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# An Assessment of Access to Basic Urban Services in Maiduguri, Borno State

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**Abstract:** *This study examined household access to basic urban services in Maiduguri and identified its implications. Questionnaire was administered in 381 households within Maiduguri metropolis using cluster sampling at ward level and systematic sampling within each ward. Descriptive statistics and the income-expenditure ratio for determining housing affordability were employed in analysing the data. Some of the findings reveal that there is inadequate household access to water since 63% utilise less than 100litres of water per day as against WaterAid's standards. Most household grey water are disposed-off in suckways usually sited on road set-backs. Electricity is supplied for less than 10hours per day with most connections via single phase. Service interruption is very rampant lasting for up to 10hours per day. Only 29% of lands are acquired from government agencies while 67% of the houses are not affordable. Only 37% of houses are located on major streets accessible to fire engines, while 3% agreed the response time by the fire department is less than 30minutes. The implications as a result are: Health risks, difficulty in maintaining power installations, reduction in environmental quality, delay in various activities, loss of life and property and uncontrolled development leading to the emergence of slums. It was recommended to review the Maiduguri master plan, initiate water projects and upgrade old ones, strengthening development control and the creation of decentralized sewer systems within neighbourhoods, among others.*

**Keywords:** *Urban Services, Challenges, Water Supply, Solid Waste Disposal, ICT, Access*

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## Introduction

In many cities, urban services such as water supply, electricity supply, waste water management services, fire services, solid waste management services and housing services are vital for survival and also serve as investment for development (UN Habitat, 2003). But in recent years, the provision of and access to these services have not been even, throughout cities (WaterAid, 2007). This is because the city is usually unprepared in tackling the challenges of provision and access to the services (J-PAL, 2012).

In order to achieve effective management of cities in sub-Saharan Africa, government efforts need to be complimented by strengthening bilateral relationship with developed nations in

the provision of infrastructures and services (World Bank, 2015). Since the gap between the various sectors of the population, is widening by the day (Institute for Human Development, 2013 and Gahlot, 2012), ensuring effective provision of these services is an indication of inclusiveness and achievement of urban management goals. In addition, the existing infrastructure, which is ailing, has proved to be difficult to manage and maintain (Lwasa, 2014). All the efforts, both from within and outside the country aimed at mitigating infrastructural deficit, sustaining the existing infrastructure and services as well as managing rapidly growing demand for infrastructure and services is a big challenge for many African governments and municipalities.

In Nigerian cities, the implication of poor access to improved drinking water supply and adequate sanitation facilities are enormous. Apart from disease burden usually associated with poor access, there are a lot of pressures on the existing urban schemes especially water supply which are often stretched beyond design capacities leading to increased overhead costs for operation and maintenance and eventual failure of the schemes (Water Supply and Sanitation and Hygiene Promotion, 2011). Maiduguri town is no far-fetched. ICT was once a luxury in Nigeria, but with the coming of telecommunication investors, it became a common item in the market. Still about 40 million Nigerians don't have access to telecommunication services, and 207 spots don't have crucial infrastructure to receive telecommunication services (WHO/UNICEF JMP, 2014 and ITU, 2017). Renting a house is supposed to be an alternative for housing acquisition, but due to its non-affordability, people are unable to have access to housing especially housing of their choice (Hermanson, 2016). The annual average financial resources allocated to sewerage, drainage and refuse services by all the states in Nigeria fell from US\$ 163 million between 1981 and 1985 to only US\$ 1.8 million between 2005 and 2010 (Amuda, Adebisi, Jimoda, and Alade, 2014). In Nigerian cities, fire-fighting services are inadequate with Lagos state having 14 workable fire stations while Borno has only 1 (Isa, Liman, Mohammed, Mathew, and Yayo, 2016). It is also estimated in 2014 in Abuja that, property worth 10.61406 Billion Naira was lost to the 114 recorded fire incidences. Lwasa (2014) attributed these challenges to urbanisation, poverty and the inability to achieve sustainable development due to its multi-dimensional nature. Sanusi (2011) on the other hand, attributed it to improper innovative spatial planning and policy failure. The bottom line is that the challenges have and will continue to be an impediment to achieving effective access to services for households in African cities. This study therefore, examined household access to urban services in Maiduguri as an avenue to establish and identify possible implications.

## **2.0 The study area**

Maiduguri is the oldest town in North Eastern Nigeria which is a creation of the British colonialists to serve as a new capital for the relic of the Kanem Borno Empire that came under their influence in the late nineteenth century. However, there were several small settlements nearby including one called Maiduguri which was in existence since early seventeenth century (Waziri 2009). It is located on longitude 11° 46'N, 11° 55'N and Longitude 13° 4'E, 13° 15'E. It rose to primacy due to its being an administrative seat since colonial times and being a gateway to Niger, Chad and Cameroun republic. As the capital of Borno state from long till date, the city has continued to grow, with various ethnic group from within and outside the country. Spatially, Maiduguri lies in the Sudan-Sahel transition zone covering an area of about 15-18km long and 11-15km wide (Daura 2001 and Waziri 2009). Demographic studies of the area revealed that

population of Maiduguri as 540,016, out of which 282,409 are males and 257,607 are females (NPC Official Gazette 2009).

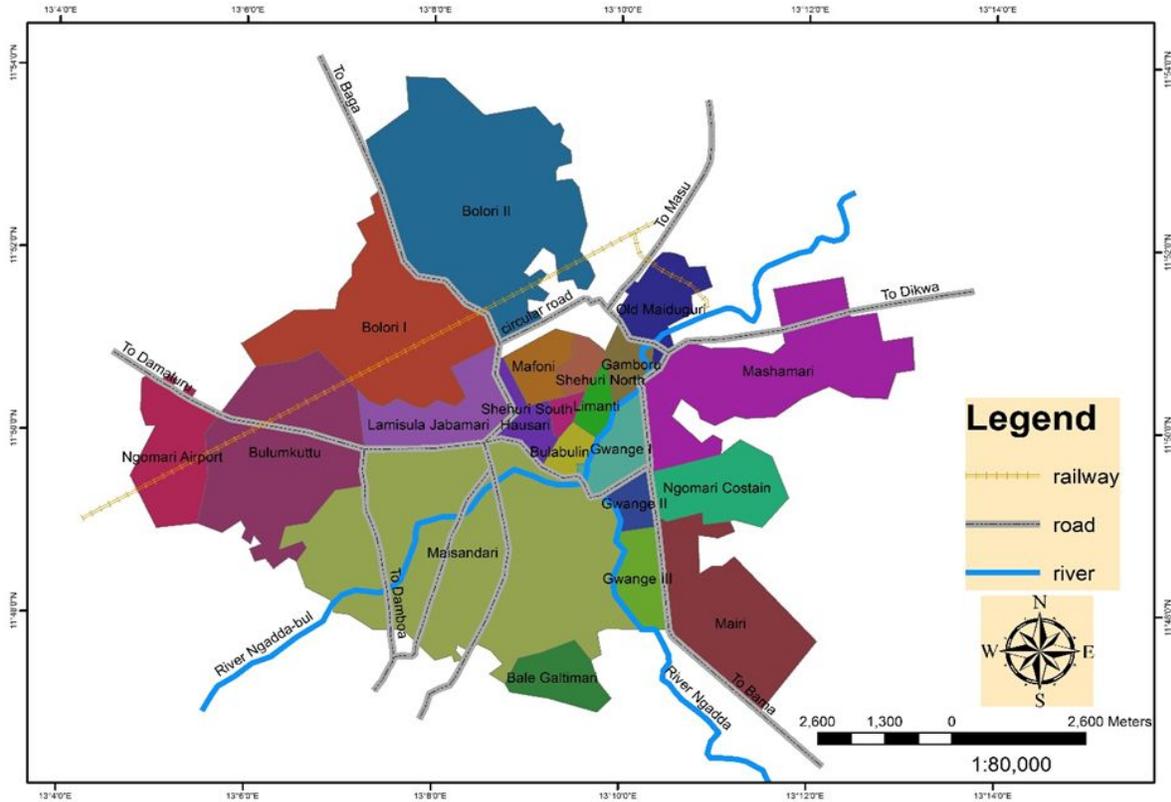


Fig 1: Wards of Maiduguri Metropolis (Source: Modified from Kawka (2002) and Remote Sensed Open-Street Map (OSM) Data, 2016)

### 3.0 Materials and methods

Questionnaire was administered to households and interview was conducted with key management staff of seven purposively selected services within Maiduguri town, namely: water supply services, waste water management services, electricity supply services, housing services, telephone/internet services, fire services and solid waste management services. A sample of 381 households were drawn from the total of 56159 households of the metropolis using Krejcie and Morgan (1970) table. A percentage of the number of households in each ward was taken in relation to the total number of households in the town. The questionnaires were administered to household heads in the 21 wards of Maiduguri town using cluster sampling at first, with each ward being a cluster, and systematic sampling later to select individual households within each individual ward. In the absence of a male household head, it is administered to the eldest female. Descriptive statistics and income-expenditure ratio for determining housing affordability was employed in analysis of the data.

Table 1: Sample Size Based on Wards

S/No	Wards	Number of Household in Ward	Percentage (%)	Number of Questionnaire administered
1.	Ngomari Airport	1265	3	8
2.	Bulumkuttu	884	2	6
3.	Bolori II	5563	9	37
4.	Bolori I	1175	2	8
5.	Lamisula Jabamari	1105	2	8
6.	Maisandari	5700	10	39
7.	Bale Galtimari	1092	2	8
8.	Mafoni	3342	6	22
9.	Hausari	3728	6	25
10.	Shehuri North	2815	5	19
11.	Shehuri South	2307	4	16
12.	Old Maiduguri	4909	8	33
13.	Gambaru	2894	6	20
14.	Limanti	2366	4	16
15.	Bulabulin	1619	3	11
16.	Mashamari	758	1	5
17.	Ngomari Costain	3354	6	23
18.	Mairi	952	2	7
19.	Gwange I	2843	5	19
20.	Gwange II	4393	8	30
21.	Gwange III	3095	6	21
	Total	56159	100	381

Source: Primary Health-Care Unit MMC and Jere LGA

#### 4.0 Results and Discussion

Table 2: Average Quantity of Water used by each Household Member per day

Variable	Frequency	%
Less than 100litres	240	63
100litres – 200litres	135	35
201litres – 300litres	6	2
<b>Total</b>	<b>381</b>	<b>100</b>

Author's field work, 2016

It is shown in table 2 that, 63% of the respondents utilise less than 100litres of water daily for their household activities. Only 37% of the respondents meet the threshold of utilising more than 100litres of water for their daily household activities (WASH, 2011). This signifies that the majority have low level of access water, since they use below the standard of 100litres/person/capita. This short supply of water is a major liability for the city that can make emergency services difficult.

Table 3: Method of Disposing Grey Water

Variable	Frequency	%
Suck-away	33	7
Street	45	12
Drainage	214	56
Others	89	25
<b>Total</b>	<b>381</b>	<b>100</b>

Author's field work, 2016



Plate 1: Cesspool for disposing grey water in water in Gaboru ward



Plate 2: Paved cesspool for disposing grey water in Bolori II ward



Plate 3: Grey water disposed in an open drain in Old Maiduguri ward



Plate 4: Grey water disposed on the street in Mairi ward

Table 3 shows that, 56% of the respondents dispose-off grey water into available neighbourhood drainages. 25% and 12% of the respondents dispose-off grey water into cesspools and on the open street respectively. Only a minimum of 7% of the respondents drain waste grey water into suck-aways. This means only the 7% are likely to have their grey waste water evacuated by BOSEPA and have access to the services. This agrees with Kagu, Badawi, and Jimme, (2013), which says majority of grey water are disposed on streets, open drains and cesspools.

Table 4: Siting of Suck-away

Variable	Frequency	%
On road setback	318	83
Within compound	63	17
Total	381	100

Author's field work, 2016



Plate 5: Suck-away Sited on Road Reserve in Bolori I Ward



Plate 6: Suck-away sited on road reserve in Gwange III Ward



Plate 7: Siting Suck-away on Road Reserve in Bolori II Ward

Table 4 shows that, majority of the respondents constituting 83% site their suck-aways on the street setbacks. This area is the utility corridor for neighbourhoods and is a major problem when

siting utilities like electricity, drainage, pipe borne water conduits and telephone cables. As a result, it is obvious that there is no centralised or decentralised sewer system for the town.

Table 5: Duration of Electricity Supply per day

Variable	Frequency	%
0 – 5hrs	184	48
6hrs – 10hrs	118	31
11hrs – 15hrs	61	16
16hrs – 20hrs	16	4.5
21hrs above	2	0.5
<b>Total</b>	<b>381</b>	<b>100</b>

Author's field work, 2016

Table 5 shows that, 48% of the respondents enjoy electricity supply in a day for 5hours or less. Only 31% enjoy electricity between 6 to 10 hours every day. 20.5% of the respondents enjoy electricity supply between 11 to 20 hours per day while just a few of 0.5% enjoy electric power for more than 21 hours daily. This implies a low supply of electricity to the majority of the households and is a strong disadvantage for the city.

Table 6: Number of phases or lines used by household

Variable	Frequency	%
<b>One</b>	202	53
<b>Two</b>	118	31
<b>Three</b>	61	16
<b>Total</b>	<b>381</b>	<b>100</b>

Author's field work, 2016

Table 6 shows that, 53% of the respondents use a single phase that supplies electricity to their household while 31% and 16% use two and three phases respectively. Municipal electricity supply to households have a maximum of three phases. Therefore, the number of phases determines the level of access to the service. Since more than half of the respondents have a single phase, it implies that the level of access is low compared to the numbers with double and triple phases.

Table 7: Average Distance to Collection or Dump Point

Variable	Frequency	%
Less than 100m	42	11
100m – 200m	76	20
200m above	42	11
Undefined	221	58
<b>Total</b>	<b>381</b>	<b>100</b>

Author's field work, 2016

Table 7 shows that 11% are less than 100meters to a solid waste collection point. This agrees with the 50-100 metres service radius standard given by Nithya, Velumani, and Senthil-Kumar (2012). A total of 31% are more than 100meters to collection points. Also, 58% of the respondents have undefined distance because they either patronise private waste collectors (*Mai Shara*) or utilise other means such as burning and burying among others.

Table 8: Waste Management Technique

Variable	Frequency	%
Open burning	200	52
Open dumping	142	37
Land fill	27	7
Undefined	12	4
<b>Total</b>	<b>381</b>	<b>100</b>

Author's field work 2016

Table 8 shows that, 52% of the waste collected either by BOSEPA or other private waste collectors are burnt openly. For the waste collected by BOSEPA, the location for burning is along Baga road in the North-West fringe of the town. Open dumping technique is used, as agreed by 37% of the respondents. For BOSEPA, the waste is dumped in the South fringe of the town, along Damboa road. For the ones not involving BOSEPA, they are either dumped on the street and drainages. Also, 7% agreed the waste is used for land fill in areas of flooding or are buried on road reserves, with 4% not knowing the technique used. This because they patronise private waste collectors.

Table 9: Medium for making Calls

Variable	Frequency	%
Mobile phone and Call stand	23	7
Mobile phone	358	93
Total	381	100

Author's field work, 2016

Table 9 shows that, 93% make calls via mobile phones while 7% utilise both call centres and the use of their mobile phones for more access to the service. This signifies that, they all have access to telecommunication services coupled with the wider coverages of the providers that make it possible. The mobile phone users who still make use of call centres have more access compared to users of mobile phone alone. These figures agree with ITU, (2013) and ITU, (2017), which showed that mobile phone use in urban areas of African developing countries have risen from 89% in 2013 to 90% in 2017 as against the world's 96%.

Table 10: Medium for Accessing Internet Services

Variable	Frequency	%
Mobile phone & Cyber café	57	15
Mobile phone	282	74
Cyber café	37	10
None	5	1
Total	381	100

Author's field work, 2016

Table 10 shows that, 74% use mobile phones for accessing the internet, while 15% use both Mobile phones and cyber café. Also, 10% use only cyber cafés for accessing the internet, while 1% don't use internet services at all. This shows that, the majority have a quick mobile access to internet services which will also help transfer of information. This conforms with ITU, (2013) and ITU, (2017), given that, most internet access are via mobile phones and at the household level, it has increased from 34% to 42 %, with 20% to 52% not using the internet.

Table 11: Experience of Service Interruption

<b>Variable</b>	<b>Frequency</b>	<b>%</b>
<b>Yes</b>	365	96
<b>No</b>	16	4
<b>Total</b>	381	100

Author's field work 2016

Table 11 shows that, 96% of the respondents agreed to having service interruption. Also, 4% agreed not having service interruption. This implies that the service is poor and as communication is important for development, it serves as a major drawback for city.

Table 12: Duration of Service Interruption experienced per day

<b>Variable</b>	<b>Frequency</b>	<b>%</b>
<b>0 – 5hrs</b>	282	73
<b>6hrs – 10hrs</b>	82	22
<b>11hrs – 15hrs</b>	14	4
<b>16hrs – 20hrs</b>	3	1
<b>Total</b>	381	100

Author's field work, 2016

Table 12 shows that, 73% experience service interruption for less than 5hours daily. Also, 22%, 4% and 1% of the respondents experience service interruption between 6-10hours, 11-15hours and 16-20hours respectively per day on the average. This implies that service interruption is a major challenge in the city.

Table 13: Medium for Acquiring Land and Housing

<b>Variable</b>	<b>Frequency</b>	<b>%</b>
<b>From government</b>	110	29
<b>Other than government</b>	204	54
<b>Self-acquisition</b>	67	17
<b>Total</b>	381	100

Author's field work, 2016

Table 13 shows that, 29% of the respondent acquire land titles directly from the designated agencies responsible, while 54% acquire land from other means than designated government agencies. Also, 17% self-acquire lands, usually at the fringes of the town without any official consent. This signifies a weakness in the channel followed for land acquisition provided by the government, being a setback for city development.

Table 14: Affordability of Land and Housing

Variable	Frequency	%
<b>Affordable</b>	124	33
<b>Not Affordable</b>	257	67
<b>Total</b>	381	100

Author’s field work, 2016

Table 14 shows that, 67% of the respondents agreed that, housing is not affordable while 33% believe it is affordable. This signifies that, a majority have the tendency of not having access or a reduced access land and housing as a result of the non-affordability.

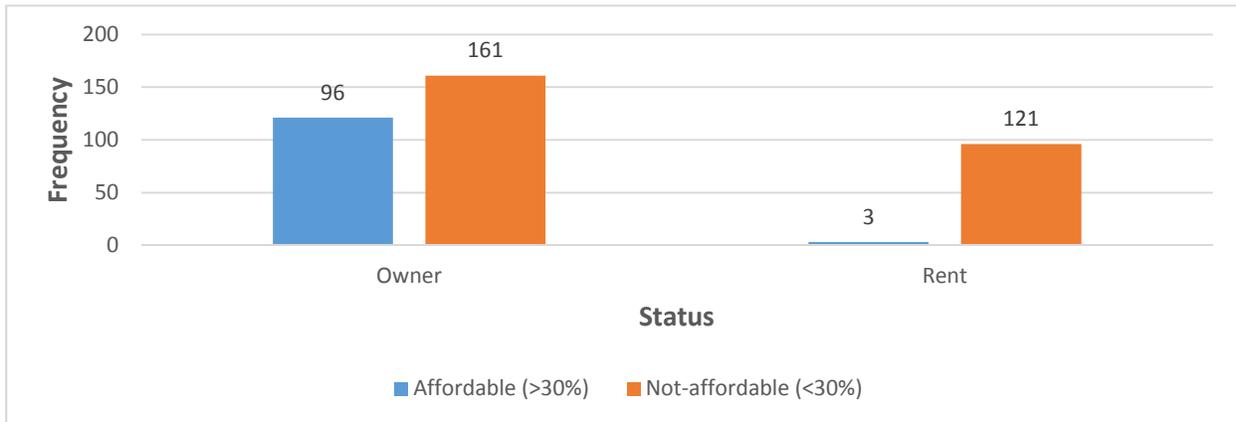


Fig 2: Affordability of Housing. (Author’s Analysis, 2016)

Fig 2 showed that, only 42% of owners and 3% of tenants spend less than 30% of their earnings on rent, while a tremendous amount of 58% of owners and 97% of tenants spend more than 30% of their income on rent. The majority goes against the 30% affordability benchmark as set by Andrew (1998), Cox and Pavletich (2010) as well as Adedeji (2006). For income and expenditure ratios exceeding 30%, housing is not affordable. This indicates that households under rent suffer the more as a result of rents being too high compared to household income.

Table 15: Location of House on Major-accessible Street

Variable	Frequency	%
Yes	140	37
No	241	67
<b>Total</b>	<b>381</b>	<b>100</b>

Author's field work 2016

Table 15 shows that, 37% of the respondents have their houses on accessible streets, while 67% have their houses on inaccessible streets making it difficult for fire trucks to come in. such a phenomenon mitigates the level of access to the service.

Table 16: Response Time by Fire Department

Variable	Frequency	%
Less than 30mins	11	3
30mins – 1hr	144	38
1hr – 2hrs	85	22
2hrs above	141	37
<b>Total</b>	<b>381</b>	<b>100</b>

Author's field work 2016

Table 16 shows that, 3% of the respondents agree to less than 30minutes response time by the fire department, while 38% agree between 30minutes and 1hour. Also, 22% and 37% agree for between 1hour to 2hours and above 2houre response time respectively. As an emergency service, little time is required for immediate response, therefore, very few fire incidences can be well taken care of.

## 5.0 Implications of Inadequate Access to Urban Services

### i. Health risks

With a 63% majority utilising less than the 100 litres of water per person per day standard (WASH, 2011), people will seek other possible sources of water irrespective of its quality or risk involved, resulting to health challenges. Only 7% dispose-off grey water into suck-aways while the others are disposed at individual household discretion, either on the street, drains or shallow cesspools. The aesthetic quality of the neighbouring environment is reduced as a result, exposing the inhabitants to serious health risks by creating breeding grounds for disease vectors. With this situation, in the case of a disease break-out, it will rather be difficult to contain it.

ii. Difficulty in maintenance of power installations and air pollution

Electricity is required for the running of the city. But, 79% of the respondents agree that, it is supplied for less than 12 hours in a day. Also 53% utilise a single phase in their household for electricity. People will result to tampering with the lines when there is a technical fault or if the phase supplying power to the particular household is down while other phases are working. This issue is rampant throughout the town especially in traditional part of the city preoccupied by low income earners (Adamu, 2016) who don't utilise the electricity prepaid meter. A continuation of this routine can make maintenance of power lines and installations difficult as not just the agency responsible have access to power installations. People will also result to the utilisation of cheap-to-install power alternatives such as generators causing both noise and air pollution.

iii. Reduction of environmental quality

Only 11% of the respondents fall within the standard threshold to solid waste collection point, which is less than 100 metres (Nithya, Velumani, and Senthil-Kumar 2012). This will provide room for indiscriminate waste dumping. The generated waste in households is openly dumped as agreed by 37% of the respondents, while 32%, openly burn the waste. Some of the waste; 7%, are used for landfill, while the techniques for managing 4% of the waste is undefined. Also, 56% and 12% of grey water are dumped in drainages and open street respectively. This will not only reduce the aesthetic quality of the environment, but will also affect the quality of the soil and cause pollution.

iv. Delay in various activities

The main drawback for access to telephone and internet is service interruption, with 96% of the respondents agreeing to that. This interruption lasts for 0-5 hours and 6-10 hours as agreed by 74% and 22% of the respondents respectively. Also, 74% and 93% of the respondents depend on mobile phones for calls, and for surfing the internet. Since communication is important for the running of the city, mobile service interruption for a single hour can halt a lot of activities such as commercial and administrative types, with a short interruption, 74% and 93% will be deprived of phone calls and internet services. Virtually all city activities depend on efficient communication to thrive. Businesses can be slowed down or halted, emergency services that depends largely on communication will seriously be affected if telecommunication service interruptions persist and movement of information for the administrative running of the town itself will also be epileptic. These various delays will not spell-out well for the survival of the town.

v. Uncontrolled development leading to emergence of slums

Majority of the respondents, that is, 54% agreed that, their lands were not acquired through the Ministry of Lands and Survey while 17% self-acquire their lands without any consent, either via government agencies or land speculators. This is as a result of the tedious procedure for acquiring land for housing. Housing also, is not affordable, as agreed by 67% of the respondents. People will therefore, result to buying land from third parties (other than government) and taking advantage of urban fringes. The Maiduguri master plan prepared by Maxlock Group in 1976, and became operational in 1977 has never been reviewed which exacerbates the existing situation. Such situation will give an upper hand to land speculators to dominate the sector which gives rise to issues like land disputes and haphazard developments. Coupled with this, 83% site soak-aways on road setbacks. This is because floor area ratios and building set backs are not adhered to, which leaves no space for soak-aways within the compound, leading to rapid urban decay.

vi. Loss of life and property

With 67% of homes not situated on major access streets, 53% of the respondents agreeing that roads are not motorability and only 3% agreeing that response time for the fire department is less than 30minutes, it will not just reduce the confidence the people have on the agency, but will also result to the loss of several lives and property worth millions of Naira. On the other hand, with 97% of the respondents agreeing that, there is rampant service interruption, it will also exacerbate the already existing problem.

## **6.0 Conclusion and Recommendations**

The quantity of water used is below the 100litres/person/day threshold as given by WASH (2011), coupled with the open disposal of grey water. Electricity is supplied for less than 12hours in a day via single phase connection. The majority walk more than 100metres to dispose solid waste and there is no modern technique for solid waste management. Mobile and internet services are interrupted on an average of 10hours daily impeding various dependent activities. Majority acquire land from their parties rather than from government agencies as a result of unaffordability. Streets are not motorable enough to be accessed by fire engines coupled with the long response time by the fire department. It is understood that services are a very vital part of the city that ensures the continuous running of it. Not having these services threatens the existence of the city as a system. The effective and efficient provision and maintenance of the service is therefore pertinent for the survival of the city. On the other hand, ensuring that the services are readily accessible to city dwellers is a whole new scenario. Man's activities are diverse and services serve as a support for the achievement of daily and collective obligations making it importance to understand and know the level of access to the services to make it livable for all.

The master plan should be reviewed to checkmate the outcrop of haphazard development in the town; ensuring a well designated utility corridor for easy provision, installation and maintenance. Water projects should be initiated with the upgrade of old conduits and the installation of new ones in areas not under coverage such as the entire Bolori II ward. Development control activities should be strengthened to curb frequent siting of suck-aways on road set back on the street to mitigate the challenges when siting utilities and road infrastructures. Roads within neighbourhood streets should be upgraded to standard or constructed if not available, with appropriate setbacks, to ensure easy access to fire trucks and providing space for installation of utilities. A one-stop-shop should be created within the ministry of lands and survey to mitigate the long and tedious procedure of land acquisition. The one-stop-shop should consist of staff from the Board of Internal Revenue Maiduguri, town planning, survey and lands divisions of the ministry of lands and survey. The various service providers should boost their telecommunication mast to have a wider coverage and see to the immediate and continuous rectification of all technical faults to mitigate service interruptions in the town. A decentralised sewer system should be constructed for each ward to take care of waste water constituting both black water from toilets and grey water from household and environmental activities. It will be easily managed at that level giving household a better access to the service.

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