacy promotes burglary. Rather, comparatively literate police station jurisdictions may also be more

urbanised, economically developed or characterised by a greater concentration of houses, commercial establishments and material assets. Such conditions may increase the availability and attractiveness of suitable targets. In contrast, robbery shows an almost negligible negative correlation with literacy ($r = -0.02$). Its R^2value is close to zero, demonstrating that literacy has virtually no explanatory influence on the spatial distribution of robbery. The occurrence of robbery is likely to be associated more closely with situational factors such as transportation routes, movement of people and goods, isolated locations, policing intensity and immediate criminal opportunities.

Dacoity records a weak negative correlation with literacy ($r = -0.19$). This suggests a slight tendency for dacoity to be lower in areas with higher literacy; nevertheless, the relationship remains weak. With an $R^2$of approximately 0.04, literacy explains only around 4 per cent of the variation in dacoity. Factors such as organised criminal networks, remoteness, road connectivity, vulnerability of households and the effectiveness of night surveillance may be more relevant in explaining its occurrence.

Considering all these together, the results demonstrate that literacy does not exercise a uniform or substantial influence on all categories of property crime. Its association is relatively stronger for theft, weaker for burglary and dacoity, and almost absent in the case of robbery. The findings therefore suggest that literacy should be viewed as a contextual socio-economic indicator rather than a direct determinant of property crime. The spatial pattern of individual offences is more appropriately understood through the combined influence of socio-economic conditions, target availability, accessibility, routine activities, policing and community vigilance.

Policy Implication

The study's findings suggest that literacy alone is not a strong predictor of spatial variation in individual categories of property crime. Although theft and burglary show weak positive correlations with literacy, these relationships have limited explanatory power, while robbery and dacoity show weak or negligible negative associations. These results indicate that educational attainment, considered in isolation, is insufficient to explain the occurrence of property crime across police station jurisdictions. The study therefore highlights the need for crime-prevention policies that move beyond conventional socio-demographic indicators and adopt a broader socio-spatial perspective. Crime-reduction strategies should incorporate multiple determinants, including urbanisation, economic activity, accessibility, land-use characteristics, policing efficiency, and environmental opportunities for crime. In particular, police agencies should strengthen evidence-based policing by regularly using spatial crime analysis and GIS-based hotspot mapping to identify areas requiring targeted preventive interventions.

The findings also underscore the importance of integrating literacy into broader socio-economic development policies. While improvements in education contribute to long-term human development, they should be complemented by job creation, economic opportunities and improved urban management to reduce the conditions that facilitate property crime. Consequently, policy interventions should emphasise an integrated approach that combines socio-economic development with environmental design and effective policing, rather than relying solely on improvements in educational attainment.

Conclusion

The present study examined the relationship between literacy and individual categories of property crime using Pearson's correlation analysis across police station jurisdictions in Nagaon district. The results reveal that literacy shows only weak associations with the selected categories of property crime. Theft and burglary exhibit weak positive relationships with literacy, whereas robbery and dacoity show weak or negligible negative correlations. Furthermore, the low coefficients of determination indicate that literacy explains only a small proportion of the spatial variation in these offences. These findings

suggest that the spatial distribution of property crime cannot be adequately interpreted by literacy levels alone. Instead, property crime reflects a complex interplay of demographic, economic, environmental and institutional factors that vary across local contexts. The study therefore reinforces the importance of adopting a multidimensional socio-spatial framework in crime geography, in which literacy is treated as one contextual indicator among several interrelated determinants of property crime. Such an approach provides a more comprehensive basis for understanding the geographical dynamics of property crime and for developing evidence-based crime prevention strategies.

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