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Analysis of the Spatial Distribution of Filling Stations and Vulnerability to Fire Hazard in Kaduna South Local Government Area, Kaduna State, Nigeria

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Abstract

This study analyzed the Spatial Distribution of Filling Stations and Vulnerability to Fire Hazard in Kaduna South Local Government Area, Kaduna State. The methods includes data used for the names and addresses of filling stations in the study area as well as guidelines and staSndards for setting up a filling station was obtained from the Department of Petroleum Resource (DPR) and verified on site, while their coordinates were obtained by the use of hand-held Global Positioning System receiver (Germin 76S). These were plotted on a base map using ArcGIS 10.1. Maps are used to determine the locations, distribution, compliance to standard and densities (concentration) of the filling stations. The result of the study shows that the areas with the highest concentration of filling stations are in Makere and Kurmin Mashi and about 82% of the filling stations do not meet regulatory requirements for proximity to major roads. In addition, with the high population density in the study area, about 52 out of 93 filling stations are located within residential areas, which have vulnerable to fire hazard. It was recommended that both government and regulatory institutions should implement the concept of sustainable urban growth in order to balance land and urban development. Also investors must understand that investments are meant for public good and not the other way round. Therefore the general public should always insist on respect for their safety and lives by making sure that utilities or developments in their vicinity conform to safety regulations and development standards.

Keywords: *Petrol, Filling-station, Vulnerability, Hazard, Disaster, Risk and Fire.*

Introduction

Filling Station or Gas Station is a facility which sells fuel and other lubricants for motor vehicles such as diesel, engine oils and provides other services such as car servicing, wheel balancing and alignment. According to Chapin(2012), Petrol Station should be located not only where they are in fact accessible but where they can be easily located by strangers and that in details, they should be placed where there will be little danger and congestion as much as possible. Also according to the Central Place Theory (Christaller, 2014) service points could be distributed rationally according to the size, spacing or distance and population to be served. This means that, demand for products sold at Filling Station would be satisfied by a system of service points at the landscape of any urban activity should be distributed on of service points at which a variety of demands are satisfied. George (1996) has argued however, that it is possible to have unequal distribution of service centers (i.e. central place) around the metropolis producing city rich and city poor sector.

With the rapid growth in the urban areas all over the world, there seem to be an increasing pressure on land and infrastructure which are originally designed to meet particular capacity. Among these utilities is petrol station. An urban planner faces challenges of location of facilities and services that as a result expose our urban populace to some dangers. Kaduna South Local Government Area is one of the towns that experiences these problems that arises as a result of un-coordinated development, thereby making the people that resides or does business around the Filling Stations more vulnerable to fire hazard.

The impact of any kind of explosion from the petrol station to its surrounding cannot be overemphasized owing to the volatility of petrol and other petroleum products sold or stored at the Filling Station. Hence, a proper and deliberate study is necessary and important in order to provide information on risk zones to the relevant emergency units to serve as an information tool for planning and response to fire incidence arising from these petrol filling stations and land uses close to them.

Agencies such as the Federal Fire Service Stations, National Emergency Management Agency (NEMA), Federal Road Safety Commission (FRSC), Police, Hospitals and other emergency units would depend on accurate data and detailed description on the various risk zones and their characteristics for proper mobilization of resource and personnel within the shortest possible time and

route when there is a distress call. Fire Service operations in Nigeria is generally very poor arising from shortage of fire stations, lack of effective communication system, shortage of water supply, obsolete equipment, poor training of personnel, lack of welfare package for officers and men of the fire service (this includes attractive salary and insurance policy) and road traffic jam. The situation has worsened to the extent that Nigeria now depend more on multinational construction and oil companies for disaster management (Jide,2009).

The use of GIS in analyzing locational distributions and vulnerability to fire disaster and other emergency mapping and management have been successful in many developed countries (Murray *et al*, 2005). GIS allows fire fighter personnel to make plans effectively for emergency response, determine mitigation priorities, analyze historical events, and predict future events; it helps fire officers to determine potential incident sites and facilitates to explore the relationship between incident and land use (Ajemirokun, *et al*, 2006). Urban Kaduna has been experiencing a population growth, since the creation of the state and will in turned lead to the increase in the creation of filling station. Hence the need of this study in analyzing the spatial distribution of filling stations and vulnerability to fire hazard in Kaduna South Local Government Area, Kaduna State, Nigeria with the aid of geospatial technology.

Statement of the Research Problem

More than half of fast-growing world population is living in urban areas, and this is only expected to grow in more coming decades (George, 1996). Most of the urban centers in the world like Kaduna State are exposed to some hazards, such as traffic congestion, pollution and many more problems resulting from an un-coordinated development. Apart from these hazards, Kaduna city is also confronted with other problems like accidents, explosion and fire and other related man-made disasters and catastrophic. In addition, kaduna urban center have a varying degree of vulnerability, depending on the level of development, copping capacity and the level to which effective development control strategies have been implemented. In most urban areas, the high demand placed on land resulted to illegal conversion, leading to haphazard development and the deliberate location of petrol stations in unsuitable areas and highly vulnerable to hazards (George, 1996). Like many cities in Nigeria, Kaduna developed without a proper development planning and as a result of non-adherence to planning laws; Filling Stations are now major contributors to problems like traffic congestion, pollution and constituting potential fire hazard and explosion. The extent of these problems depends on the criteria or variables such as location, size and setback from the road etc. This work, therefore addresses the problem confronting urban environment in its bids to ensure suitable location of Filling Stations. This study

explored GIS capability to analyze the location of filling stations in Kaduna South Local Government Area and proffer ways of ensuring strict compliance to planning laws and regulations with regards to Petroleum Filling Stations location.

Aim and Objectives

The aim of the study is to analyze the spatial distribution of filling stations and vulnerability to fire hazard in Kaduna South Local Government Area with the aid of geospatial technology.

In addition, the specific objectives of the study are to:

i. Identify the location of filling stations in the study area.
ii. identify the distribution of fire hotspots density of filling stations in the study area.
iii. assess the compliance of the filling stations with fire safety regulation standard.

Study Area and Methodology

Location of the Study Area

Kaduna South Local Government Area is located on latitude $10^{0}35'30"$N and longitude $7^{0}28'25"$E. It was carved out of the former metropolitan Kaduna Local Government on 23rd of September, 1991. The Local Government is bordered by Chikun, Kaduna North and Igabi Local Government Areas on the south, east and north-west respectively. Its landmass is 950 square kilometers and it is the most populated Local Government Area in Kaduna State.

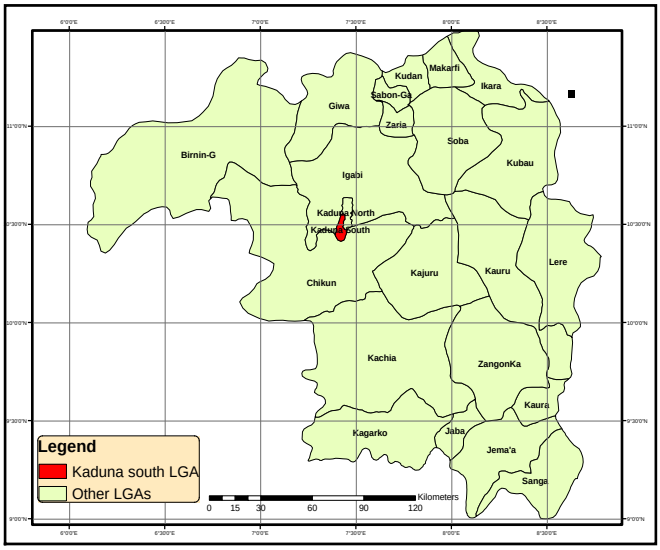

Figure 1: Map of Kaduna State Showing Kaduna South Local Government Area
Source: Kaduna State, Ministry of Lands and Survey

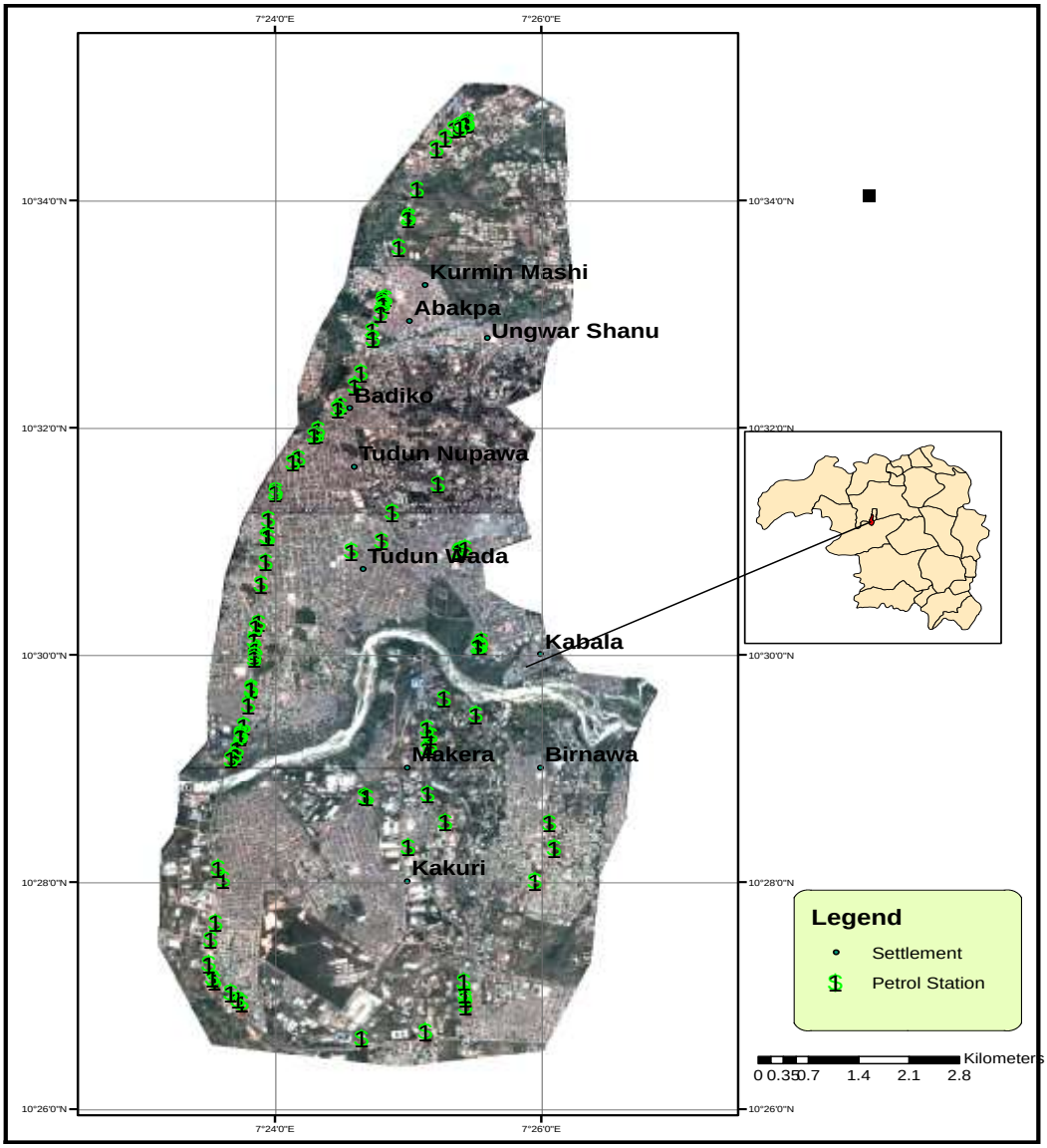

Figure 2: Satellite image of the Study Area
Source: National Centre for Remote Sensing, Jos.

METHODOLOGY

The research methodology for the purpose of this project involved the acquisition and generation of data in form of satellite imagery; maps field data regulation extracts and GPS locations of the filling stations.

Data Sources

The main data sets used for this study include the following:

Satellite Image-Spot 5 of 2005 was obtained from National Centre for Remote Sensing, Jos and was used to delineate roads and built up areas.
Maps of Kaduna and Kaduna South Local Government Area were obtained from the Kaduna State Ministry of Lands and Survey and were modified and used to delineate the study area.
Population record of 2006 census was obtained from National Population Commission, Kaduna office and was projected to 2012 using 3.18 growth rates according to United Nation's population estimate to ascertain the population of the various communities within the study area and filling station locations obtained with the aid of GPS.
The addresses of the filling stations were obtained from the Department of Petroleum Resource (DPR), Kaduna zonal Office.

Hardware and Software

HP 650 Windows 7 laptop computer was used for the research-Microsoft Excel was used for data design and Microsoft Word for presentation and display.
ArcGIS 10.1 was used for spatial and image analysis.
Handheld GPS (Germin Map 76S chart plotting receiver) was used in collecting coordinates of the filling stations.

Field Work

Location and collection of coordinates of all the filling stations in the study area were carried out using GPS.
Oral interview was done at the Department of Petroleum Resource (DPR), Kaduna Zonal Office with the head of operations to obtain the standards and guidelines for setting a filling station.

Data Analysis

The coordinates of the filling station were typed and codded in excel, import in to the ArcGIS 10.1 environment, the coordinates locations were added as waypoints and the locational layer were created. GIS Analysis-Density Analysis was done using the Kernel Density Analysis (KDE) to get the density distribution of the filling stations. A buffer of 45metres was created to get the number of filling stations that comply or do not comply to the fire safety standard.
Statistical Analysis-Simple Statistical Analysis table was used to present the results.

Results and Discussion

For effective, and adequate mapping and response to fire outbreak, relevant information about potentially vulnerable areas formed the basis to an effective and purposeful response to fire outbreak which subsequently provides a better and safety environment to live in. This aspect presents and discusses the results generated at the course of study in simple statistical analysis using tables, chats and maps.

Filling Stations Distribution in the Study Area

The filling stations in the study area are not evenly distributed. Table 1 shows that out of the 93 filling stations located and used for the study, 14% are in Badiko, Barnawa has 13%, Kakuri/Makera/Trikaniya have 25%, Kurmin Mashi has 21%, Tudun Wada7%, Unguwan Mu'azu 13% and Unguwan Sanusi 7%. It was found that 60 out of the 93 filling stations in the study area are located along the Nnamdi Azikwe Way which cut across Kurmin Mashi, Unguwan Sanusi, Badiko, Tudun Wada, Unguwan Mu'azu and Trikaniya. The distribution of the filling stations is as are also represented by the Bar Chart in figure 3.

Table 1: Filling Stations and Fire Service Station Distribution in the Study Area

S/N	Area	No. of Filling Stations	Percentage
1	Badiko	13	14%
2	Barnawa/South Bridge	12	13%
3	Kakuri/Makere/Trikaniya	23	25%
4	Kurmin Mashi	20	21%
5	Tudun Wada	7	7%
6	Unguwan Mu'azu	11	13%
8	Unguwan Sanusi	7	7%
	Total	93	100%

Source: Field Work, 2019

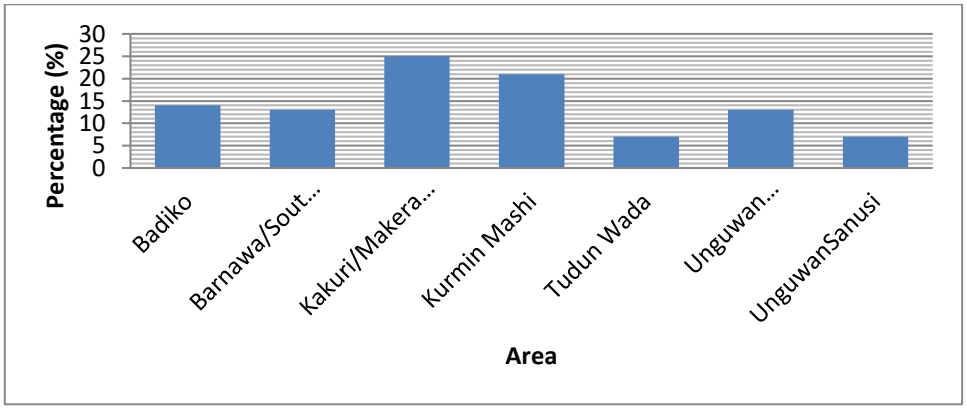

Figure 3: Bar Chat of the Distribution of Filling Stations in the Study Area
Source: Fieldwork, 2019

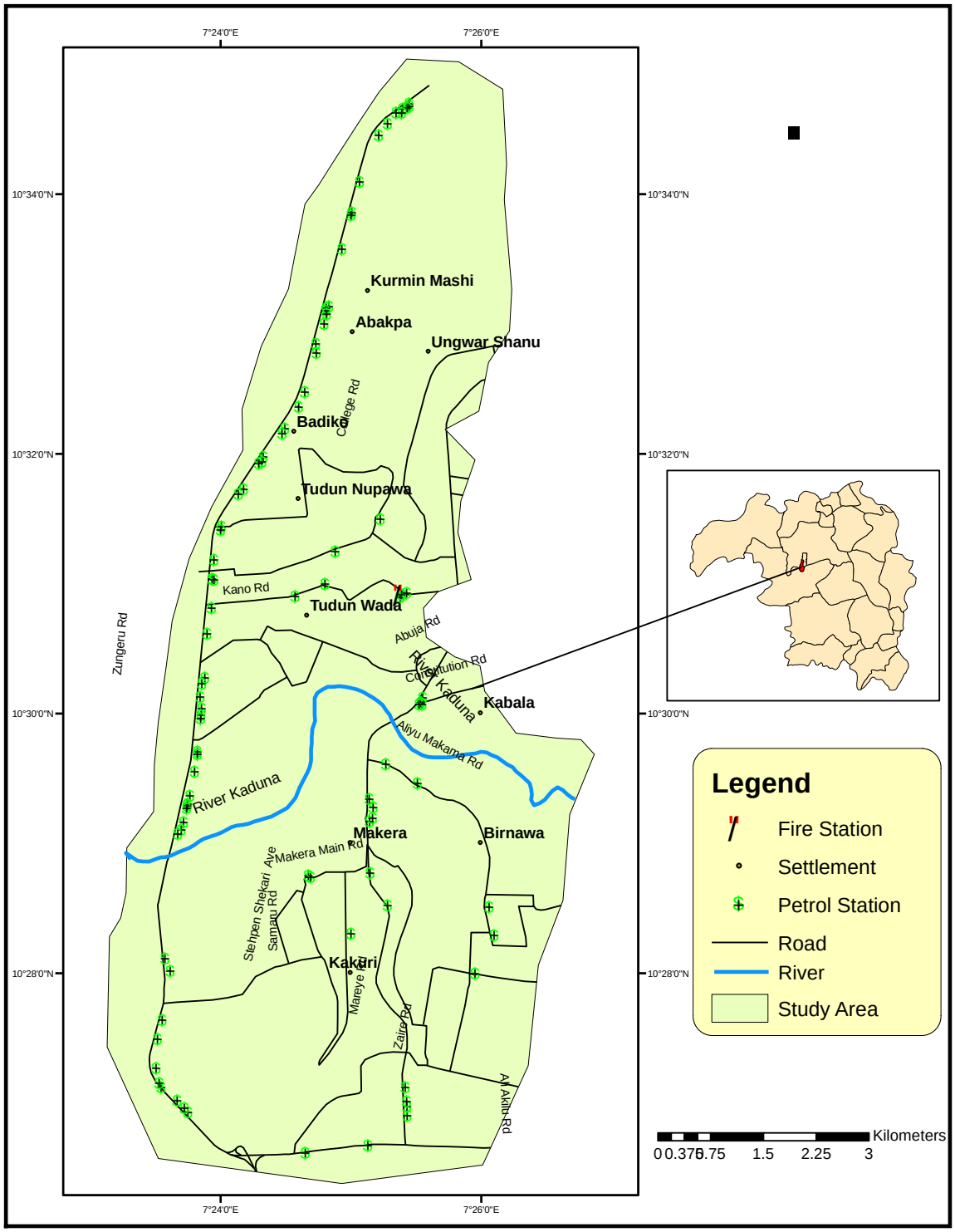

Figure 4: Filling Stations and Fire Service Station Distribution in the Study Area
Source: GIS Analysis (2019)

Filling Stations that do not meet Standard of 45metres Buffer

In accordance to the fire safety standard of 45metres distance from a filling station's pump to the centre of the road, a buffer of 45metres was created to ascertain the filling stations that do not meet the standard. The results of the buffering are shown in table 2 and the Figure 5 is a histogram that represents the stations that meet or not the standard. Out of the 93 filling stations (82%) did not meet the standard. Badiko has 16% of the filling stations that do not meet the standard. Barnawa/South Bridge has 14%, Kakuri/Makera/Trikaniya 29%, Kumin Mashi 16%, Tudun Wada 8%, Unguwan Mu'azu 8% and Unguwan Sanusi 9%.

Table 2: Filling Stations that do not meet Standard of 45metres Buffer

S/N	Area	No. of Filling Stations	Percentage
1	Badiko	12	16%
2	Barnawa/South Bridge	11	14%
3	Kakuri/Makera/Trikaniya	22	29%
4	Kurmin Mashi	12	16%
5	Tudun Wada	6	8%
6	Unguwan Mu'azu	6	8%
7	Unguwan Sanusi	7	9%
	Total	76	100%

Source: Fieldwork, 2019

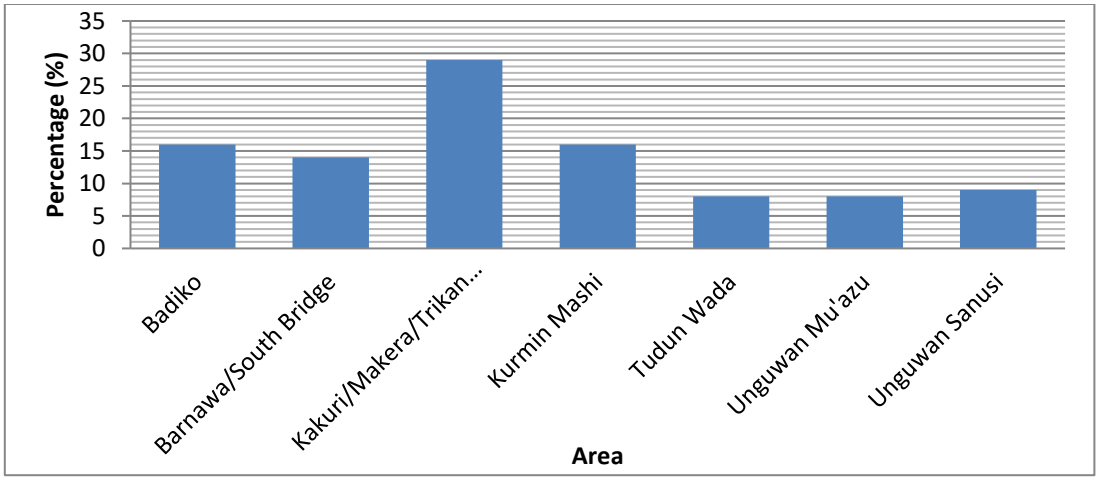

Figure 5: Bar Chat of Filling Stations that do not meet the 45metres Buffer
Source: Fieldwork, 2019

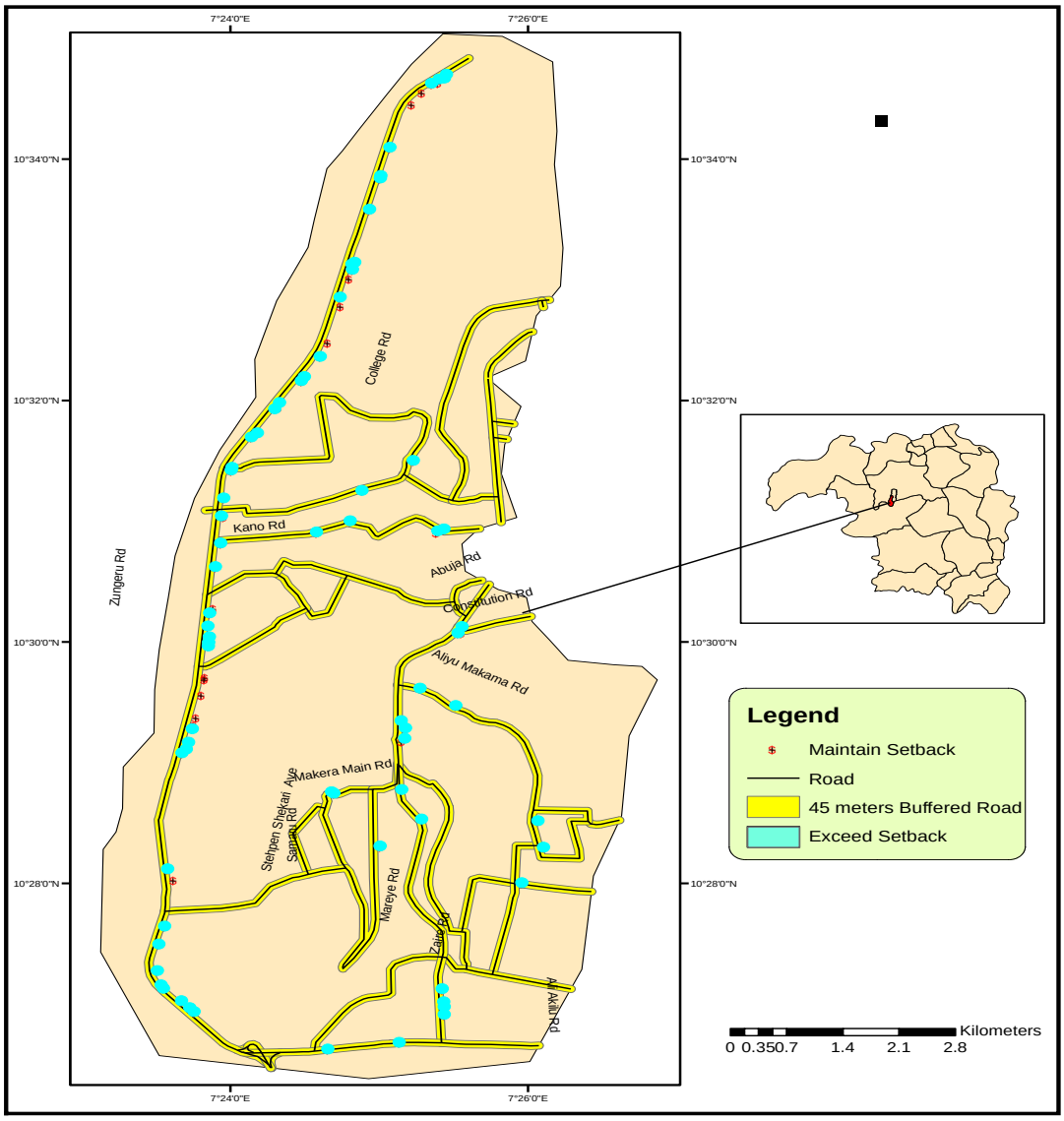

Figure 6: Filling Stations that Maintain/Exceed 45metres Fire Safety Setback Standard in the study area

Source: GIS Analysis (2019)

Filling Stations within Residential Areas

According to the standards for setting filling stations, a filling station should be sited for every 5,000 people. The table above revealed the filling stations that fell within the residential areas of the study area. 52 out of the 93 filling stations in the study area are sited within residential areas. All the filling stations in Badiko are within residential area representing 25% of the total filling stations within residential areas.

Barnawa/South Bridge has 16%, Kakuri/Makera/Trikaniya 19%, Kurmin Mashi 13%, Tudun Wada 2%, Unguwan Mu'azu 12% and Unguwan Sanusi 13%.

Table 3: Filling Stations within Residential Areas

S/N	Area	No. of Filling Stations	Percentage
1	Badiko	13	25%
2	Barnawa/South Bridge	8	18%
3	Kakuri/Makera/Trikaniya	10	19%
4	Kurmin Mashi	7	13%
5	Tudun Wada	1	2%
6	Unguwan Mu'azu	6	12%
7	Unguwan Sanusi	7	13%
	Total	52	100%

Source: Field Work, 2019

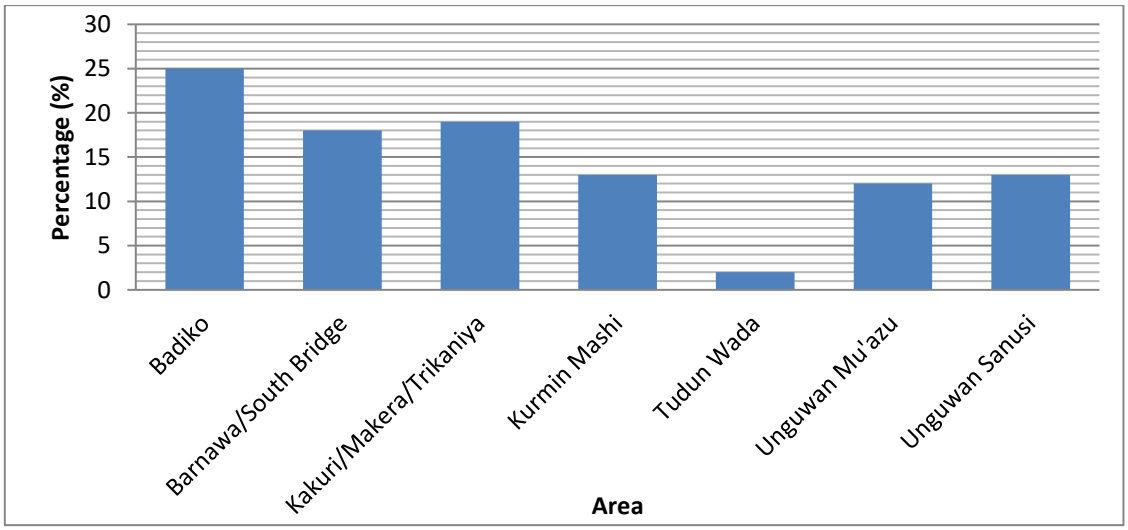

Figure 7: Bar Chart of Filling Stations within Residential Areas
Source: Fieldwork, 2019

Filling Stations within Commercial Areas

The results of filling stations within commercial areas are shown in table 4. It revealed that 31 out of the 93 filling stations in the study area fell within commercial areas. Barnawa/South Bridge has 13% constituted from the filling stations around the stadium roundabout (South Bridge), surrounded by Plazas and Shops. The filling stations in the commercial of Kakuri/Makera/Trikaniya constitutes 42%, they are located around industries and banks. Kurmin Mashi has 26% of the stations within

commercial areas; these are located at New Panteka. Tudun Wada constitutes the remaining 19%; these are located at the busy areas of Old Panteka (Poly Road), Kasuwan Barci and Kano road-an extension of Central Market.

Table 4: Filling Stations within Commercial Areas

S/N	Area	No. of Filling Stations	Percentage
1	Badiko	0	0
2	Barnawa/South Bridge	4	13
3	Kakuri/Makera/Trikaniya	13	42
4	Kurmin Mashi	8	26
5	Tudun Wada	6	19
6	Unguwan Mu'azu	0	0
7	Unguwan Sanusi	0	0
	Total	31	100%

Source: Field Work, 2019

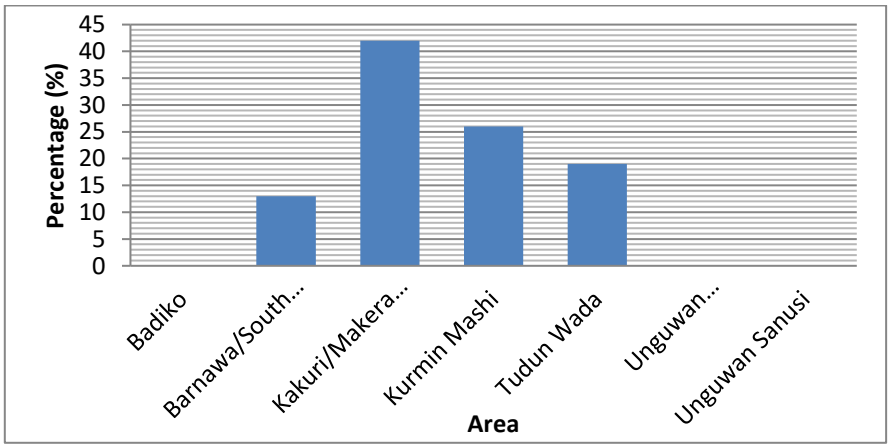

Figure 8: Bar Chart of Filling Stations within Commercial Areas
Source: Fieldwork, 2019

Evenly Density Distribution of Filling Stations in the Study Area

The table 5 shows the filling stations that are evenly distributed within the study area. There are 30 filling stations that are evenly distributed across the study area. Badiko has 10%, Barnawa 30%, Kakuri 23%, Kurmin Mashi 7%, Tudun Wada 13%, Unguwan Mu'azu 7% and Unguwan Sanusi has 10% of the evenly distributed filling stations.

Table 5: Evenly Density Distribution of Filling Stations in the Study Area

S/N	Area	No. of Filling Stations	Percentage
1	Badiko	3	10%
2	Barnawa/South Bridge	9	30%
3	Kakuri/Makera/Trikaniya	7	23%
4	Kurmin Mashi	2	7%
5	Tudun Wada	4	13%
6	Unguwan Mu'azu	2	7%
7	Unguwan Sanusi	3	10%
	Total	30	100%

Source: Field Work, 2019

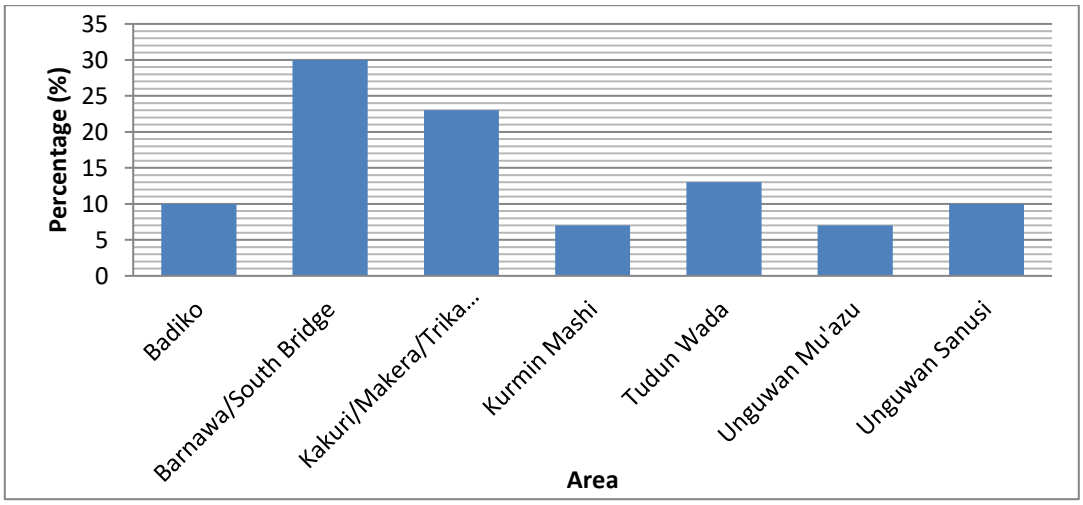

Figure 9: Bar Chart Histogram of Evenly Density Distribution of Filling Stations in the Study Area
Source: Fieldwork, 2019

Low Distribution Density of Filling Stations in the Study Area

The table above represents the filling stations that are of low density distribution in the study area. It was revealed that the low density distribution constitute the highest number of filling stations in the study area. 21.2% of the low distributed filling stations go to Badiko, 39.4% to Kakuri/Makera/Trikaniya, Kurmin Mashi 15.2%, Unguwan Mu'azu and Unguwan Sanusi has 12.1% each while Barnawa and Tudun Wada have none of the low density distributed filling stations.

Table 6: Low Distribution Density of Filling Stations in the Study Area

S/N	Area	No. of Filling Stations	Percentage
1	Badiko	7	21.2%
2	Barnawa/South Bridge	0	0%
3	Kakuri/Makera/Trikaniya	13	39.4%
4	Kurmin Mashi	5	15.2%
5	Tudun Wada	0	0%
6	Unguwan Mu'azu	4	12.1%
7	Unguwan Sanusi	4	12.1%
	Total	33	100%

Source: Field Work, 2019

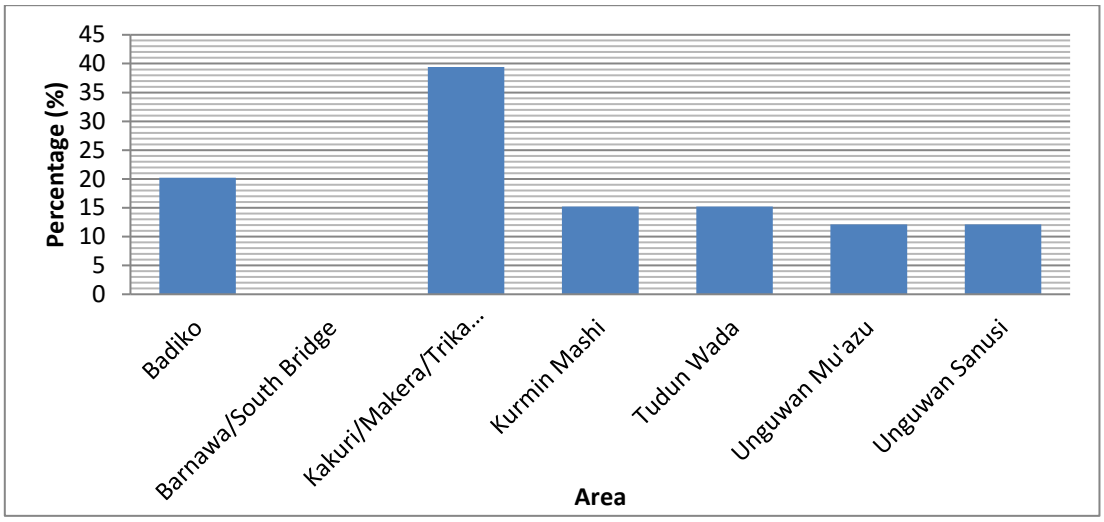

Figure 10: Bar Chart of Low density Distribution of Filling Stations in the Study Area
Source: Fieldwork, 2019

Medium Density Distribution of Filling Stations in the Study Area

Table 7 is a representation of the medium density distribution of filling stations within the study area. There are 17 filling stations that fall in this category and are almost of uniform representation within the areas. Badiko, Kakuri/Makera/Trikaniya, Kurmin Mashi have 3 filling stations each that represents the medium density distribution. This represents 17.6% each. Unguwan Mu'azu has 29%, while Barnawa and Unguwan Sanusi are not represented in this category.

Table 7: Medium Density Distribution of Filling Stations in the Study Area

S/N	Area	No. of Filling Stations	Percentage
1	Badiko	3	17.6%
2	Barnawa/South Bridge	0	0%
3	Kakuri/Makera/Trikaniya	3	17.6%
4	Kurmin Mashi	3	17.6
5	Tudun Wada	3	17.6%
6	Unguwan Mu'azu	5	29.6%
7	Unguwan Sanusi	0	0%
	Total	17	100%

Source: Field Work, 2019

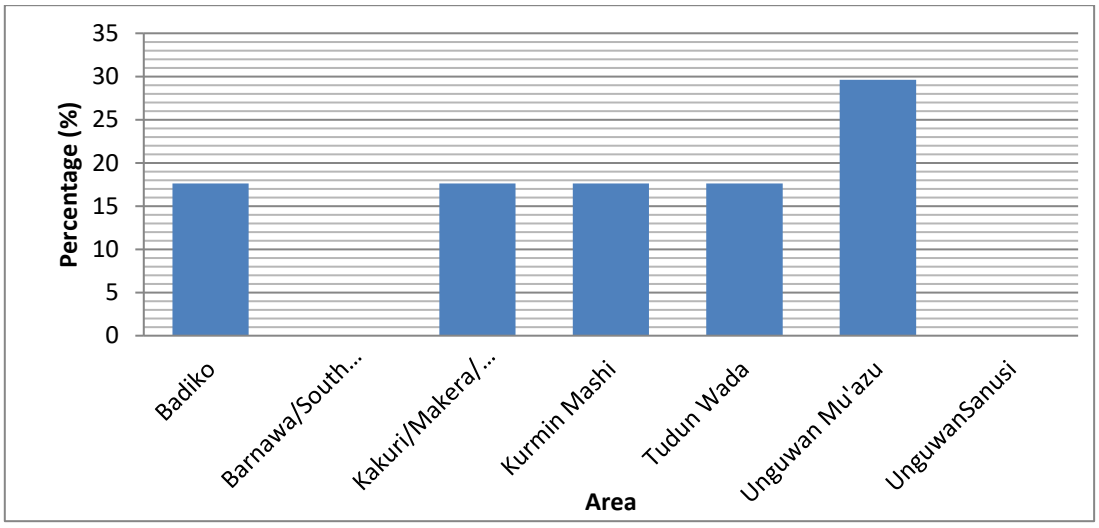

Figure 11: Bar Chart of Medium Distribution of filling Stations in the Study Area
Source: Fieldwork, 2019

High Density Distribution of Filling Stations in the Study Area

Table 8 represents the filling stations that fall in the category of the high density in the study area. 13 filling stations fall in this category. The high density areas are only found in Barnawa/South Bridge (at South Bridge to be precise) representing 23% and Kurmin Mashi 77%.

Table 8: High Density Distribution of Filling Stations in the Study Area

S/N	Area	No. of Filling Stations	Percentage
1	Badiko	0	0%
2	Barnawa/South Bridge	3	23%

3	Kakuri/Makera/Trikaniya	0	0%
4	Kurmin Mashi	10	77%
5	Tudun Wada	0	0%
6	Unguwan Mu'azu	0	0%
7	Unguwan Sanusi	0	0%
	Total	13	100%

Source: Field Work, 2019

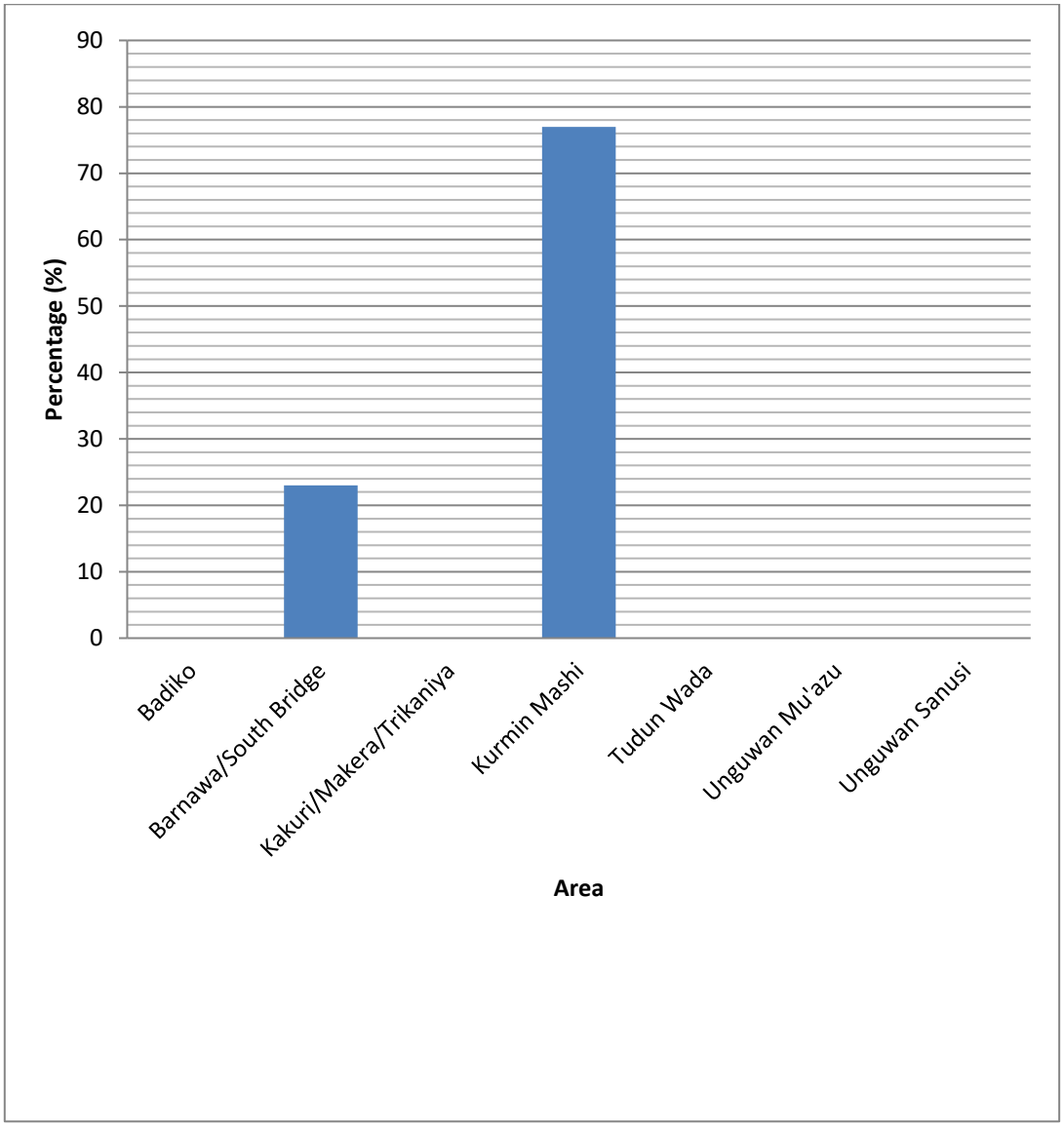

Figure 12: Bar Chart of High Density Distribution of Filling Stations in the Study Area
Source: Fieldwork, 2019

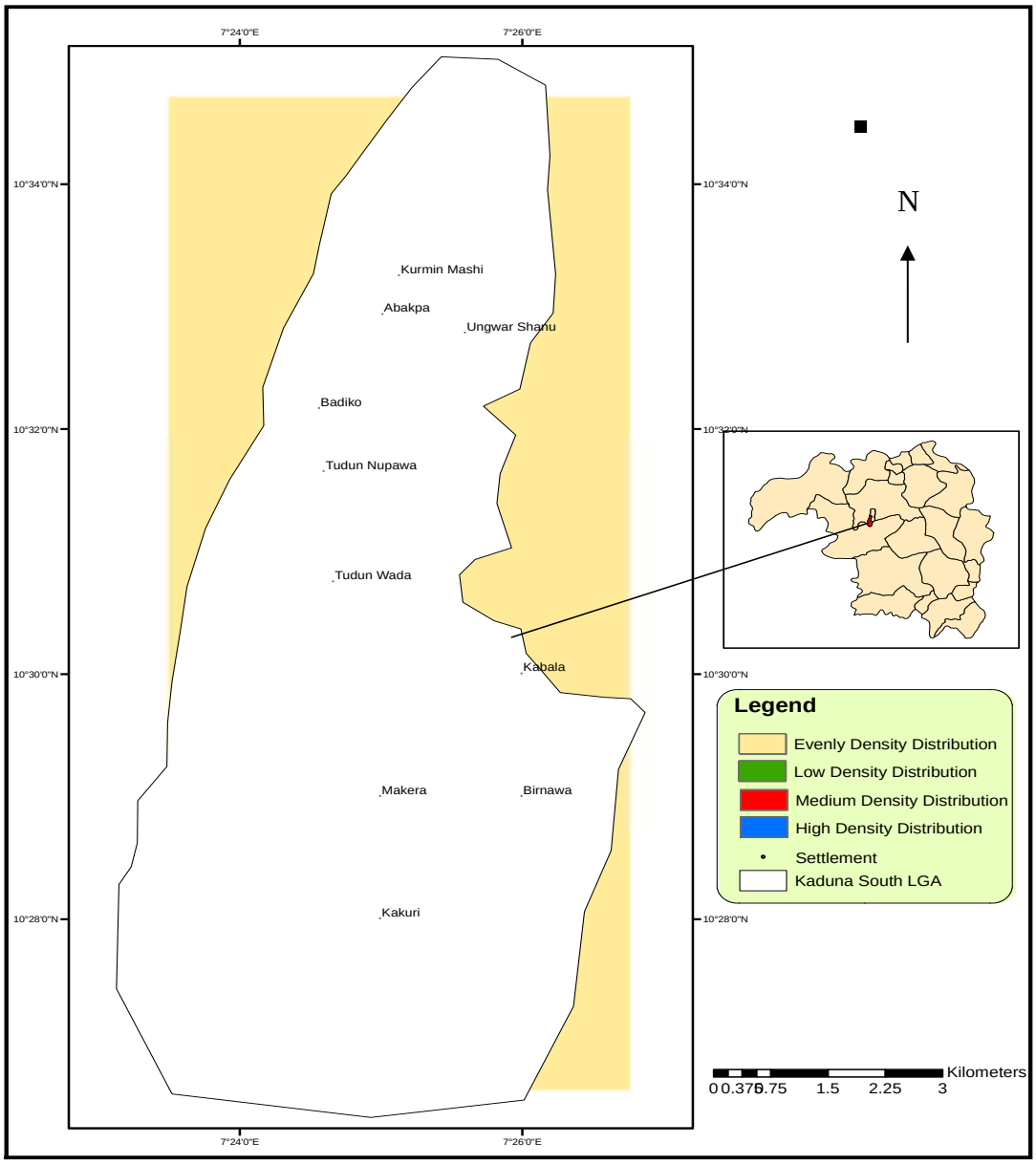

Figure 13: Classification of Distribution Density of Petrol Filling Stations in the Study Area

Source: GIS Analysis (2019)

Distribution Density of Filling Stations in the Study Area

One of the objectives of this study set out to achieve is to identify all the filling stations in the study area as an indication of utilities that store highly inflammable liquids which could trigger an explosion in case of a fire outbreak and pose danger to the surroundings. It also shows the location of the fire service station that is meant to

manage fire incidence in the study area. The study discovered that there is only one fire station located in Tudun Wada to serve the entire study area and beyond.

The study identified the fillings stations that comply/failed to comply with the fire safety regulations and standards. The fire safety standard used in the analysis are first, filling station pumps must observe a 45metres setback to the middle of the road and secondly, there must be an 8metres setback between the walls of the filling station and any surrounding building. For the buffer created to identify compliance, it shows that 78 (84%) out of the 93 filling stations captured was not comply with the 45metres fire safety setback from the center of the road, leaving only 15 (16%) that complied. Due to time constraint the researcher could not digitize the buildings around the filling stations to create a buffer to get the 8metres setback compliance but it was observed that most of the filling stations did not comply and are even sharing fence with houses or commercial buildings. It generally shows that fire safety regulations standards are seriously violated and this indicates the level of exposure to fire hazard within the area.

The classification of concentration of the filling stations in the area based on density was achieved using the Kernel density and proximity and point distance statistical analysis toolbox in ArcGIS 10.1 to show the distributions. It shows that the filling stations in the study are mostly of even and low density distribution constituting 30 and 33 of the total of 93 filling stations in the study area respectively. Seventeen (17) filling stations constitute the medium density. It also shows that filling stations are densely distributed around the New Panteka–Kurmin Mashi along Nnamdi Azikwe Express Way, and around the stadium roundabout along Kachia/Junction Road. It also found that these areas could be categorized as potentially hazardous and vulnerable areas in view of the concentration of the filling stations that are clustered within a short distance. This could be very vulnerable areas or spots and of high priority in case of any fire outbreak in any of the stations around. Although there are not very many filling stations that fall within the high density, even those that are evenly distributed or those in low and medium densities could also pose hazard to the residential and commercial areas they are located in, looking at the level of violation of the safety standards, by not meeting the standard of minimum size of plot within the built-up areas of $1000m^2$, 400metres distance from one station to another, 45metres setback from the pump to the center of the road and 8metres setback from the surrounding buildings.

Summary, Conclusion and Recommendations

Summary

Generally, the struggle for limited space within the urban area as the result of high population growth is fast becoming a challenge, as most economic and social activities

seek to take advantage of the infrastructures and ready market in order to maximize gains. However, this drive has led to a lot of safety violation and bridge of regulations both on the side of the government agencies saddled with enforcing these regulations as well as the public who erect their structures for whatever purpose.

It calls for great concern considering the number of petrol stations that fall short of one fire safety regulation or the order. The situations show that either the filling stations are wrongly sited in view of fire safety regulations or the buildings around encroach towards these petrol stations. Whichever way, fire safety regulation is being greatly undermined.

The cascading effects of fire risks appear to have a fertile ground in case of fire outbreak either from the petrol filling stations or from the buildings around the petrol filling stations, as one source could lead to another due to the closeness of petrol stations from the buildings and petrol pumps to the road which in most cases takes a lot of traffic especially in areas around the stadium roundabout and New Panteka along Nnamdi Azikwe Express Way.

Also, some areas are heavily concentrated with filling stations and those areas have high buildings and population density, thereby making the area very vulnerable in case of a fire incidence as many lives and properties could be loss and economic activities seriously affected. This of course places the areas under serious threat when there is fire outbreak.

It was also observed and gathered that some houses, whether residential or commercial also exceed their limit, thereby putting themselves at risk of existing utilities that could be potentially dangerous disasters.

Conclusion

This study revealed that most filling stations are concentrated along Nnamdi Azikwe Way in Kurmin Mashi, Unguwan Sanusi, Badiko, Unguwan Mu'azu and Trikania areas of the study area and more than 82% do not meet with the general standard off-set from main roads prescribed by DPR. The situation of fire safety around filling stations has not been taken seriously as there are little or no precautionary measures in place to tackle fire outbreak. The level of compliance to fire safety is of great concern as both developers and the public take safety for granted. Considering the fact that there is only on Fire Service Station in the study, this could pose enormous challenge for fire disaster management and readiness of the fire service is nothing compared to the enormous challenges of fire in the state and country at large. The water corporation is performing below the water requirement of the people let alone having water for hydrants. This of course could frustrate any effort put in place to combat fire as water is the basic requirement to manage or control fire outbreak/disaster. It is therefore

necessary for government and development control agencies to ensure that property developers, owners of filling stations and residents comply with standards for either siting of filling stations or housing development with around filling stations with the aid of geospatial technology.

Recommendations

The growing trend of fire safety regulations violence certainly should not be overlooked but given deliberate effort both on the side of the government and the public in ensuring a safe society to live and work in. It calls for both the drastic and consensus effort in checking this trend of lack of compliance. It is therefore recommended that necessary action should be taken by government, regulatory bodies, investors and residents around the vicinity of filling stations as follows:

Role of Government

The government being the custodian of the land within a given region should implement the concept of urban growth boundary around cities based on cities proliferated growth and capability to extend urban infrastructure. This would help planners and decision makers to prepare a defined area for eventual urbanization before the municipality actually extend infrastructures and commence annexation. The urban growth boundary area should be designed to accommodate anticipated growth for at least 25 years. A growth boundary implies that the planning commission and other agencies can prepare a defined area for eventual urbanization before the municipality actually extends infrastructures and commence annexation.

The government should provide at least fire service outpost to each of the communities in the study area in addition to the only one situated at Tudun Wada to ensure quick response to fire emergencies.

Regulatory Bodies

Clearly regulatory bodies have an interest to balance when addressing land development in the urban areas. There must be harmonization of development standards from the various agencies saddled with the responsibility of enforcing regulations for any kind of infrastructural development in order to avoid contradictions of regulations and repetitions of standards. Each agency must ensure that its part of regulation codes are properly met and duly approved by the officers in charge before giving permission to any developer for development.

There must be a routine monitoring of development structure by each of the agencies/commission to ensure that developers do not exceed the limit of standards and regulations put in place for both safety and planning purposes.

Measures of prosecuting offenders should be clearly laid out and adequately enforced in order to show the level of commitment and seriousness of the agencies in ensuring that regulations and standards must be met. Efforts should be made to sensitize the public on standards and regulations that would ensure their safety.

Investors/Developers

Investors must understand that investments are meant to be for the good of the people and not the other way round. Hence, they must see standards and regulations as part of investment into health and safety of the people or area they set to do business in. The integrity of any business lies in the ability of the investor to run his business in line with the best practice other than taking advantage of the freedom and incapacity of regulatory bodies. Investments only thrive well in a safe and organized society.

The General Public

The general public should always insist on respect for their safety and lives by making sure that utilities or developments in their vicinity conform to safety regulations and development standards. There should be an avenue where complains and agitations could be registered to the various regulatory agencies.

On the other hand, the public must look beyond gains when disposing their landed properties. Properties should not be sold for developments that do not suit the area.

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