



GEOSPATIAL ANALYSIS OF INSECURITY AND ITS THREAT ON ROAD TRANSPORTATION IN KADUNA STATE NIGERIA

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ABSTRACT

The escalating waves of criminal activities involving motorists and other road users on highways is alarming, consequently resulting in many travellers losing lives and properties. This paper is aimed at analyzing the spatial distribution of criminal activities and its threat on road transportation across the state. The study utilized both primary and secondary data sources namely: structured questionnaire (likert scale), FGD and printed material such as journals and records from security agency. The ArcGIS software was used to determine the spatial pattern of the criminal activities in the study area. The questionnaire was analyzed using Microsoft Excel Package and the results were presented in charts. The results indicated that the state is bedeviled with four major types of insecurities which are arm robbery, Kidnapping, Ethnic violence and religious violence of which armed robbery predominate with 32%. The results also indicated that more than 61% of the LGAs in state had faced at least one attacked for the period 2017 to 2021. The areas bothering thick forests such as Birnin Gwari, Chikun and Giwa Local Government Areas were heavily hit by criminal activities. It was recommended that security apparatus should be placed more on the problematic areas for proactive majors to minimize the incidences of the attacks.

Keywords: Road Transportation, Insecurity, GIS, Krigging, Kaduna

INTRODUCTION

Insecurity is a serious issue that has hindered industrialization and sustainable growth and development any Nation. Insecurity entails different meanings such as: absence of safety; danger; hazard; uncertainty; lack of protection, and lack of safety. Achumba, et al., (2013) defined insecurity as the state of being open or subject to danger or threat of danger; and/or exposed to risk or anxiety, danger connotes the condition of being susceptible to harm or injury while anxiety is a unclear unpleasant emotion that is experienced in expectation of some calamity.

Nigeria is recently bedeviled with escalating insecurity that metamorphoses from ethno religious, farmer-herdsmen clashes into cattle rustling and later to banditry, kidnapping of people for ransom and assassination (Okoli and Okpaleke, 2014). This has reached an alarming state that the security agencies are becoming helpless and vulnerable and not being able to protect the lives and properties of the ever-growing population of Nigeria.

Kaduna State has been a foremost flashpoint to different types of this insecurity that has led to huge humanitarian crisis, weakened social capital and breakdown of democratic norms and values (WANEP, 2018). The insecurity in Kaduna revolves around three different but interlinked threats. The first is the farmer-herder conflict that results to growing tensions over access to natural resources like land, water and its use among communities. The second threat is the activities of armed gangs engaged in criminality, including kidnapping for ransom, arms dealing, highway robbery and cattle rustling. The third threat is from violent extremism. This threat resurfaced in 2020 when a militant Islamist group Ansaru carried started carrying out heinous activities of series of other attacks and ambush of travellers and security agencies (Olajumoke, 2021).

There are so many remote and immediate factors attributed to this insecurity in state. These are summarized by Oyinloye (2020) as special treatment by people in power, loss of traditional relationship and cohesion, poor natural resource

(land and water) management and policy, bush burning, population increase, crop damage, ethno-religious factors, hate speech and stereotyping, climate change, lack of voice and political representation among others.

The increase wave of attacks involves attacking motorists and road users on highways and kidnapping passengers on board is alarming. With 197 people kidnapped in (May 2022 alone for instance) on highways, travellers are advised to avoid notorious roads and only travel by road when it's absolutely necessary (Nigeria Security Intelligence, 2022). Banditry activities have of recent increased tremendously along some major roads in Kaduna state like the Abuja-Kaduna road, Kaduna-Birnin Gwari road, Zaria-Birnin Gwari road as well as Birnin Gwari-Funtua road the development left many motorist and passengers unaccounted for just as their belongings were carted away by the bandits (Chukwueme & Agaba, 2019).

The victims of kidnapping and banditry undergo traumatic experience usually and left with indelible mark that last for a life time. This has a negative psychological effect, mostly in children and in mostly leading to depression, anxiety and Post-Traumatic Stress Disorder (PTSD) which regrettably has a long-lasting consequence (Olajojo and Owoniyi, 2022)

Despite the efforts by law enforcement agencies to curb the menace of criminal activities in the state, crime and criminality are on the increase in the affected areas. This cannot be unconnected with the traditional approach used by the various law enforcement agencies to crime detection in Nigeria. In view of this, it is crucial to devise a means whereby law enforcement agencies can find the best alternative approach to crime management which usually starts with crime mapping to visualize the rate at which crime is concentrated in a particular area (Odumosu, 1999).

The advent of computerized crime mapping has become one of the most powerful tools that provide law enforcement agencies with sophisticated tools in an analytical and descriptive way in fighting crime and devise a means for crime prevention (Santos, 2012). One of such tools is the

Geographic Information Systems (GIS) which is basically, the application that complement traditional policing goals for effective and efficient crime management (Hafiz and Sadiq, 2016).

GIS as a computerized tool for the analysis of geospatial data can be used effectively to study and understand crime data, since each crime location has a geographic reference; maps will be digitized and geo-referenced identifying crime hotspots and pattern enabling crime analyses which are essential for effective crime management.

The aim of this paper is to analyze insecurity and its threat on road transportation in Kaduna state Nigeria using the geographical Information System which help in making crime maps that will help security agencies to effectively plan for emergency service delivery, thereby providing solutions to issues like theft, and other related crimes. However, crime mapping implementation is relatively low in Nigeria.

MATERIAL AND METHODS

Study Area

Location and Size

The study area (Kaduna State) is located between Latitudes 09° 02'N to 11° 32'N and Longitude 06° 15'E to 08° 38'E. It shares common borders with Federal Capital Territory, Abuja to the South, Kano and Bauchi States to the Northeast, Zamfara State to the Northwest, Niger State to the West, Plateau State to the Southeast and Katsina State to the North and Nassarawa State. The climate of Kaduna State is the tropical wet-and-dry type classified under Koppen's as Aw climate. The wet season lasts from April to October with a peak of the rainfall in August, while the dry season extends from November of one calendar-year to April of the next (Abaje et al, 2012).

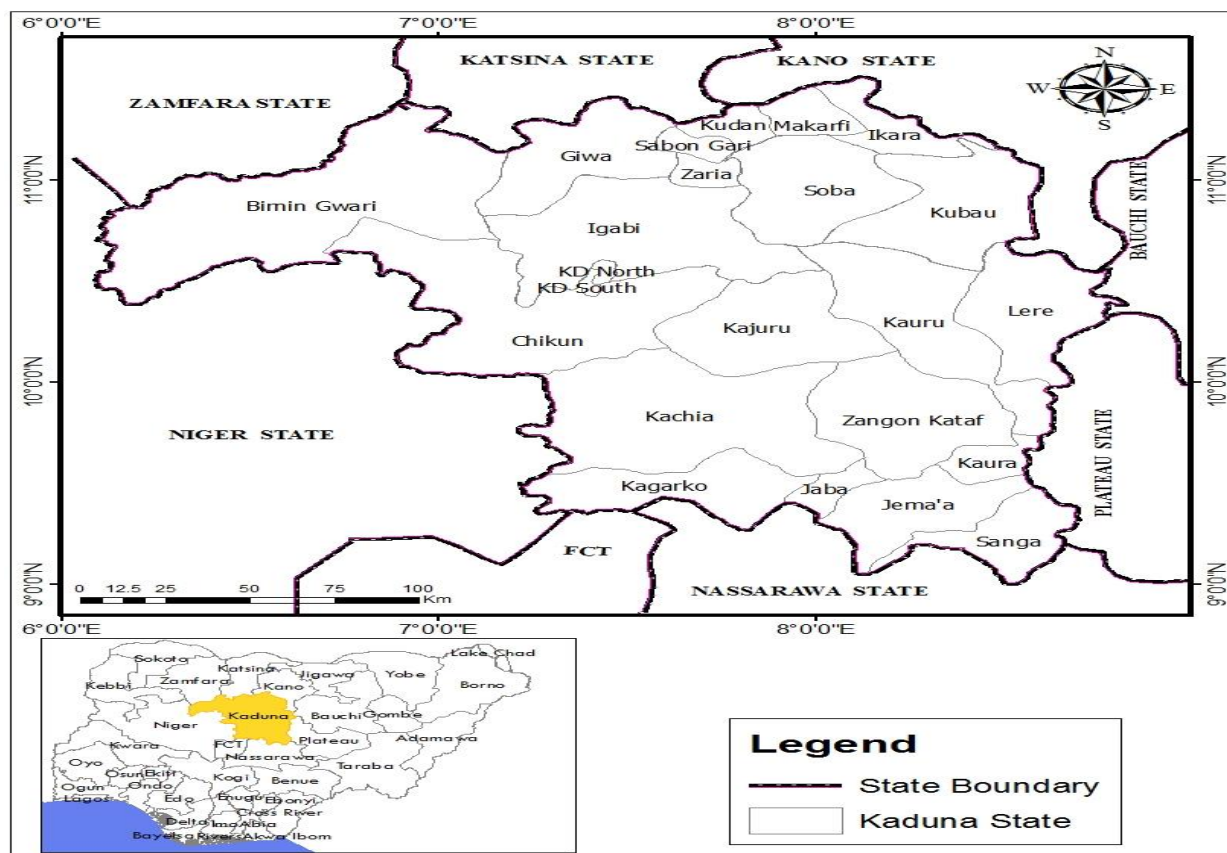


Figure 1: Map of the study area
Source: G.I.S Lab. Geography Department, ABU, Zaria

The vegetation in the study area is Northern Guinea Savannah, normally characterized by woodlands, grasses normally mixed with other herbaceous or shrubby plants. The vegetation is green in the rainy season with fresh leaves, but become dry during the dry season to minimize loss of water through transpiration. Forests are under significant pressure not only from climate change but also from increasing populations and greater demand for forest resources (Haider, 2019). There exist very large unoccupied areas in the forests, Kamuku in Birnin Gwari LGA, Kachia, Dansadau and Dajin Rugu forests, a situation that creates governance voids, making it favorable for the bandits to fill. There is significant relationship between the vast constituted ungovernable areas in the Nigeria and propensity for atrocious violence (Gadzama et al., 2018).

Transportation is a vital factor in socio-economic development and wellbeing of people in every economy or society. It is the only means by which food produced at farm site is moved to different homes as well as markets. The study area is served with a good connectivity of road that range road trunks across the study area and neighboring states of Sokoto, Kano, FCT and Niger. Similarly, all the Local government areas in the study area are link with good tarred roads. However, most rural roads in the study areas are poorly connected and are not all season motorable roads.

1.2.2 Methods
This study triangulates both primary, secondary data and the application of Geographic Information System techniques. Geographical Positioning System (GPS) Garmin 76 was used to get the coordinates of attack points. The Secondary data

used in the study were obtained from journal articles, libraries and Nigerian Dailies. The attack locations obtained by the used of GPS on the field were transferred into Microsoft Excel package and imported into ArcGIS 10 environment for geocoding. The data were analyzed and presented by the use of visualized maps to explain the spatial distribution of crime incidents in Kaduna state. The softwares used for data analysis include: ArcGIS 10.0, CrimeStat III, Global Mapper 13.0, Map Source, and Transfo (used for converting geographic (angular) coordinates to UTM coordinates (Olajuyigbe, et al., 2016).

Geostatistical analysis is tools that make best prediction possible through the examination of the relationship between all the sample points and producing a continuous surface of crime hotspots, standard errors (uncertainty) of prediction, and probabilities that critical values are exceeded. This analysis tool bridges the gap existed between geostatistic and

GIS. Examples of such geostatistical operations includes: Inverse Distance Weighing (IDW), Kriging, Kernel Kriging, Cokriging etc, which are all interpolation techniques (Kothari, 2004).

RESULTS AND DISCUSSION

Type of insecurity Experience

It is obvious from Figure 2 that the major type of insecurity experience in study area is arm robbery with 32%, followed closely by Kidnapping and Ethnic attacks (26% and 24%) respectively. It was found out from FGD that arm robbery happened to be the general crime that cut across the entire state, unlike other types of criminal activities that localized. instances, resource conflict (Farmer-Herder) in the southern part of the state usually turned ethnic and religious because majority of the herders are Fulbe muslims while the majority farmers are of different tribes extracts practicing Christianity.

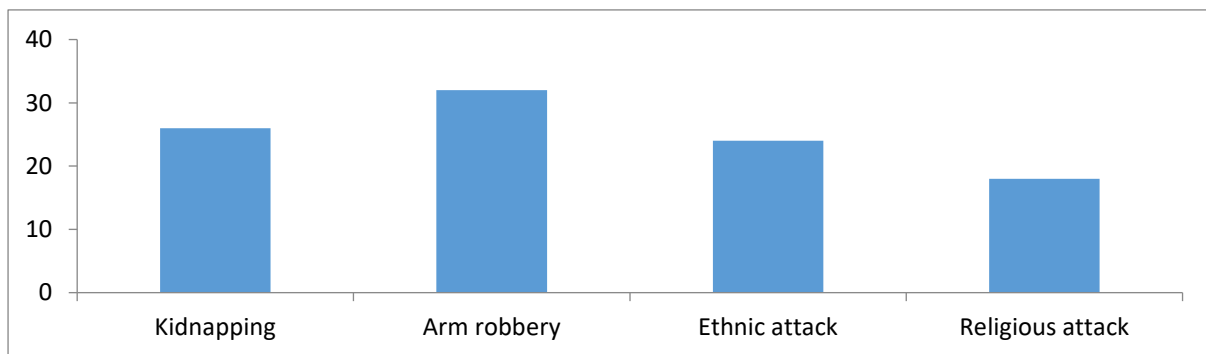


Figure 2: Type of insecurity Experience

Criminal activities Occurrence across the state LGAs

The results in Figure 3 indicate that fourteen local government of the state, representing 61% had faced at least one attack from any of the mentioned types criminal activities for the period 2017 to 2021. The leading LGA in of the state are those bordering the forested areas in the state like Birnin

Gwari, Chikun and Kachia forested areas as presented in Figure 3. This may not be unconnected to the fact that the forest serves as hideout and operating base for bandits and other criminal elements (Ladan 2019). In the forest’s frontline LGAs Birnin Gwari is leading with 38 attacks representing (22%), followed by Chikun (20%) and Giwa (16%).

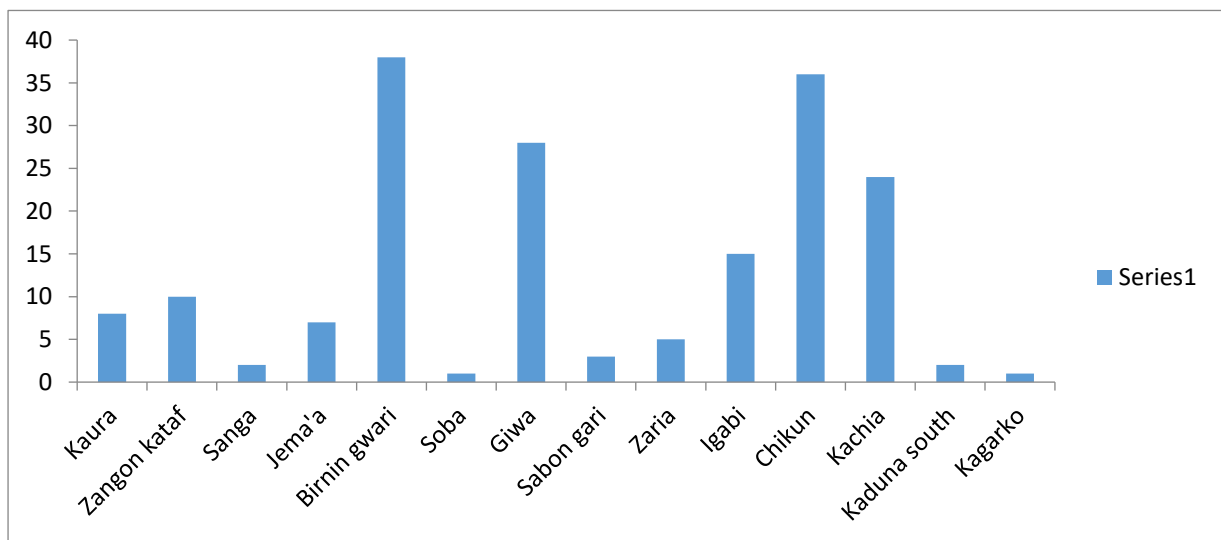


Figure 3: Attack frequency per LGAs

Spatial pattern of Criminal Activities in Kaduna State

The result in Figure 3 also indicates that the criminal activities are mostly concentrated in the northwestern part of the state bordering the mostly hardly hit states of Katsina, Zamfara and Niger state with insecurity, while the eastern part of the state recorded low or no occurrence of criminal activities. This

shows an uneven distribution pattern of criminal activities in the state.

Hence, transportation by road in areas represented in red colors in (Figure 3) is unsafe for commuters because the criminal elements move easily across the aforementioned states likely because of the vast forests connected the states

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