

Assessment of the Physical Accessibility of Public Primary and Secondary Schools in Kaduna State, Nigeria

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ABSTRACT

This paper is aimed at evaluating the nature of physical accessibility of public primary and secondary schools in Kaduna State. The study used Global Positioning System (Map 78) to ascertain the location of the schools through field observation and School Accessibility Assessment Form (SAAF) for collecting information directly from teachers and students. GIS techniques was employed to show the spatial distribution and analysis. Multistage sampling method was adopted 3 urban Local Government Areas (LGAs) were purposive selected while 2 LGAs were randomly selected from each senatorial zone. ArcGIS (10.6) and Statistical Package for the Social Sciences (v25) was used for data analysis using. The study revealed that the physical distance travelled varied from 1.13 to 1.7km in urban areas to public primary schools and 1.3 to 2.25km in rural areas in the state. It also revealed that variation in the travelled distance to public secondary schools varied from 2.96 to 4.32km in the rural areas and from 2.12km to 2.45km in urban areas across the state. The study revealed that 34% of total children travelled below 2km to public primary school and about 80% travelled more 2km to public secondary school. It concluded that the state has not met the expected 2km walk distance to public schools; uneven distribution of public schools; most of the public schools are concentrated in the urban areas at the expense of the rural suburbs. Government should provide additional public schools in rural areas and allocate substantial part of its budget to the educational sector.

INTRODUCTION

Accessibility is determined by the spatial distribution of destinations, the level of ease of reaching each destination, the magnitude, quality, and the character of the activities found there, and the attractiveness of a place, which makes people prefer it to others. Distinctions are sometimes made between potential and realized accessibility (Aggarwal and Thakur 2003; Olamiju and Olujimi, 2011). Fabiyi and Ogunyemi (2015) described accessibility as the capacity to overcome space. According to Nyam-Jim (2016) applied definition of accessibility should come from the service users rather than researchers. In other words, accessibility concerns both the pattern of activities and the links between the activities (Ogunjimi, Ajibola, and Akah, 2014). A location or point in space is defined to be accessible if the effort it takes to get there is acceptable to the targeted individuals; so the concept of accessibility incorporates not only the transport link between the origin and

destination and the ability for travelling by the targeted people, but also the characteristics of the destination and the objective of the trip (Jong and Ritsema, 1999; Lu, 2004; Ogunyemi, Muibi, Eguaroje, Fabiyi and Halilu, 2014).

Accessibility to public facility is the distance travelled by folks to receive the service, or from which a service is provided to the whole community of interest in administration, economy, education and health (Jong and Ritsema, 1999; Lu, 2004). Public facilities such as schools, hospitals, post office, market, court and police/fire stations are important because they provide both desirable services to and impose undesirable impacts on those who do not have access to its use in the areas. Three types of accessibility are common; firstly, geographical (or physical) accessibility, which emphasizes on the relationship between the location of centers of service provision and those of prospective users. Secondly, socio-economic accessibility which includes factors as the ability to pay for the service, sufficient

understanding of any provision to obtain maximum benefits from it, and the influence of culture on determining patterns of use. Lastly, organizational accessibility, which is associated with the internal structure of service system and the availability of resources (Yero, 2002; Nyam-Jim, 2016).

Accessibility is an important issue in geography and geographic studies. Ingram (1971) and Alzeer (2005) pointed out that accessibility is an inherent characteristic or advantage of a place with respect to overcoming some form of friction. The crucial thing about accessibility in geography education, is that it relates to the location of schools. These should be located more closely to where the largest possible number of people to be served. The measurement of accessibility can be based on terms of physical distance, time and monetary and/or inconvenience costs (Alzeer, 2005). A typical distance travelled, varies between nations and urban or rural contexts in space (Nyam-Jim, 2016). In Nigeria, the standard distance for location of schools follow the UNESCO standard of 2km walking distance to school by any child. Travel to and from school is a common practice for children (FGN, 2014).

Kučerová and Kučera (2012) examined the changes in the spatial distribution of elementary schools in rural communities in Czech and discovered decreased in the number of elementary schools, along with a concentration of elementary education provisions, in larger population centers. Aliyu, Shahidah and Aliyu (2013) used Nearest Neighbour Analysis to determine the distribution pattern of schools in Yola North Local Government Area (LGA) and found random distribution pattern. Musa and Mohammed (2013) studied the distribution of primary and secondary schools in Bida, Niger State, Nigeria and found deficiency in basic education facilities, while, quiet a number of the inhabitant have inadequate access to education in some part of Bida. Olamiju and Olujimi (2011) studied the regional location of public schools in the Akure region of Nigeria and exposed that Akure South had more public secondary schools than other parts of Akure. Olamiju and Olujimi (2011) also observed that 50.06% of the students in the Akure travelled below 2km while the remaining 49.40% travelled above 2km to their schools. Inobeme and Ayanwole (2009) understudied the spatial distribution of government secondary schools and established gross inadequacy and inequity

in the allocation of secondary schools in Zaria Area of Kaduna State. Sule, Abdullahi and Bungwon (2012) observed uneven distribution of primary schools in Kaduna Metropolis, Kaduna. Nyam Jim (2016) examined the locational analysis of public secondary schools in Kaduna Education Zone and observed insufficient facilities in many schools. Thus, it has been observed that there is little understanding of nature of physical accessibility to public primary and secondary schools in Kaduna State.

The location and travel time to school is belief to be a major factor for parents allowing their wards attending school. The study is of the view that the poor access to public schools in Kaduna State is one of the reasons for the high dropout rate in primary and secondary education in the state. There is need for comprehensive information to help examine the gap in accessibility to public schools in Kaduna State. However, the question should be if the existing or available public schools are easily accessible by the children in Kaduna State? Thus, this paper will assess the nature of physical accessibility of public primary and secondary schools in Kaduna State.

METHODS AND MATERIAL

A multistage sampling technique was used to obtain a representative sample of public schools in the selected LGAs across the state. The first stage involved the stratification of the state by senatorial zones. The second stage was the purposive selection of the one urban LGA from each of the three senatorial zones. The third stage was the randomly selection 2 LGAs from each three senatorial zones considered semi-urban and rural areas. The study involved the identification and location of all public primary and secondary schools in the 9 selected LGAs. Three (3) LGAs from each of the three senatorial districts. Kaduna Central Senatorial Zone (Kaduna South, Chikun, Birnin Gwari LGAs) Kaduna North Senatorial Zone (KNSZ) (Zaria, Lere and Soba LGAs) and Kaduna South Senatorial Zone (KSSZ) (Jemaa, Kagarko and Kajuru LGAs). The choice of nine LGAs out of the 23 LGAs in the State was enable the study to assess of each school and covering 40% of the LGAs. The inventory of the existing public schools was obtained from Kaduna State Ministry of Education, Science and Technology (MOES&T) and administrative map from Kaduna Sate Geographic Information Services

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(KADGIS). Hand-held Global Positioning System (GPS Map 78) was used to collect coordinates of the schools. School Accessibility Assessment Form (SAAF) was employed to collect information directly from teachers and students through oral interview. This study also employed GIS techniques to show the spatial distribution and analysis of public schools. The spatial analysis was performed on the set of data acquired from the GPS using descriptive (total, mean and percentage). The study used ArcGIS (10.6) and Statistical Package for the Social Sciences (SPSS, version 25) for data analysis.

Study Area

Kaduna State is located at mid-central portion of the Northern parts of Nigeria and serves as a major gate way to important traditional, political and commercial states of Kano, Katsina, and Sokoto (Hena, 2014; Bako, Maiwada, Abubakar and Akwo, 2016). The Kaduna State is located between Latitudes $9^{\circ} 03'$ and $11^{\circ} 32'$ North of the Equator and Longitudes $6^{\circ} 05'$ and $8^{\circ} 38'$ East of the Greenwich Meridian (Figure 1).



Figure 1. Kaduna State in Nigeria

Source: KADGIS (2017)

Kaduna State has 23 LGAs and experiences a tropical continental climate with two distinct seasonal climates, dry and rainy seasons (Hena, 2014). The annual average rainfall in the state is about 1323mm. The average daily minimum and maximum temperatures are 15.1° and 35.18° degrees Celsius (Nwude, 2006; Akpu, 2012; Hena, 2014; Bako *et al.*, 2016). Kaduna State extends from the tropical grassland known as the Guinea Savannah to Sudan Savannah (Nwude, 2006). Kaduna State is third most densely populated states in Nigeria. The population of the state according to 2006 National Census stands at 6,113,503 and has 3.18% growth rate (National Population Commission, 2009) and 2017 projected population stands at 8,147,161 (KDSG, 2017; NBS, 2017). The state's population structure shows that majority of the citizenry lives in urban and semi urban towns like Kaduna, Zaria, Kafanchan, Kgoro, Zonkwa, Birnin Gwari,

Makarfi and Zangon Kataf. Twenty-two percent (22%) of the population are infants, aged between 0-5 years while 18% are children aged 6-11 years (KDSG, 2017).

RESULTS

The result of nature of physical accessibility is presented in three sections; at the LGA level, then at the senatorial level and finally, the state level.

Chikun LGA: The result reveals that 56% of the students travel less than 2km to school in Chikun LGA. While 24% of the children travels more than 2km to public primary school (Table 1). Further probe reveals that more than three out of every four students travel less than 2km from dwelling places to schools in Chikun LGA (Figures 2 to 5). The result also reveals less than 76% of the students in Chikun LGA travel more than the expected minimum walking distance of 2 km public secondary school.

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Table 1. Percentage of Students with the Travelling Distances to Public Schools

Senatorial Zone	LGA	Primary Schools						Secondary Schools					
		0.75km	1km	2km	4km	7km	Average	0.75km	1km	2km	4km	7km	Average
Central	Chikun	18%	28%	30%	15%	9%	2.25	0	5%	19%	48%	28%	4.30
	Birnin Gwari	30%	45%	20%	3%	2%	1.32	5%	12%	39%	25%	19%	3.25
	Kaduna South	35%	32%	28%	3%	2%	1.39	15%	25%	40%	12%	8%	2.12
North	Lere	25%	43%	29%	3%	0%	1.32	4%	22%	37%	21%	16%	2.96
	Soba	22%	35%	38%	5%	0%	1.50	10%	19%	25%	31%	15%	3.07
	Zaria	38%	45%	15%	1%	1%	1.13	9%	22%	45%	14%	10%	2.45
South	Jema'a	18%	39%	26%	16%	1%	1.77	3%	7%	25%	40%	25%	3.95
	Kagarko	25%	43%	28%	4%	0	1.33	7%	5%	28%	18%	42%	4.32
	Kajuru	14%	38%	28%	15%	5%	2.01	5%	8%	48%	28%	11%	2.97

Source: Fieldwork (2018)

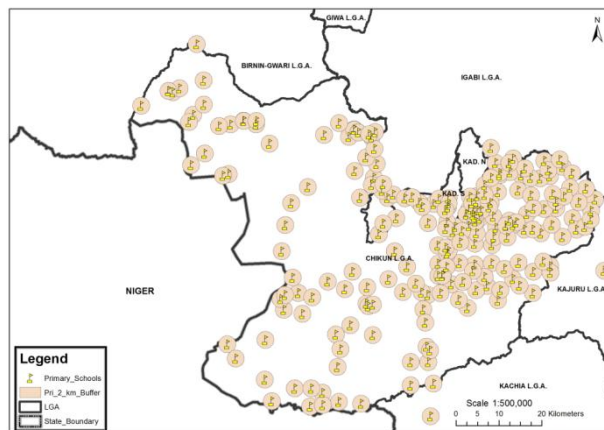


Figure 2. 2Km Buffer of Primary Schools in Chikun LGA

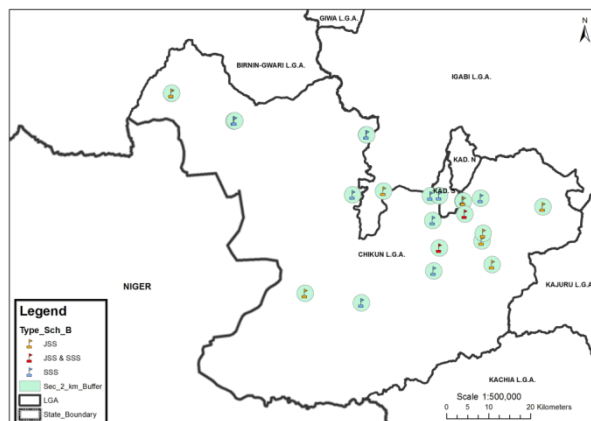


Figure 3. 2Km Buffer of Secondary Schools in Chikun LGA

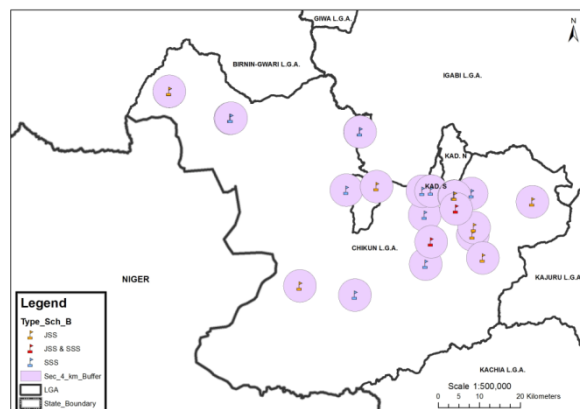


Figure 4. 4Km Buffer of Primary Schools in Chikun LGA

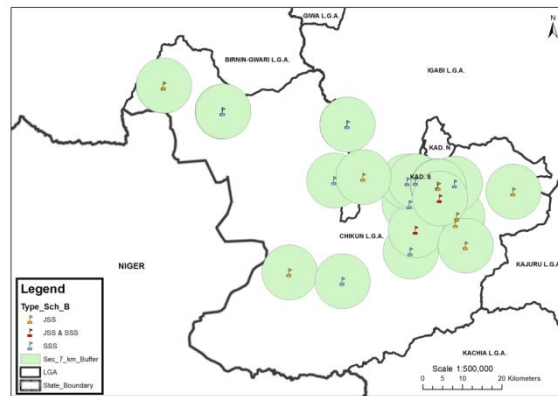


Figure5. 4Km Buffer of Secondary Schools in Chikun LGA

This may be attributed to urban growth pattern of Kaduna metropolis, the capital of Kaduna State, which is expanding very fast towards Chikun LGA due to urbanization. This is in agreement with the findings Maxlock and Partners (2015).

Birnin Gwari LGA: The result reveals that 44.44% of the students travel less than 2km to primary schools and one out of every four pupils travel less than 2km to schools. The result also shows that one out of every 20 pupils travel more than 2km to the nearest public primary school and two out of every five students agree to travel more than 4km to public secondary school (Figures 6 to 13). The result reveals that less than 10% of the students in Birnin Gwari LGA agreed to traveling over 7km to secondary schools. The result also shows that 2km buffering for primary schools does not covering

up to 30% of the LGA. The implication of this is that many children must walk or travel over 4km to the nearest primary school in order to obtain education. This might be one of the reasons why the level of literacy in Birnin Gwari LGA is below the state average, which is in agreement with the submission of KDSG (2016). The buffer analysis also reveals less than 10% of the LGA is covered by 2km buffering for secondary schools and less than 15% of the LGA is covered by 4km buffer for secondary schools. The result further shows that 70% and 20% coverage for primary and secondary schools at 7km buffer. The result reveals that secondary school buffering of 12km and 15km cover about 57% and 72%. This finding reveals that primary schools in Birnin Gwari LGA does not meet the expected minimum walking distance of 2km to school.

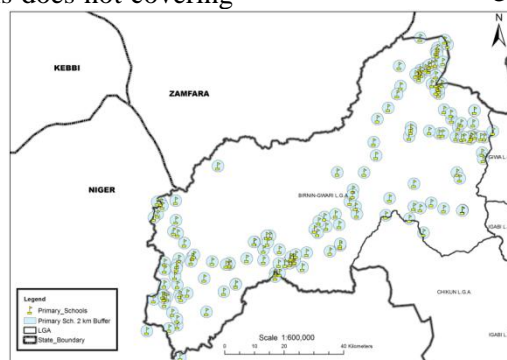


Figure6. 2Km Buffer of Primary Schools in Birnin Gwari LGA

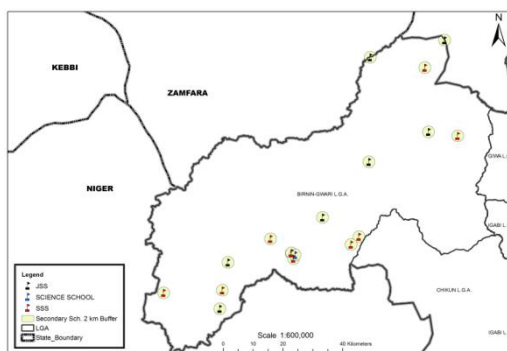


Figure7. 2Km Buffer of Secondary Schools in Birnin Gwari LGA

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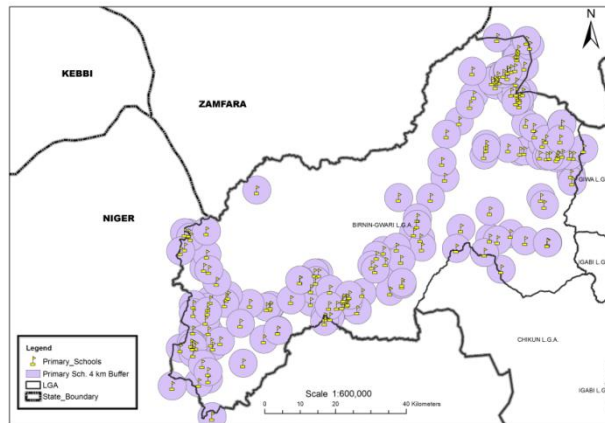


Figure8. 4Km Buffer of Primary Schools in Birnin Gwari LGA

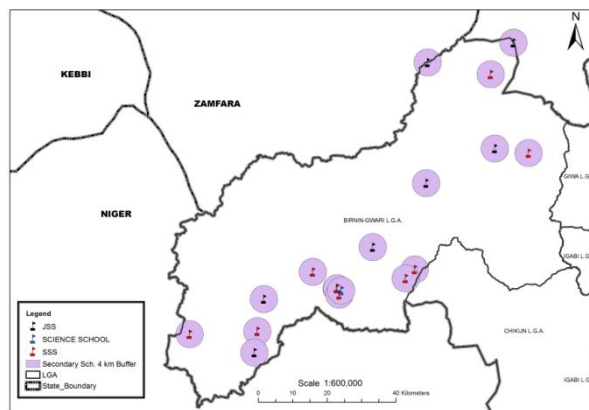


Figure9. 4Km Buffer of Secondary Schools in Birnin Gwari LGA

Source: Fieldwork (2018)

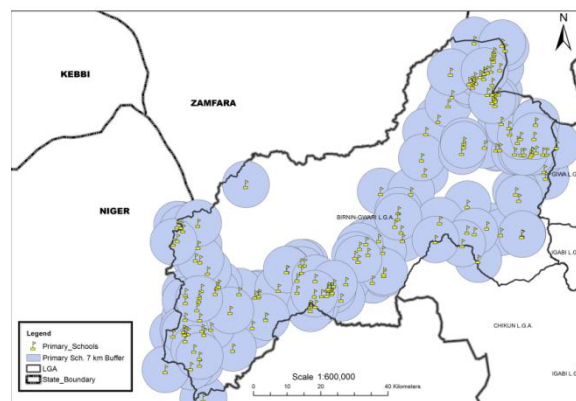


Figure10. 7Km Buffer of Primary Schools in Birnin Gwari LGA

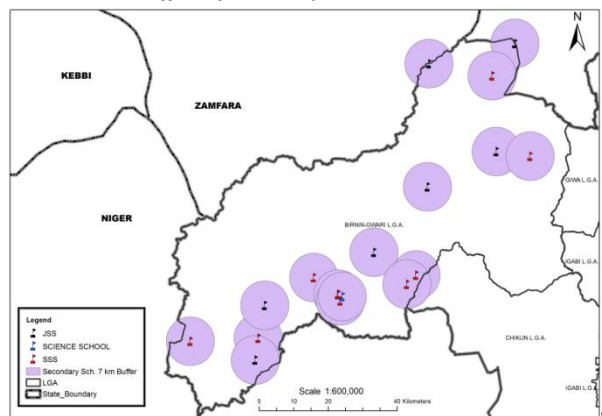


Figure11. 7Km Buffer of Secondary Schools in Birnin Gwari LGA

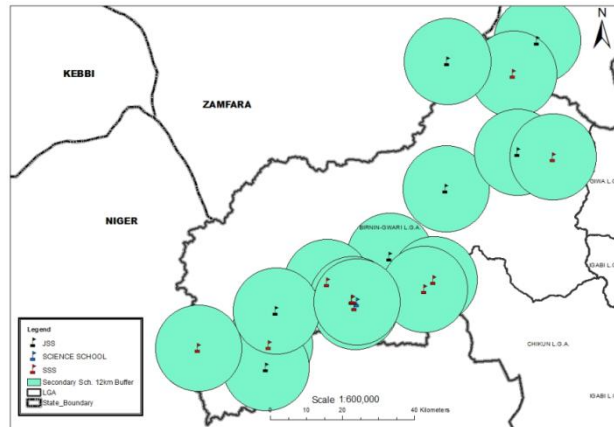


Figure12. 12Km Buffer of Secondary Schools in Birnin Gwari LGA

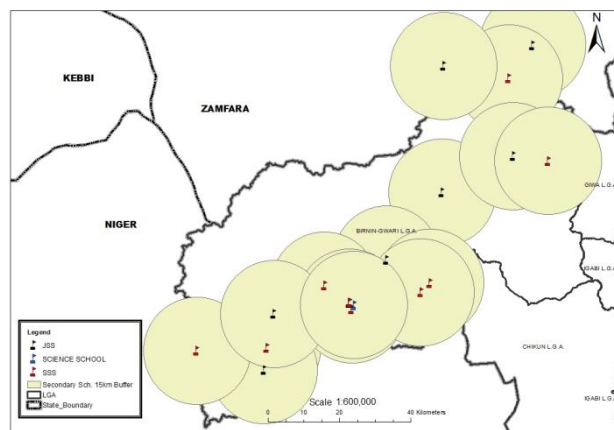


Figure13. 15Km Buffer of Secondary Schools in Birnin Gwari LGA

Kaduna South LGA: The result reveals that 5% pupils agreed to travel more than the expected 2km to public primary school. While one out of every five students agreed to travel more than 2km to secondary school. The probe further reveals that less than 80% of the students travels 2km or less than to school in Kaduna South LGA. The result shows that at 0.5km buffering for primary schools covers up to 20%

while 0.75km buffering covers 52%, 1km cover 78% and 2km covers 98.2% of Kaduna South LGA (Figures 14 to 17). The implication of this is that many children walk or travel less than 2km to the nearest public primary school in the LGA. This might be one of the reasons why the level of literacy is higher in Kaduna South LGA than the state level.

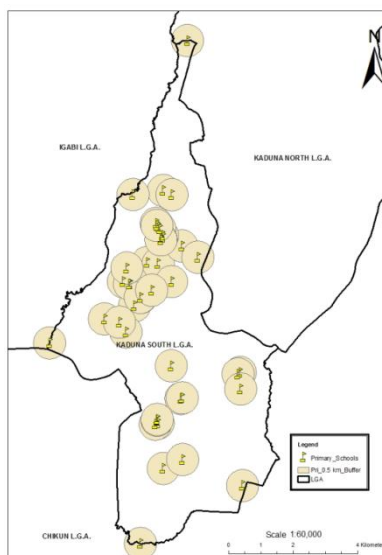


Figure14. 0.5Km Buffer of Primary Schools in Kaduna South LGA

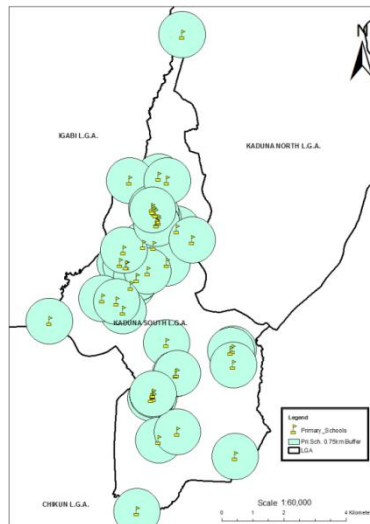


Figure15. 0.75Km Buffer of Primary Schools in Kaduna South LGA

The result reveals less than 10% of the LGA is covered by 0.5km buffer for secondary schools and 22% of the LGA is covered by 0.75km buffer for secondary schools (Figures 18 and

19). The result also reveals that 65% of the LGA is covered by 1km buffer and 92% of the LGA is covered by 2km buffer for secondary schools (Figures 20 and 21).

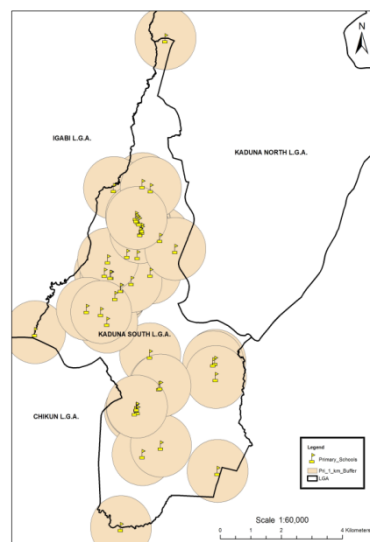


Figure16. 1Km Buffer of Primary Schools in Kaduna South LGA

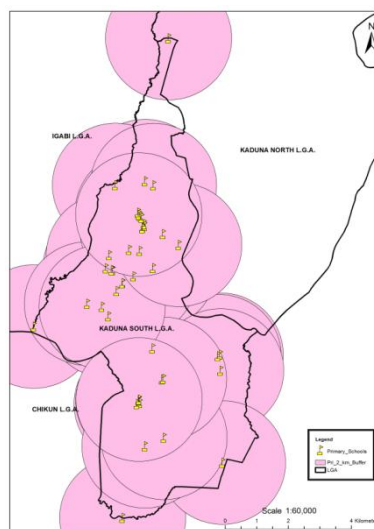


Figure17. 2Km Buffer of Primary Schools in Kaduna South LGA

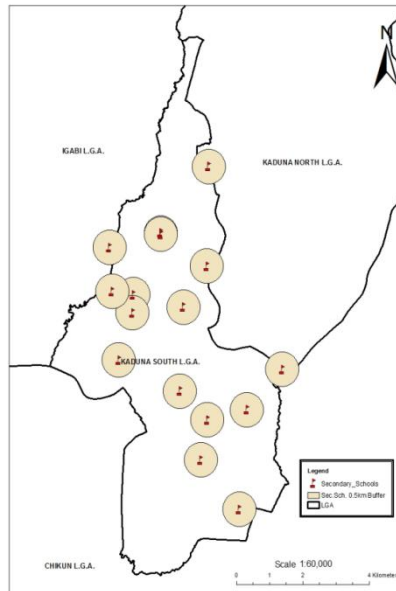


Figure18. 0.5Km Buffer of Secondary Schools in Kaduna South LGA

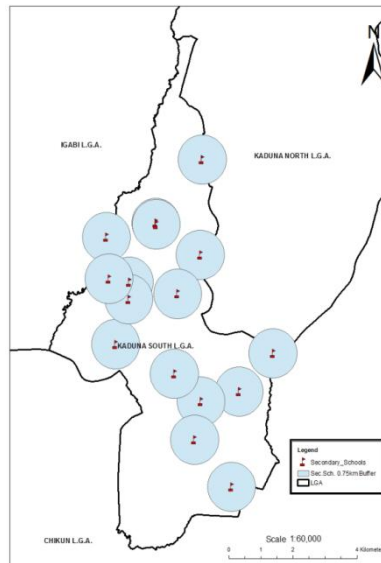


Figure19.0.75Km Buffer of Secondary Schools in Kaduna South LGA

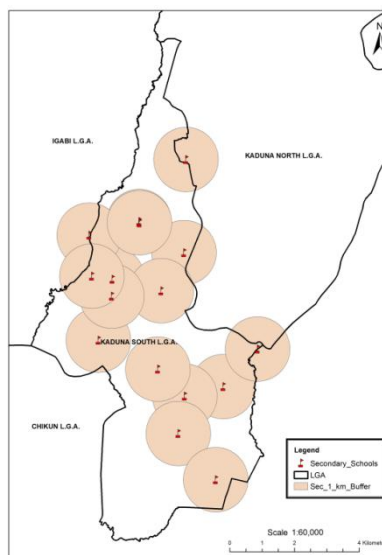


Figure20. 1Km Buffer of Secondary Schools in Kaduna South LGA

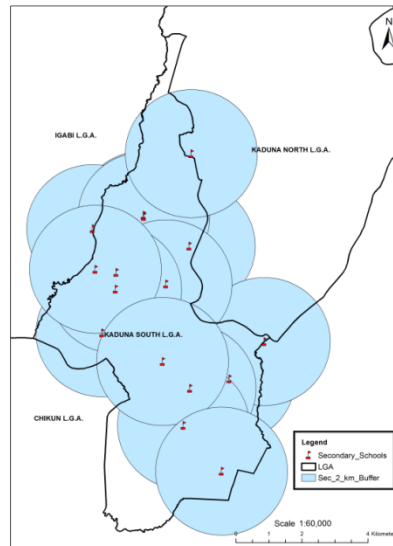


Figure21. 2Km Buffer of Secondary Schools in Kaduna South LGA

Lere LGA: The result reveals that 66% of the students travel more than the expected 2km. While 34% of the children travel less than 2km to the nearest public primary school within the LGA. It also reveals that less than 30% of the students (secondary) travel less than 2km from home to public schools in Lere LGA. The result similarly shows that pupils travel shorter distances of average distance of 1.32km from home to schools and secondary school students' travel longer with average distance of 2.96km. The result reveals that the locations of public primary schools have met expected the 2km walking distance to school. However, some areas within Lere LGA do not meet 2 km buffer for existing public primary schools and these areas are mostly farming settlements (Figures 22 to 25). The result also reveals that children from neighbouring states of Bauchi, Kano and Plateau attend of these public primary schools. Leading to most public schools along the

state's boundary are overcrowded such as Tsifini, Bajima, Zankana and Kunkuru communities of Lere LGA. It also shows that secondary schools in Lere LGA reveals does not meet the expected minimum walking distance of 2 km to schools. This is so because more public secondary schools are located within the urban settlement such as Saminaka (17 secondary and 16 primary schools), Lere town (8 secondary and 15 primary schools), and Dan-Alhaji (three secondary and 20 primary schools). While the rural areas like Sheni, Gimi-Janji, Yarda and Araba does not have public secondary schools. However, smaller towns like Gama, Ungwan Pa-Hauswa and Karigi do not have no public schools and are more than 7 km away from the nearest public schools. Thus, children within these communities travel above 7.5 km to the nearest public secondary school. This may be among the reasons for the high dropout of secondary students in Lere LGA.

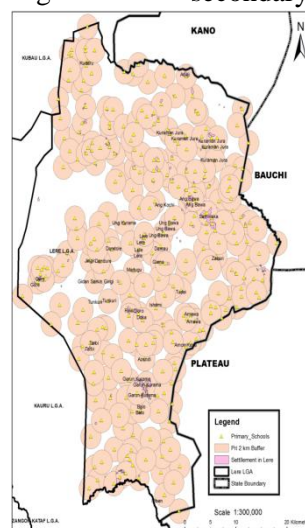


Figure22. 2Km Buffer of Primary Schools in Lere LGA

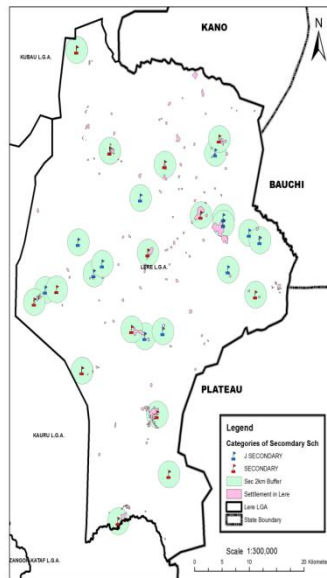


Figure23. 2Km Buffer of Secondary Schools in Lere LGA

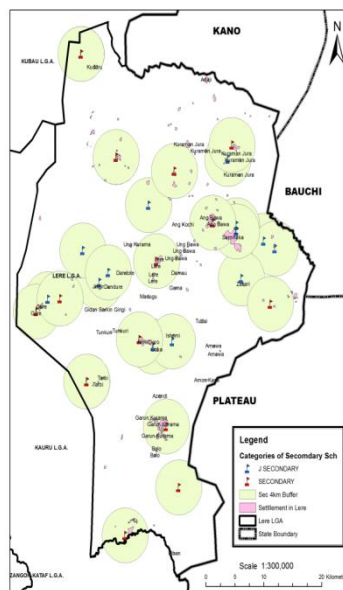


Figure24. 4Km Buffer of Secondary Schools in Lere LGA

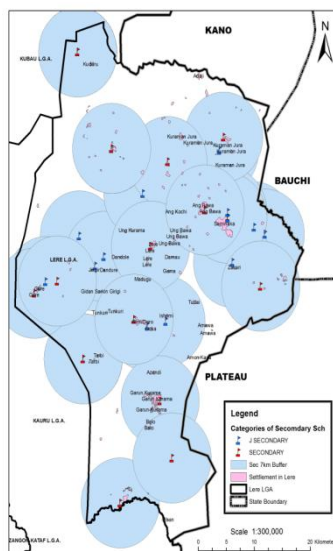


Figure25. 7Km Buffer of Secondary Schools in Lere LGA

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Soba LGA: The result reveals that more than 50% of the students agree to travel less than the expected 2km to primary school. The result also shows that average distant travelled to primary school is 1.5km and 3.02km to secondary school. While 54% of the students in public secondary schools' travel 2km or less from dwelling places. The result also reveals less than 25% students disagreed that public schools in Soba LGA meet the expected minimum walking distance of 2 km for secondary (both junior and

senior) schools (Figures 26 to 29). The buffer analysis also reveals that 40% of the students travel more than 4km to school (Figures 30 and 31). It further reveals that Soba town, which is the most developed town in the LGA have the highest numbers of both public primary and secondary schools. The buffer analysis also shows that there is spatial inequity in the location of secondary schools and 10% of the students travel 7km and above to school.

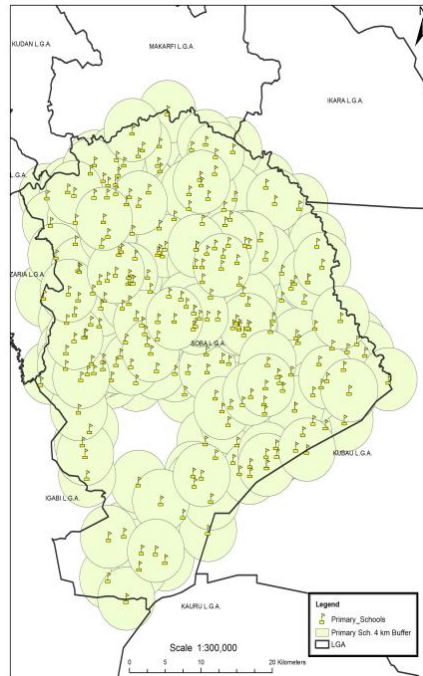


Figure26. 2Km Buffer of Primary Schools in Soba LGA

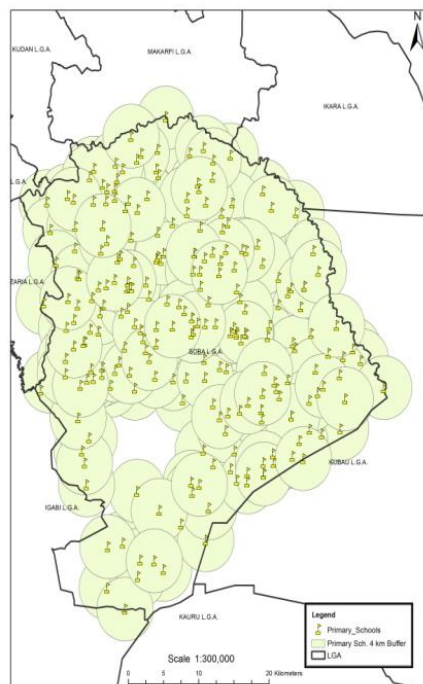


Figure27. 4Km Buffer of Primary Schools in Soba LGA

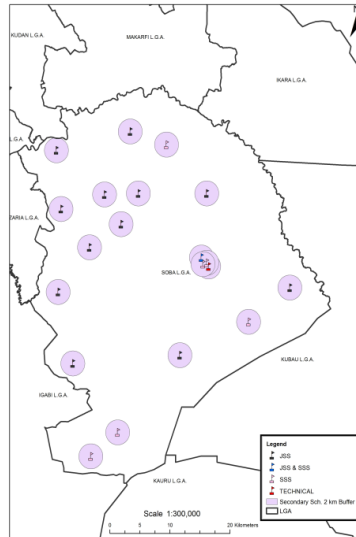


Figure28. 2Km Buffer of Secondary Schools in Soba LGA

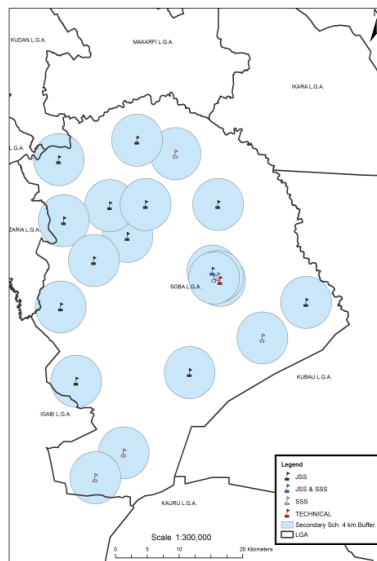


Figure29. 4Km Buffer of Secondary Schools in Soba LGA

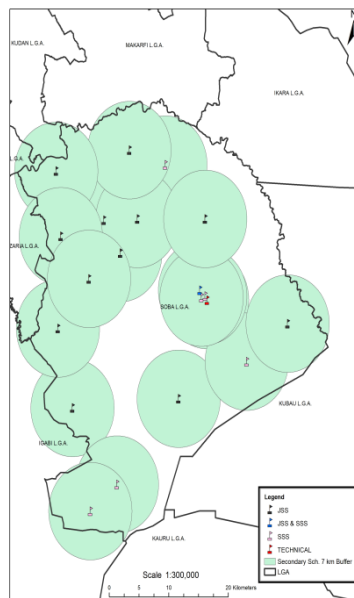


Figure30. 7Km Buffer of Secondary Schools in Soba LGA

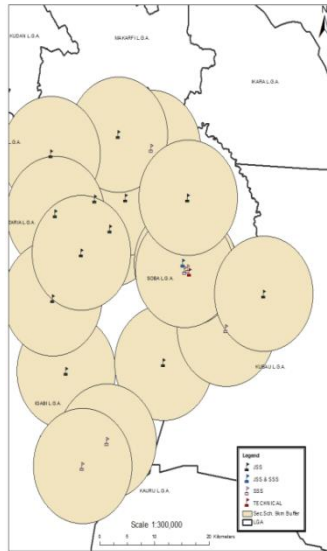


Figure31. 9Km Buffer of Secondary Schools in Soba LGA

Zaria LGA: 83% of the pupils travel less than 2km while 76% of the students in secondary school travel less than 2km from dwelling places to public schools. This might be related to the size of Zaria LGA in terms of landmass covering 300km².

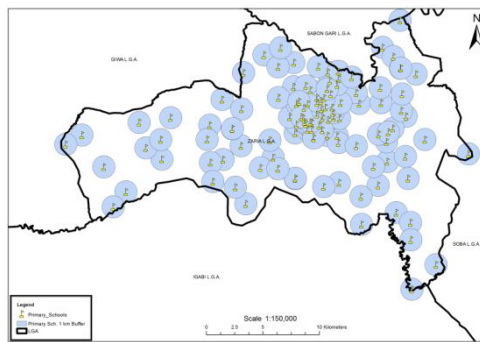


Figure32. 1Km Buffer of Primary Schools in Zaria LGA

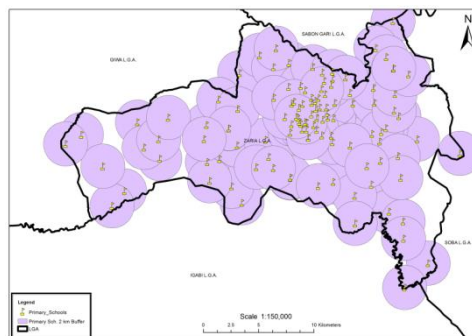


Figure33. 2Km Buffer of Primary Schools in Zaria LGA

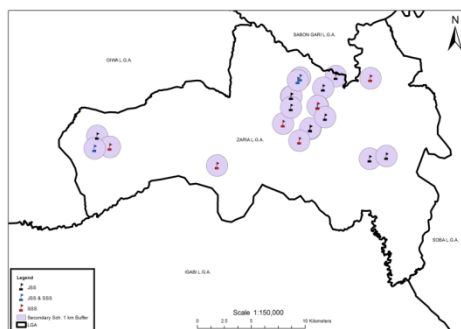


Figure34. 1Km Buffer of Secondary Schools in Zaria LGA

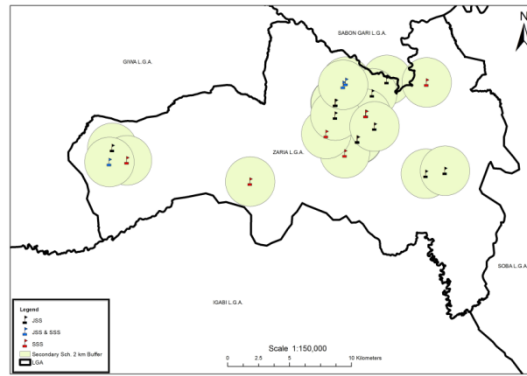


Figure35. 2Km Buffer of Secondary Schools in Zaria LGA

The buffer analysis shows that 40% of the children in primary school walk about 0.75km to school while nine out of every 20 pupils travel about 1km to public primary school. The entire LGA is covered at 2km buffer while 51% is covered by 1km bufer (Figures 32 and 33). The result also discloses that less than 76% of Zaria LGA meets the expected minimum walking distance of 2km for secondary (junior and senior) schools (Figure 34). The result also reveals that the average distant travel to primary school is 1.13km and 2.45km to secondary

schools. This is so because more secondary schools are located around the Ahmadu Bello University in Samaru and its environs (Figure 35).

Jemaá LGA: 37.5% of the pupils travel less than 2km to public primary school, 66.7% travel more than 2km to secondary school and less than 25% students travel more than 4km to secondary schools. The buffer analysis reveals that above 50% of the LGA are covered at 2km buffering while above 82% are covered at 4km buffer (Figures 36 and 37).

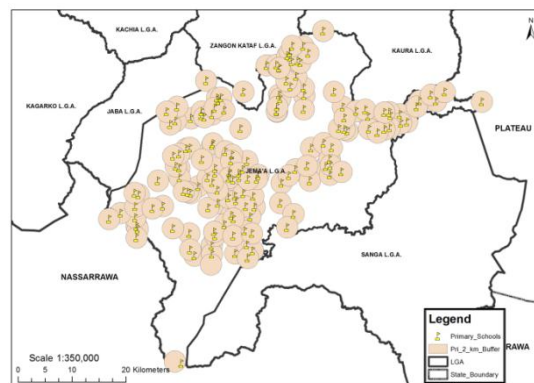


Figure36. 2Km Buffer of Primary Schools in Jemaá LGA

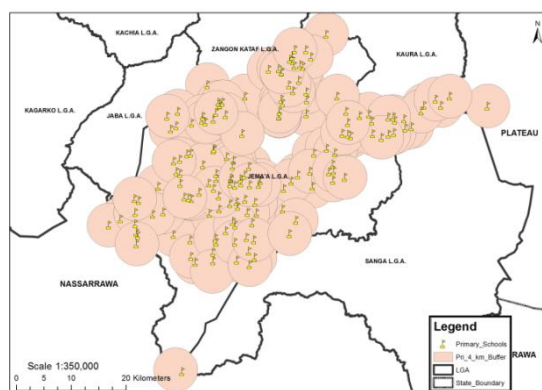


Figure37. 4Km Buffer of Primary Schools in Jemaá LGA

The 2km buffer shows that less than 10% coverage and less than 20% coverage at 4km buffer for secondary schools (Figures 38 and

39). The result reveals that 57% and 72% coverage of the LGA at 9 km and 12km buffer of secondary school (Figures 40 and 41).

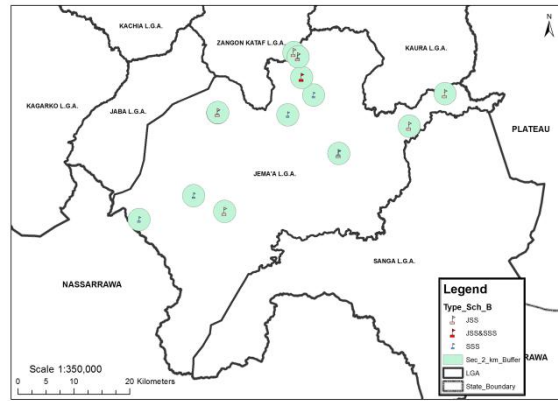


Figure38. 2Km Buffer of Secondary Schools in Jemaá LGA

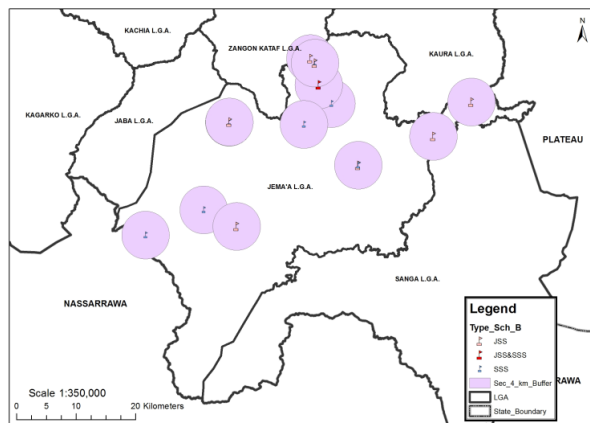


Figure39. 4Km Buffer of Secondary Schools in Jemaá LGA

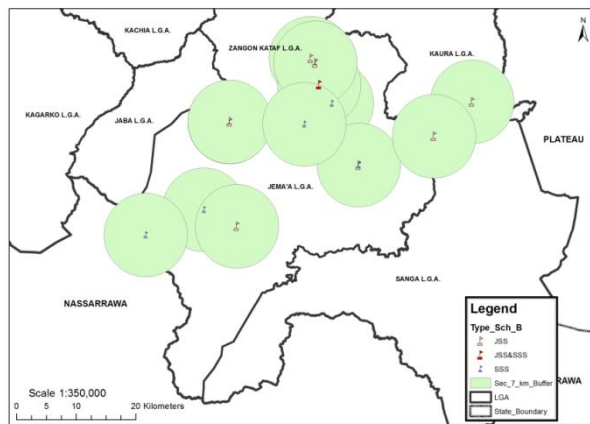


Figure40. 7Km Buffer of Secondary Schools in Jemaá LGA

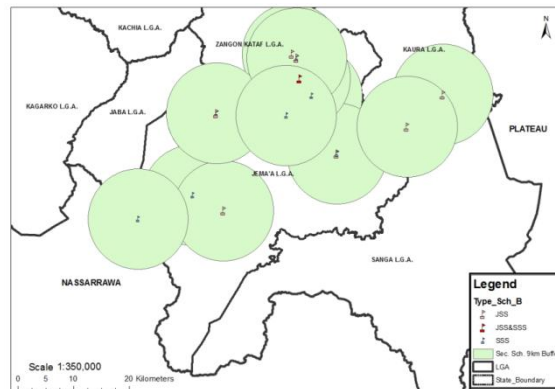


Figure41. 9Km Buffer of Secondary Schools in Jemaá LGA

Assessment of the Physical Accessibility of Public Primary and Secondary Schools in Kaduna State, Nigeria

Kagarko LGA: The result reveals that 68% of the pupils agreed to travel less than 2km to school and one out every four pupils agreed to travel about the expected 2km to public primary school. While one out of every 25 children agreed to travel more than 2km to public primary school. It further reveals that 12% travels less than 2km while three out of every 5 students disagreed to traveling less than 4km to secondary school. This implies that the public secondary schools are not sited reconsidering the dwelling places of the children. The result

further shows that 21% of the total public schools in the LGA are located around the headquarter Kafanchan and its environs. The buffer analysis of the primary schools reveals that 50% is covered at 2km buffer while 92.1% is covered at 4km buffer (Figures 42 and 43). The buffer analysis of the secondary schools reveals that less than 10% coverage at the recommended 2km, about 20.3% at 4km, 78% at 7km and 81.2% at 9km buffer (Figures 44 to 47).

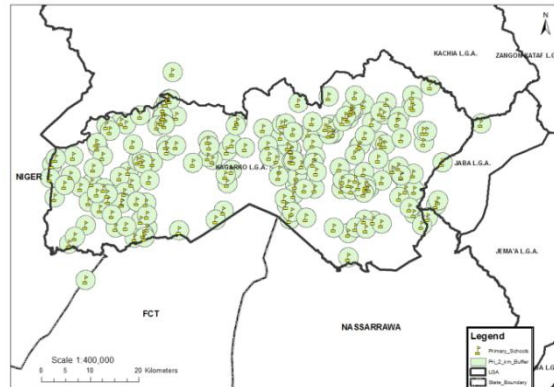


Figure42. 2 Km Buffer of Primary Schools in Kagarko LGA

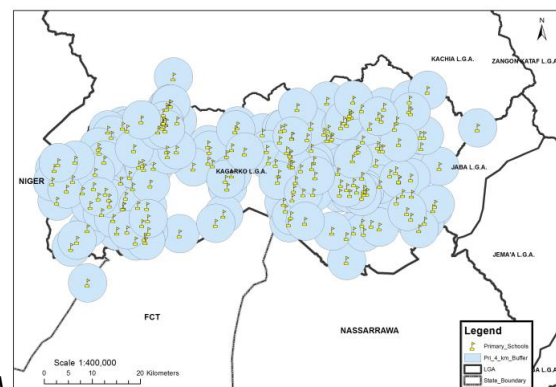


Figure43. 4Km Buffer of Secondary Schools in Kagarko LGA

This finding shows that the Kaduna State MOES&T did not follow that Education Policy Guideline in siting schools in Kagarko LGA. The result also discovers that about 40% of the

schools in Kagarko LGA are sited along the major roads as such the Abuja-Kaduna Expressway, Bwari-Jere- and Kafanchan Road.

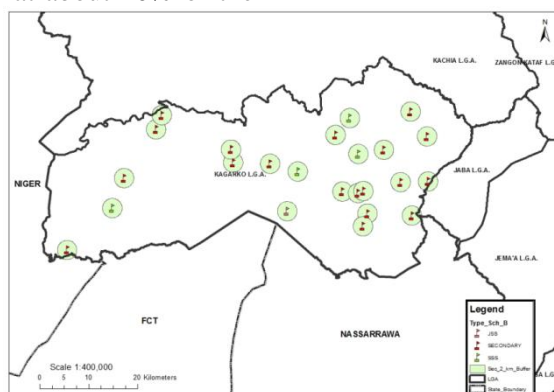


Figure44. 2Km Buffer of Secondary Schools in Kagarko LGA

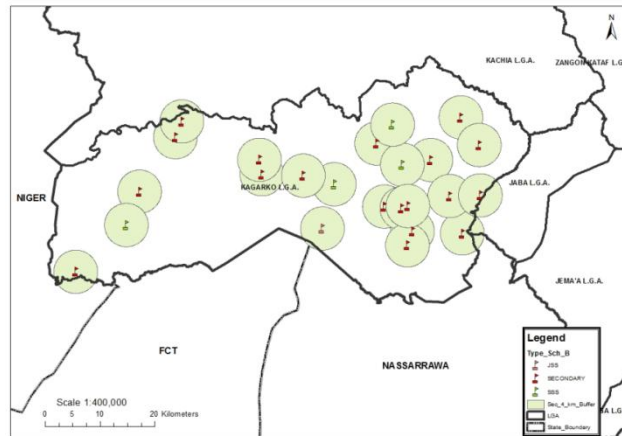


Figure45. 4Km Buffer of Secondary Schools in Kagarko LGA

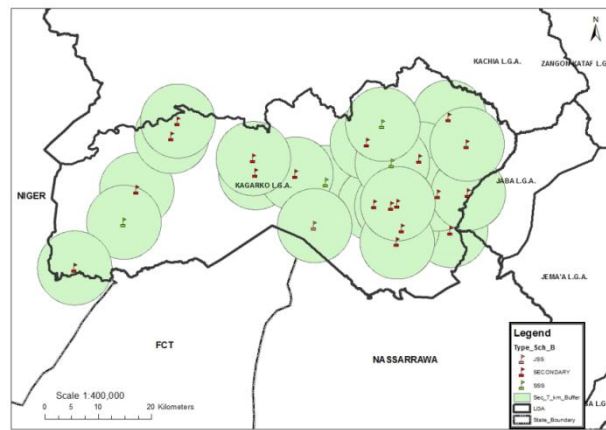


Figure46. 7Km Buffer of Secondary Schools in Kagarko LGA

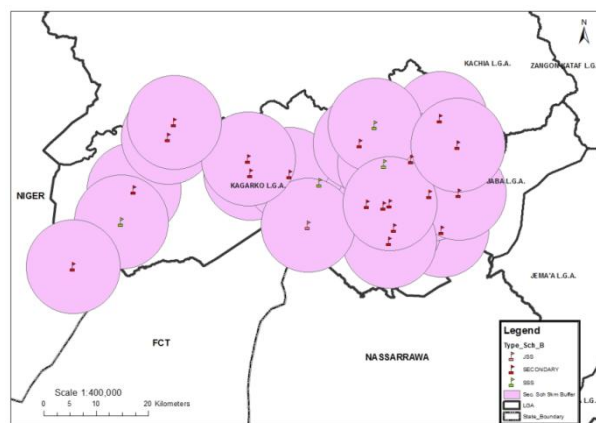


Figure47. 9Km Buffer of Secondary Schools in Kagarko LGA

Kajuru LGA: The result shows that 14% of the pupils walk about 0.75km to school while 70% travel 2km or less to public primary school (Table 1) and 5% travels 7km to public primary school. This implies that many children spend more than one-hour trekking to school. This might be part of the reason why Kajuru LGA have high level of primary school dropout on the state. It shows that three out of every four of the students travel less than 2km to public secondary school. While two out of every five

students travel more than 2km to school. Further probe reveals that less than 61% of the students travels less than 2km to schools in the LGA. The buffer analysis reveals that 2km buffer of primary (72%) schools do not cover the whole LGA and 88.2% coverage for 4km buffer (Figures 48 and 49). The result also shows that 2km buffer for secondary schools cover less than 10% while 4km covers 18% and 7km buffer covers 82% of the LGA (Figures 50 to 52).

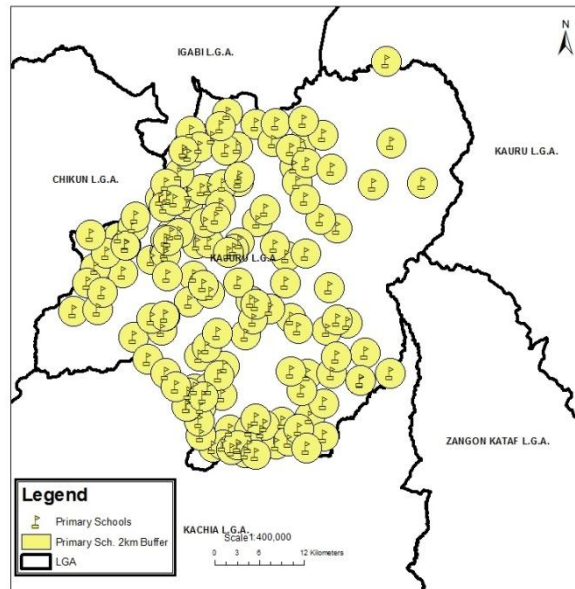


Figure48. Km Buffer of Primary Schools in Kajuru LGA

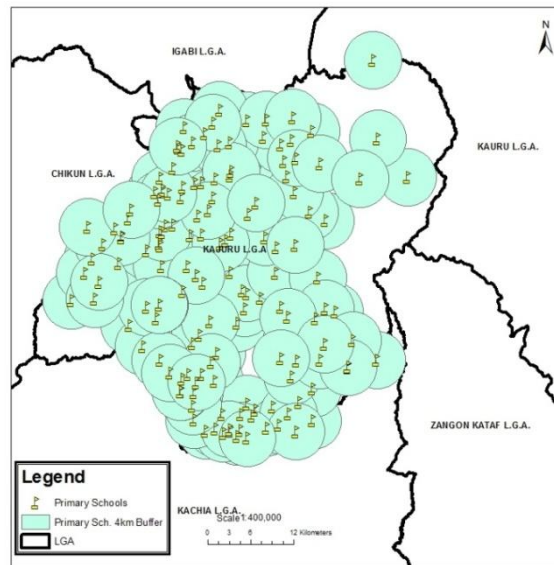


Figure50. 2Km Buffer of Secondary Schools in Kajuru LGA

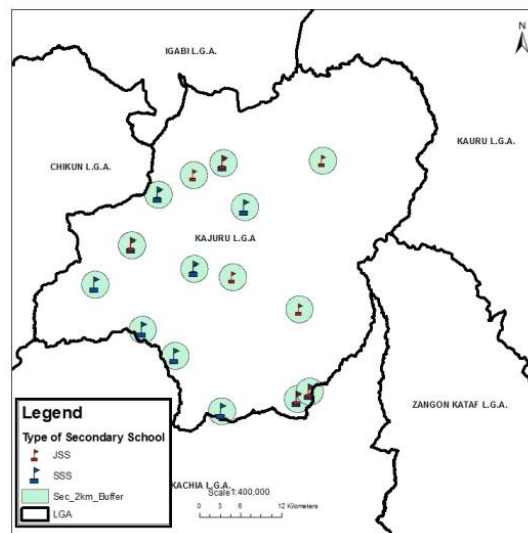


Figure51. 4Km Buffer of Secondary Schools in Kajuru LGA

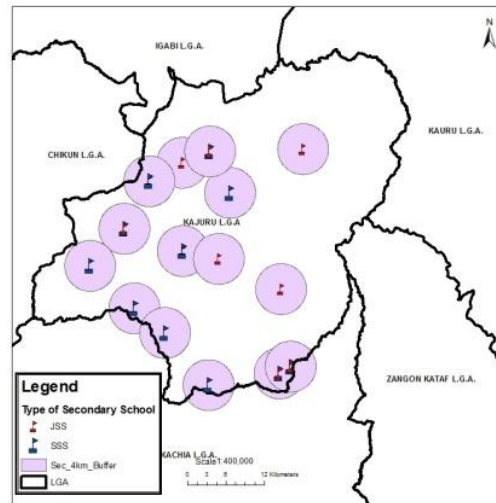


Figure52. 7Km Buffer of Secondary Schools in Kajuru LGA

Physical Accessibility at Senatorial Level

The result shows that Kaduna North Senatorial Zone (KNSZ) have the highest level of access of below 1km to primary (70%) and secondary (28.7%) schools, which is closely followed by

Kaduna Central Zone (KCSZ) Senatorial (63% primary and 21% secondary) and Kaduna South Senatorial Zone (KSSZ) have the least number of students that travel more than 1km to primary (59%) and secondary (12%) schools (Figure 53).

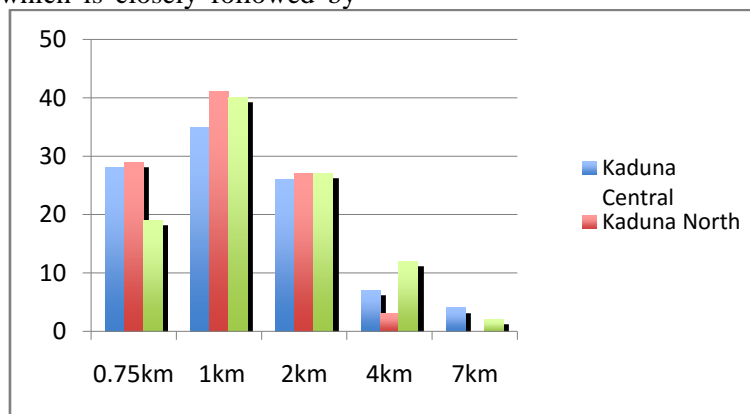


Figure53. Travel Distance to Public Schools in Senatorial Zone of Kaduna State

The result also reveals that the travel distance to secondary schools among the senatorial zones are not the same. KSSZ have one out of every four students travel more than 7km to the nearest public secondary schools while one out of every two of the students travel over 4km to public secondary schools in KCSZ and one out of every three students travel over 2km to secondary schools in KNSZ. The result also indicates that students traveling below 2 km distance to school are living close to public school and are mostly within urban areas while students travel longer distances to schools especially secondary schools in the rural areas.

Accessibility to Public Schools at State Level

The result shows that the nature of accessibility to public primary and secondary schools in Kaduna does not meet the expected standard as

set by NPE of the Federal Government of Nigeria and UNESCO. However, this study shows that the minimum distance to and from schools are not equal in the state. The result also reveals that the distance travelled to public primary schools varies from 1.13 to 1.7km in urban areas for primary schools and 1.3 to 2.25km in rural areas of the state. It also reveals variation in the travelled distance to public secondary schools, which varies 2.96 to 4.32km in the rural areas and from 2.12km to 2.45km in urban areas of the state. The result however demonstrates that there is disparity to access to public schools in Kaduna State. The result shows that students are objected to long travel distances which are mostly by trekking. This might contribute to why many parents are afraid to allow their daughters to seek education in the state. The result also reveals that farming

(pastoral and semi-pastoralist) is a major means of livelihood in the state but these farming settlements do not have schools.

Implication of Physical Accessibility to Public Schools

The result reveals that the urban towns such as Zaria, Kaduna, Kafanchan, Soba have more public schools. This is in agreement Yuan, Qingsong, Yaolin, Lingyu, Haofeng and Enxiang (2016) that accessibility to education is relative to economic development of the area. The result also shows that the junior and senior secondary school are not evenly distributed in all the LGAs and leading to overcrowded and overstressed public schools. The result reveals that students trek as much as 12km to the nearest public secondary school. It also shows that in Zaria and Kaduna South LGAs have the minimum distance travelled by pupils are less than 2km to primary schools (98% and 95%) while 76% students travel less than 2km. However, the result reveals that in Lere, Soba, Kajuru, Chikun, Kagarko and Birnin Gwari LGAs over 45% of the students travel more than 4km to school. The implications of poor level of accessibility to public schools are low attendance and promptness by students. This is in agreement with Jasper, Le, and Bartram (2012) and Figueroa (2016) that better access to public school increases school attendance. The implication of this is that many students are late to school while it might also lead to some dropping out of school.

The distances travelled to school does have effect on the student health as most rural areas do not have good transport and where available the cost might be high. The extra cost of transportation might also contribute to a child dropping out of school. Many parents are also afraid to release their wards especially girls to schools that far away from home due to insecurity and leading to many children not willing to continue secondary education or/and dropout of school. The finding of this study shows that Kaduna State is far from meeting target SDG 4, which aim is that by 2030, ensuring that all children (girls and boys) complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes (UNESCO, 2018). The findings of this study have shown that the distribution of public schools in Lere LGA is uneven. However, the public primary schools have met the expected travel distance of 2km.

While secondary schools are clustered around the urban settlements and more than 7km travel distance for rural students. This might be one of the reasons why parents do not support their wards traveling very faraway to seek education especially with the cost, insecurity and fear. This may account for why children in rural areas have high dropout rate in secondary education.

Remedies to Physical Access to Public Schools

Providing public primary and secondary school education to all school aged children with a focus on quality education assumes greater meaning today in our society. This stage of education serves as means to move on to a higher stage as well as to provide generic competencies that cut across various domains of knowledge as well as skills. For equity in access to public primary and secondary school to be achieved then the state government and educational actors have to ensure that no child is left behind, especially the poorest and most vulnerable groups. The study observes that vulnerable people including people with disability are not considered as no school for vulnerable person was identified in the nine selected LGAs. Thus, there is need for building of least two special schools in each LGA for vulnerable persons with school bus should be provided as well. The MOES&T should apply the minimum travel distance to school in siting (establishment) and re-arrangement of existing schools especially in rural areas. This is a sure to bring easy access to public schools, which will reduce the travel distance to public school and boost the quality of education.

CONCLUSION

This study has investigated the physical accessibility in terms of travel distance to public schools in nine selected Local Government Areas of Kaduna State, Nigeria. This study further carried out the evaluation of the travel distance to public schools shown that 34% of the students travel below 2km and while less than 80% of secondary students travel above 2km. It has conclusively shown that the state has not met the expected 2km walk distance to public schools; there is lopsidedness in the distribution of public schools; most of the public schools are concentrated in the urban areas at the expense of the rural suburbs. Spatial imbalance in the nature of accessibility of the public schools are still observed that need to be adequately addressed to enable the state achieve the Sustainable Development Goals on

education by the year 2030. The use of GIS tools as planning and management tool has been demonstrated by this study and can be employed to enhance the siting of schools to ensure for equivalent distribution. And also it will guide in siting new public schools to favour the areas that are deficient and also to consider the nature of accessibility to these schools.

The study recommends for the use of geographic data on schools especially by the educational agencies (MOES&T) as they can be very useful while using school mapping to ensure efficient and equitable distribution of public primary and secondary schools. Kaduna State Government should provide additional public schools at both primary and secondary to make up the shortfalls especially in farming settlements and rural areas. Kaduna State should brace up to this challenge by committing substantial part of its annual budget into improving the educational sector and most importantly educational facilities in the state.

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