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GEO-SPATIAL ANALYSIS OF CRIME IN KADUNA METROPOLIS, NIGERIA.

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ABSTRACT
Criminal activities are important concerns for public safety of our contemporary society. Clarifying where different types of crimes occur is one of the many important functions of crime analyses. This research aimed to map and analyse crime in Kaduna metropolis, Nigeria, applying Geo-Spatial Technique. The attribute data were obtained from the Police Divisional Head Quarters in Kaduna. An administrative map of the study area was used to delineate the police districts according to the Divisional Police Headquarters Jurisdiction in Kaduna Metropolis. The study identified and mapped a total of 11 crime types in the study area. The coordinates of each crime incidence were obtained from Google Earth Pro 4.2, this is because the exact location were not captured when the crimes were committed. An overlay analysis was performed and all the acquired coordinates of the crimes were displayed on the composite map. Finally, a GIS database was created where the spatial and attribute data were encoded and query analysis was performed. The study revealed that Theft/Stealing and Hurting/Fight ranks highest with 19.29% and 16.82% respectively. The study also discovered that crime incidence is highest in Tudun Wada with (15.05%), followed by Sabon Tasha and Rigachikun with 10.24% and 10.16% respectively. The study also revealed that Tudunwada, Sabon Tasha, Rigachikun and Rigasa are the major crime hotspots in the metropolis. This research, therefore recommends more effort should be put towards fighting crime especially in the months of December and January as the two months have the highest number of crimes committed. Also, crime cases should be recorded in details alongside their geographical coordinates by the Nigerian police.

Keywords: GIS, Mapping, Spatial distribution, Crime.

INTRODUCTION
Crime is one of the continuous problems that bedevil the existence of mankind. Since early days, crime has been a disturbing threat to man's personality, property and lawful authority (Louis, *et al*,1981).The relationship between crime and evolution of mankind is considered a historical one as Cain (first son of Adam and Eve) committed the first violent crime when he murdered his brother Abel because of jealousy (Hafiz *et al*, 2011). Today, in the modern complex world, the situation is most highly disturbing. Crime started in the primitive days as a simple and less organised issue, and ended today as very complex and organised. Therefore, the existence of crime and its problems have spanned the history of mankind. Due to the complex nature of the subject of crime, its causes and consequences, various academic disciplines such as criminology, sociology, geography, psychology and demography study it from their own perspective (Hafiz *et al*, 2011).

The distribution of crime across the landscape is geographically random since crimes are human phenomena. Several factors, including the lure of potential targets and simple geographic convenience for an offender, influence where people choose to break the law. Therefore, geography plays an important role in law enforcement and criminal justice (Francis, *et al*, 2006).The International Crime Victim Survey (ICVS) has collected data on 55 countries, spread over six major regions including Africa, Asia, Central and Eastern Europe, Latin America, and Western Europe. The findings showed that for the 1989 to 1996 period, more than half of urban respondents reported being victimized at least once, regardless of what part of the world they inhabit (Zhuo, *et al*, 2008).This shows that criminal activities continue to be a major concern in contemporary society (Francis, *et al*, 2006).

Francis *et al* (2006), asserts that there is no place or society that is completely devoid of crime. The existence of crime is as old as the creation of man itself and man has always looked for ways to combat it and reduce it as much as possible. Murray, *et al*, (2001) explained that the occurrence of criminal activity in form of theft, assault homicide etc. is something that takes place every day in almost all reaches of our world. They stressed that there is a great deal of debate on the causes of crime and affirmed that in the 1980s the rate of crime occurrence grew sharply to nearly epidemic proportions.

The rate of crime in Nigeria is attributed to the rate of unemployment estimated at 13.9% by the National Bureau of Statistics (2017), high rate of poverty estimated at 62.6% by the United Nations Development programme (2016) and corrupt Police Force that is ill-equipped to fight crime (Adibe, 2009). The idea that unemployment, poverty and corruption are related to a whole series of other misfortunes such as illness, despair, and crime, is not new (Aminu, *et al*, 2013). Nigeria is currently caught in the web of crime dilemma, manifesting in the convulsive upsurge of both violent and non-violent crimes. But the most alarming and terrifying is the present escalation of violent crimes and the barbarity, lethality and trauma the perpetrators unleash on the hapless citizenry across the length and breadth of the country. Notable in this regard are the rising incidents of armed robbery, assassination and ransom-driven kidnapping, which are now ravaging the polity like a tsunami and spreading a climate of fears and anxieties about public safety (Uche, 2008). Ackerman and Murray (2004) stated that high crime rates are not unique features of a few nations, but statistically normal features of life all over the world

In urban areas like Kaduna due to population explosion, stark economic inequality and deprivation, unemployment, socio-political condition among others are factors that contribute to crime occurrence (Dodo, 2008; Francis *et al* 2006). Greenburg and Rohe (1984) affirmed that certain environmental factors such as the physical layout of an area, proximity to various services and land use mixes are likely to influence criminal behaviour and are fundamental to the explanation of criminal activities in a spatial context. The issue of access, exposure, opportunity and the availability of targets are also important elements in helping to explain crime from an environmental perspective (Cohen *et al*, 1979; Brantingham *et al*, 1981). There have been several research efforts seeking to explain the geographic variation in crime rate for more than 150 years (Eck *et al*, 1995).

Geographic Information System (GIS) as a tool can be used by relevant agencies such as police personnel to plan effectively for emergency response, determined mitigation priorities, analyse historical events, and predict future events. The ability to access and process information quickly while displaying it in a spatial and visual medium allows agencies to allocate resources quickly and more effectively. In the 'mission-critical' nature of law enforcement, information about the location of a crime incident, suspect, or victim is often crucial to determine the manner and size of the response. GIS software helps co-ordinate vast amounts of location-based data from multiple sources. It enables the user to create layers for the data and view the data most critical to the particular issue or mission (Johnson, 2000).

Applications of GIS to crime mapping and management have been successful in many developed countries. It is therefore pertinent to know that any community with high criminal activities is unattractive or less attractive to both local and foreign investment. This is the problem that prevails in some part of Nigeria. According to Aluyor (2005), the Nigerian security agents are not effective in trying to abate crime because of inadequate or poor location of police formations and personnel and failure to adopt the new technology used in fighting crime in developed countries. The police force has failed the Nigerian public by not providing information and awareness on crime hot spots, the time of the day or period of the year that crime are committed as reported by crime victims. This has contributed to the rising cases of crime incidence in Kaduna metropolis.

The use of GIS to map out and analyze crime distribution will play a great role in abating crime rates in Kaduna metropolis. That is why the researchers seek to test the possibility of applying such tools in fighting crime. Failure to adopt the new technology in fighting crime means a degradation of police abilities, and a regression to the days of informal, infrequent crime analysis performed sporadically by patrol officers. Success can offer greatly improved problem oriented policing capabilities, optimal resource allocation, reduced crime rates, and the prevention of thousands of crimes (International Association of Chiefs of Police, 2002)

The popular adage that 'information is power' is true because if crime are mapped out and analysed, both the police and the citizens (public) are informed about the areas that are notorious for a particular crime, it therefore means that they have been empowered and decisions would be easily taken. One major advantage of crime mapping is that it helps citizens to understand crime and how it affects the places we live. Currently, GIS is not widely used to fight crime in Nigeria. This is due to the lack of awareness of the benefits offered by GIS in crime control and management in the country. Providing crime statistics for police administrators is important, Crime analysis of this nature can support decision making, problem solving, and strategy planning at every level of policing.

Kaduna metropolis is located between latitudes10°25'15"N and 10°36'08"N and longitudes 7°23'31"E and 7°29'33"E. The metropolis is the State capital of Kaduna State of Nigeria. According to the 2006 census of the federal republic of Nigeria, Kaduna metropolis , comprising Kaduna north, Kaduna south parts of Chikun and Igabi had a projected population of about 907,907 at a growth rate of 10% per annum. It covers an area of about 118km^2 and it covers Kaduna North and South Local Government Areas with some parts of Chikun and Igabi Local Government area, namely. The distance between the Eastern and Western limits of the metropolis is approximately 13.7 km and between the North and South is approximately 20 km. (Dodo, 2008). See Figure 1.

MATERIALS AND METHOD

Data Types and Sources

The following data were required for this study:
Administrative Map of Kaduna metropolis: This was sourced from the Kaduna State Ministry of lands and survey; it was used to delineate the districts according to the Divisional Police Headquarters Jurisdiction in Kaduna Metropolis.

Crime Records: This was obtained from the Police Divisional Head Quarters in Kaduna. There are Seventeen (17) Divisional head Quarters within the study area, however only 15 of these Divisional Headquarters provided consistent records on crime incidence. They are;Gabassawa, SabonGari (MagajiGari), Kakuri, Kabala Doki, KurminMashi, Kawo, Barnawa, Tudun Wada, UngwanSanusi, Rigasa, Malali, UngwanRimi, and Kabala West. Crime Data were collected from all these Divisional Headquarters. These data were used for the Crime Mapping Analysis.

Techniques of Data Analysis

A combination of descriptive and overlay analysis was employed in the analysis of the data. The descriptive statistics such as appropriate maps, line graphs, bar graphs, and tables were employed to illustrate the distribution of the crime types and incidences in the study area.

Attribute data of crime was collected from the various Divisional headquarters files provided at the police headquarters. This was then copied in Microsoft excel and saved as CSV (comma delimited) format which is recognizable and acceptable to the ArcCatalog extension of ArcGIS.

The administrative boundary map of the study area was scanned and imported into ArcGIS 9.3 for geo-referencing. The map was then converted to Universal Transverse Mercator (UTM) projection system with World Geodetic System (WGS) 84, 32N Minna datum, for easy distance measurement. Onscreen digitization was done with features such as roads, river, and rail-track in the study area were digitized as line features. The crime attribute data received from the various police stations were

without Geographic coordinates since crime is not reported with geographic coordinates, without which crime mapping in GIS platform is not possible. Therefore, to get latitude and longitude coordinates of all the crime spots, the geo-referenced map of the area was used to pinpoint the locations and record their grid coordinates randomly within the ward or divisional headquarters. The coordinates and addresses of crime cases were copied to Microsoft excel and saved as CSV (comma delimited) format, and then imported into ArcGIS 9.3 using the add XY, Command at the tools menu. This overlaid the points (coordinates) on the geo-referenced map of the study area to achieve the first objective, which is to identify and map crime incidence and to examine the spatial distribution of crime incidence in the study area.

To assess crime hot spots in the study area, attribute tables of crime data in ArcGIS 9.3was carried out to provide crime maps and high crime spots within the study area. Identifying hotspots onspot (point) level was difficult in the study area because crimes are not documented with geographic coordinates. The clustering method was used to identify crime hotspot as adopted by Bala, *et al* (2015). They identified hotspots using crime average for the various wards. Wards that have crime above the average were marked or identified as hotspots. Therefore, crime hotspots in this study were identified using the formula below

$$\text{Average Crime Incidence} = \frac{Total\ number\ of\ Crime\ Cases}{Total\ number\ of\ Areas}$$

Where Total crime case = 7201 while number of areas is 15. Therefore crime average = 480.surface maps (Raghunath, 2007) hence the importance of this study

RESULTS AND DISCUSSION

This study utilized a combination of descriptive and overlay analysis in the analysis of the data captured. The descriptive statistics such as appropriate maps, line graphs, and tables were employed to illustrate the distribution of the crime types and incidences in the study area.

The studysuccessfully identified eleven (11) crime types in Kaduna Metropolis between 2010 and 2011 based on crime categorization by the Nigerian Police Force. These included Armed Robbery, Murder/Homicide, Assault, Theft/Stealing, Rape, Forgery, Burglary/Home Breaking, Suicide, Cheating, Hurting/Fight, and Kidnapping.The crime types identified in the study area are presented in table 1.

From Table 1, it can be clearly seen that Theft/Stealing has the highest percentage with 19.29% in the study area and is closely followed by Hurting/Fight with 16.82%. it can also be observed that Kidnapping with 0.46% was the least crime committed within the study area. This result revealing crime types are similar with the ones identified by Bala, *et al* (2015) in Katsina State, and that identified in Benin City by (Balogun, *et al*, 2014).

Also, the general crime incidence in Kaduna Metropolis is shown in table 2 and figure 2. A close look at the figure 2 reveals that crime incidence is highest in Tudun Wada with (15.05%), and then followed by Sabon Tasha and Rigachikun with 10.24% and 10.16% respectively. If one is familiar with these areas one will not be surprised because these are areas with high population concentration and also because of the presence of large markets in Tudun Wada and Sabo areas, Such as KasuwaBarchi, Popular Panteka Market and Sabo Markets as well as hanging out joints such as bars and hotels. Thus offences like cheating, theft, assaults, robbery, rape, among others will be frequently experienced because of the nature of activities in these areas. A close look at the table shows that SabonGari, and Kabala Doki all have low crime incidences with a percentage of 3.27% and 3.92% respectively.

Table 3 presents the spatial distribution of armed robbery in Kaduna metropolis. Table 3 and figure 3 presents the spatial distribution of armed robbery in Kaduna metropolis. From table 3, out of a total of 550 cases of Armed Robbery incidence, Sabon Tasha has the highest rate of armed robbery recorded in the study area, with 13.64% followed by Rigachikun with 13.27% and Kabala West with 8.93% closely followed by Rigasa with 8.73%. These are basically areas with high population concentration in the study area most of whom are unemployed. The findings agree with that of Ferreira, João and Martins (2012) that there is a relationship between population and Armed Robbery. It has also confirmed the works of Aminu, *et al* (2013) that there is a link between crime and unemployment. From the table, areas with low records of armed robbery are Malali 2% and SabonGari 2.73%. The reason for low armed robbery cases in Malali could be because most part of the area is planned commonly called the Government Reserve Areas (GRA) that serves as residential houses for government officials.

Similarly, table 4 and figure 4 gives the distribution of cheating incidences in Kaduna Metropolis.From table 4, it shows that Tudun Wada has the highest percentage of cheating in the entire Kaduna metropolis with 14.52%, followed by Sabon Tasha with 14.33% and Rigachikun with 10.71%. Again these are areas of high population concentration it provides a good atmosphere (environment) for the criminals to perpetuate their acts because of low chances of being caught. People cheat to gain favour or advantage at the expense of their victim. These areas are busy areas with large markets for trading or commercial activities. These areas lure criminals of such dubious character. The table also reveals that Kabala Doki has the least record of cheating with 1.99%. This area is not as populated as those with high incidence and the presence of a number of security formations reduces the activities of criminals. Figure 4 shows the spatial distribution of cheating incidence in Kaduna metropolis.

Table 5 revealed that Tudun Wada has the highest record of assault in Kaduna metropolis with 21.75% out of the total incidence of 984. This is followed by Rigasa with 9.55%, Sabon Tasha and ungwanSanusi with 8.74% and 8.23% respectively. The reason for this high incidence of assault here could be attributed to inadequate police or security post, high concentration of population because of the presence of Markets as well as unplanned settlements. According to Sherman and Weisburd's (1988) Assault crime is usually tagged hard crime, and is essentially stranger-to stranger predatory crime. The location of security post is far from adequate in these areas. This also agrees with the finding of Ahmadi (2003) in his assessment of crime, based on crime per block discovered that there is a direct relationship between crime values and distance from police stations and also in assessing crime base on density of crime, peaks occurred in areas with high population. Findings also revealed that Kabala Doki and Sabon-Gari are areas with the least number of assaults with 2.34% and 2.44% respectively. if

one is familiar with these two areas, one can easily attach the reason for this to the closeness of a number of security formations such as police barracks, Police College, police training school and prison. The spatial distribution of assault is shown in Figure 5.

From table 6, Rigachikun has the highest Kidnapping incidence in the metropolis with a rate of 33.3% incidences, closely followed by Barnawa with 27.3%. This crime can be perpetuated anywhere regardless of where the adopted persons resides, all that the criminals need to do is to keep a close eye (track) on their victims. Also from the table, Tudun Wada, SabonGari, UngwanSanusi, Rigasa, Kabala West and KurminMashi are areas with no kidnapping incidence. If one is familiar with these areas, one can attach the reason of this low kidnapping incidence to the high population concentration of the middle and low income class status of the residents, in the case of Gabasawa, the reason could be because of a number of security formations such as Police headquarters, police college, Nigerian prison, and Immigration service all located very close to the area hence, this pose a great fear in the minds of the criminals. From figure 6, the spatial distribution of kidnapping incidence in Kaduna metropolis can be viewed.
Table 7, shows that Rigachikun has the highest incidence of rape with a percentage of 19.1% closely followed by Tudunwada with 15% and kabala west 12.3%. These are usually busy areas during the day and at night less busy thus providing a conducive environment for such criminal offences. Findings also reveal that Sabon-Gari has the least of Rape incidence with 1.8%, followed by Gabasawa and Sabon Tasha with 2.3% each. Figure 7 shows the spatial distribution of rape incidence in the study area.

From Table 8, findings have shown that Tudunwada has the highest crime of Theft/Stealing in Kaduna metropolis with 17.2% of the total rate followed by Gabasawa and KurminMashi with 10.6% and 8.09 % respectively. The high population concentration of people in Tudun Wada and the presence of large markets could account for high rate of Theft/Stealing in Tudun Wada which agrees with the crime pattern theory posited by Brantingham and Brantingham (1981) that the presence of certain land uses are theoretically predictive of crime levels in the neighborhood surrounding them. In the case of Gabaswa despite the presence of security formations in the area, theft and stealing is also prevalent. A close look at the table shows that SabonGari has the least incidence of theft/stealing with 3.18%, followed by Kabala Doki and Kakuri with 4.48% and 4.55% respectively. From Figure 8 the spatial distribution of Theft/Stealing can be viewed.

The temporal distribution of crime in the study area between 2010 and 2011 is presented on table 9 and figure 9. According to Brantigham and Brantingham (1981), patterns are conceivable at different levels. Hence, crimes can be analysed across centuries, years, months or across hour.
Table 9, reveals the temporal distribution of crime in Kaduna Metropolis in 2010, December has the highest crime incidence with 12.08% closely followed by January with crime incidence of 11.46%. October is the month with third highest crime record with 9.81%. A close look at the table also reveals that the month of March has the least crime record with a rate of 6.37%. In 2011, the month of December still maintain the month with the highest crime incidence with a percentage of 14.85% slightly higher than 2010. Again January has the second highest crime incidence with a percentage of 10.97%, closely followed by the month of August with 9.70%. Unlike 2010, in 2011 May has the least of crime incidence with 4.55%. There was also an increase in crime incidence within the last four months of the year with the peak of crime incidence recorded in the last month of the year.

From the two years records, it was revealed that crime incidence was highest in December and January for both 2010 and 2011. This could be true because December is usually festive period in Kaduna and most part of the country. These periods marks the yuletide or Christmas season as well as many wedding celebrations within that period. Hence criminals are on the rampage in other to have money or property to show off during the festivity. Another reason for high crime incidence in January is because January is usually tagged “hard times”, it is believed that people must have lavished their savings during the festive time and will resolved to some sort of criminal activities to make ends meet. Figure 2 shows the trend of crime incidence in Kaduna metropolis.

Areas with crime incidence more than the average were considered hot spots. Cool spots are places or areas with less than the average amount of crime or disorder. Some hot spots may be hotter than others. Table 10 and figure 10 shows the crime hot spots in Kaduna Metropolis.
From Table 10, four hot spots were identified in the study Area. They are Tudunwada, Sabon Tasha, Rigachikun and Rigasa. These are areas within the metropolis with crime above the average in the study area between 2010 and 2013. While others have less than average thus classified not hot spot or cold spot. This can be viewed from figure 10.

Conclusion and Recommendation

Crime is not spread evenly across the landscape. It clumps in some areas and is almost absent in others. This study has shown how GIS as a tool can be used effectively to analyze crime and display crime maps for adequate planning in terms of resources and personnel deployment towards combating crime in the study area. The study identified and mapped a total of 11 crime types across the 15 districts in the study area. The study revealed that Theft/Stealing and Hurting/Fight ranks highest with 19.29% and 16.82% respectively in the study area. The study also discovered Tudun Wada, Sabon Tasha, Rigachikun and Rigasa to be the major crime hot spots in the metropolis. These are areas where almost all crime types are prevalent. Therefore asserting the fact that crime occurrence is not even across the landscape.

In 2011, December and January remained the months with the highest crime incidences. Although the study did not focus on the distribution and location of police station, but from the field survey or visits it has also been discovered that police formations are far from being adequate especially in the populated areas of the metropolis like Tudun wada Sabon Tasha and Riga-Chikun. This research, therefore recommends that effort should be put towards fighting crime especially in the months of December and January. Also, Crime cases should be recorded in detail alongside geographical coordinate of crime incidence spots by the Nigerian police so as to allow for hot spot analysis at spots level rather than streets or neighbourhood level. Finally, more security formations should be established within the metropolis to reduce crime.This is because areas with more security formations in the study area had less crime incidences compared to areas with fewer security formations.

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TABLES and FIGURES:

Table 1: Crime Types in Kaduna Metropolis

S/N	Crime Types	No. of cases	%
1	Armed Robbery	550	7.65
2	Murder	201	2.8
3	Assault	984	13.69
4	Theft	1384	19.26
5	Rape	220	3.06
6	Forgery	499	6.94
7	Burglary	955	13.29
8	Suicide	98	1.37
9	Cheating	1054	14.66
10	Hurting/Fighting	1209	16.82
11	Kidnapping	33	0.46
	Total	**7187**	**100**

Source: Field Survey, 2015

Table 2: General Crime Incidence in Kaduna Metropolis

S/N	Crime Types	No. of cases	%
1	Gabasawa	412	5.73
2	Tudun wada	1081	15.05
3	Kawo	314	4.37
4	Malali	314	4.37
5	Kabala Doki	282	3.92
6	Barnawa	346	4.81
7	Sabon Tasha	736	10.24
8	Rigachikun	730	10.16
9	Sabon Gari	235	3.27
10	Ungwan Rimi	389	5.41
11	Ung. Sanusi	448	6.23
12	Kakuri	401	5.58
13	Rigasa	623	8.67
14	Kabala West	434	6.04
15	Kurmi Mashi	442	6.15
	Total	**7187**	**100**

Source: Field Survey, 2015

Table 3: Armed Robbery incidence in Kaduna Metropolis

S/N	Crime Types	No. of cases	%
1	Gabasawa	20	3.6
2	Tudun wada	28	5.1
3	Kawo	20	3.6
4	Malali	11	2
5	Kabala Doki	22	4
6	Barnawa	40	7.3
7	Sabon Tasha	75	13.64
8	Rigachikun	73	13.27
9	Sabon Gari	15	2.73
10	Ungwan Rimi	42	7.64
11	Ung. Sanusi	34	6.2
12	Kakuri	34	6.2
13	Rigasa	48	8.73
14	Kabala West	49	8.91
15	Kurmi Mashi	39	7.1
	Total	**550**	**100**

Source: Field Survey, 2015

Table 4: Cheating incidence in Kaduna Metropolis

S/N	Crime Types	No. of cases	%
1	Gabasawa	90	8.54
2	Tudun wada	153	14.52
3	Kawo	75	7.12
4	Malali	36	3.41
5	Kabala Doki	21	1.99
6	Barnawa	24	2.28
7	Sabon Tasha	151	14.33
8	Rigachikun	113	10.71
9	Sabon Gari	42	3.98
10	Ungwan Rimi	47	4.46
11	Ung. Sanusi	42	3.98
12	Kakuri	36	3.41
13	Rigasa	98	9.3
14	Kabala West	62	5.9
15	Kurmi Mashi	64	6.07
	Total	**1054**	**100**

Source: Field Survey, 2015

Table 5: Assault incidence in Kaduna Metropolis

S/N	Crime Types	No. of cases	%
1	Gabasawa	42	4.27
2	Tudun wada	214	21.75
3	Kawo	33	3.35
4	Malali	37	3.76
5	Kabala Doki	23	2.34
6	Barnawa	42	4.27
7	Sabon Tasha	86	8.74
8	Rigachikun	70	7.11
9	Sabon Gari	24	2.44
10	Ungwan Rimi	67	6.81
11	Ung. Sanusi	81	8.23
12	Kakuri	77	7.83
13	Rigasa	94	9.55
14	Kabala West	52	5.28
15	Kurmi Mashi	42	4.27
	Total	**984**	**100**

Source: Field Survey, 2015

Table 6 Hurting/Fighting incidence in Kaduna Metropolis

S/N	Crime Types	No. of cases	%
1	Gabasawa	54	4.5
2	Tudun wada	180	14.9
3	Kawo	30	2.5
4	Malali	52	4.3
5	Kabala Doki	46	3.8
6	Barnawa	54	4.5
7	Sabon Tasha	207	17.1
8	Rigachikun	110	9.1
9	Sabon Gari	38	3.1
10	Ungwan Rimi	78	6.5
11	Ung. Sanusi	93	7.7
12	Kakuri	50	4.1
13	Rigasa	117	9.7
14	Kabala West	39	3.2
15	Kurmi Mashi	61	5
	Total	**1209**	**100**

Source: Field Survey, 2015

Table 7: Rape incidence in Kaduna Metropolis

S/N	Crime Types	No. of cases	%
1	Gabasawa	5	2.3
2	Tudun wada	33	15
3	Kawo	20	9.1
4	Malali	9	4.1
5	Kabala Doki	12	5.5
6	Barnawa	14	6.4
7	Sabon Tasha	5	2.3
8	Rigachikun	42	19.1
9	Sabon Gari	4	1.8
10	Ungwan Rimi	10	4.5
11	Ung. Sanusi	10	4.5
12	Kakuri	13	5.9
13	Rigasa	10	4.5
14	Kabala West	27	12.3
15	Kurmi Mashi	6	2.7
	Total	**220**	**100**

Source: Field Survey, 2015

Table 8: Theft/Stealing incidence in Kaduna Metropolis

S/N	Crime Types	No. of cases	%
1	Gabasawa	147	10.6
2	Tudun wada	238	17.2
3	Kawo	76	5.49
4	Malali	104	7.51
5	Kabala Doki	62	4.48
6	Barnawa	41	3
7	Sabon Tasha	79	5.71
8	Rigachikun	98	7.08
9	Sabon Gari	44	3.18
10	Ungwan Rimi	56	4.05
11	Ung. Sanusi	93	6.72
12	Kakuri	63	4.55
13	Rigasa	100	7.23
14	Kabala West	71	5.13
15	Kurmi Mashi	112	8.09
	Total	**1384**	**100**

Source: Field Survey, 2015.

Table 9: Temporal Distribution of Crime in the Study Area

S/N	Months	2010 No. of Crime	%	2011 No. of crime	%
1	JAN	423	11.46	388	10.97
2	FEB	293	7.94	255	7.21
3	MAR	233	6.31	272	7.69
4	APR	248	6.72	222	6.28
5	MAY	282	7.64	161	4.55
6	JUN	259	7.02	198	5.6
7	JUL	252	6.83	213	6.04
8	AUG	251	6.8	329	9.32
9	SEP	283	7.67	343	9.7
10	OCT	362	9.8	310	8.77
11	NOV	359	9.73	319	9.02
12	DEC	446	12.08	525	14.85
	Total	**3691**	**100**	**3535**	**100**

Source: Field Survey, 2015.

Table 10: Crime Hot Spots in the Study Area.

S/N	Area	No. OF CASES	DIFF. BWT AVC AND NO OF CRIME CASES	REMARKS
1	Gabasawa	412	-68	NOT HOT SPOT
2	Tudun wada	1081	601	HOT SPOT
3	Kawo	314	-166	NOT HOT SPOT
4	Malali	314	-166	NOT HOT SPOT
5	Kabala Doki	282	-198	NOT HOT SPOT
6	Barnawa	346	-134	NOT HOT SPOT
7	Sabon Tasha	736	256	HOT SPOT
8	Rigachikun	736	256	HOT SPOT
9	Sabon Gari	235	-245	NOT HOT SPOT
10	Ungwan Rimi	387	-93	NOT HOT SPOT
11	Ungwan Sanusi	448	-32	NOT HOT SPOT
12	Kakuri	401	-79	NOT HOT SPOT
13	Rigasa	623	143	HOT SPOT
14	Kabala West	434	-46	NOT HOT SPOT
15	Kurmi Mashi	452	-28	NOT HOT SPOT

Source: Field Survey, 2015.

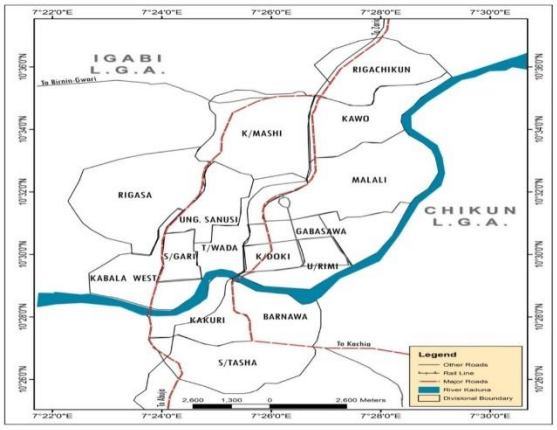


Figure 1: Kaduna Metropolis (Study Area)
Source: Modified from Administrative map of Kaduna State

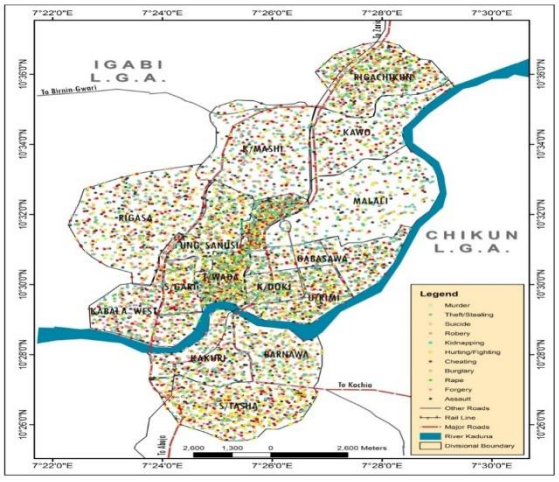


Figure 2: General crime Incidence in Kaduna Metropolis.
Source: Author's Analysis, 2015

Figure 3: Distribution of Armed Robbery Incidence in Kaduna Metropolis
Source: Author's Analysis, 2015

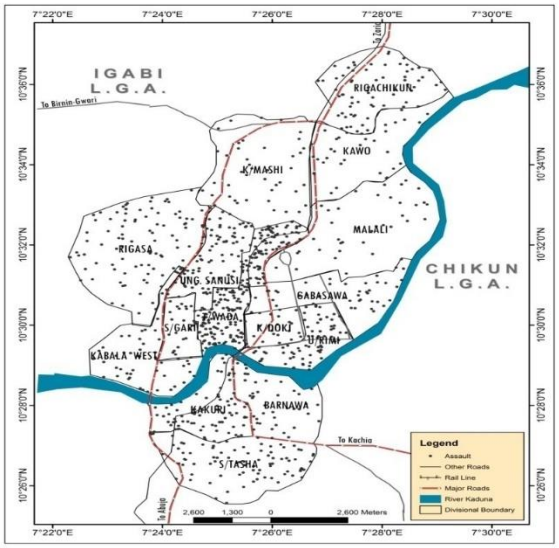


Figure 5: Distribution of Assault Incidence in Kaduna Metropolis
Source: Author's Analysis, 2015

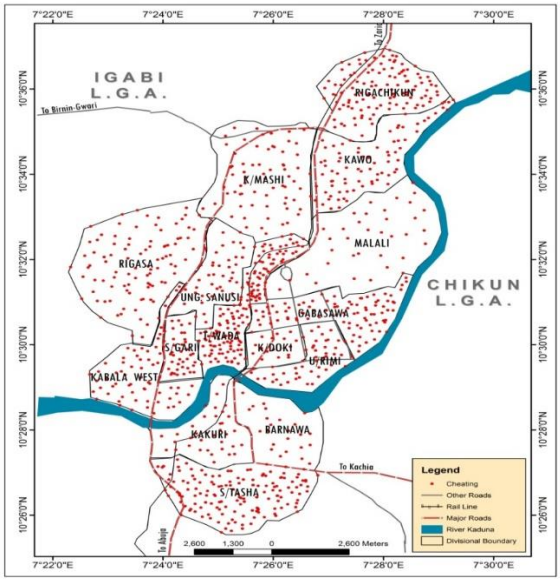


Figure 4: Distribution of Cheating Incidence in Kaduna Metropolis
Source: Author's Analysis, 2015

Figure 6: Distribution of Hurting/Fighting Incidence in Kaduna Metropolis
Source: Author's Analysis, 2015

Figure 7: Distribution of Rape Incidence in Kaduna Metropolis
Source: Author's Analysis, 2015

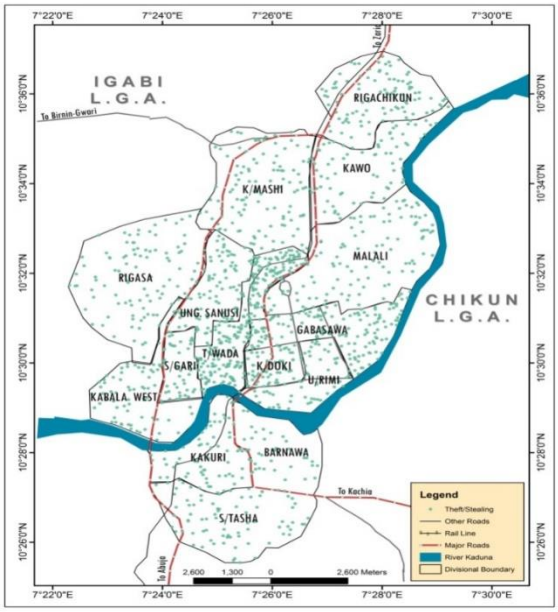
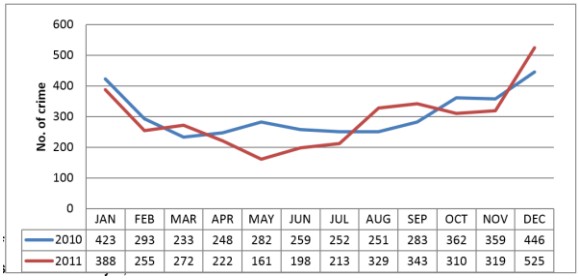


Figure 8: Distribution of Theft/Stealing Incidence in Kaduna Metropolis
Source: Author's Analysis, 2015



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2010	423	293	233	248	282	259	252	251	283	362	359	446
2011	388	255	272	222	161	198	213	329	343	310	319	525

Figure 9: Temporal Distribution of Crime In The Study Area.
Source: Author's Analysis, 2015

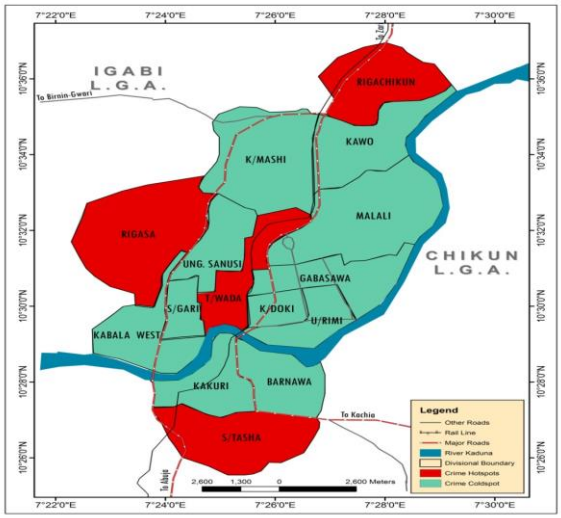


Figure 10: Crime Hotspots in the Study Area
Source: Author's Analysis, 2015