

# An Analysis of the Spatial Pattern of Secondary Schools in Odukpani L.G.A., Cross River State, Nigeria

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**Abstract**— Locational attributes of secondary schools determine the number of students' enrolments at such schools. The Nigerian government in one of her signature projects to the United Nations accepted to make all Nigerians, boys and girls alike to be able to read and write by the year 2015. This signature project has not been actualized even after 5 years of deadline as many remote areas are still faced with the problems of access to educational facilities and one of such areas is Odukpani Local Government Area of Cross River State. The study is aimed at carrying out an analysis of the spatial pattern of secondary schools in the study area. It made use of the application of GIS in mapping out locational attributes of the existing schools and the use of questionnaires in determining the distances of existing secondary schools to and from homes of the students. Five public secondary schools were purposively sampled for the survey with 20 copies of questionnaires used in each school making a total of 100. The analysis shows that there are 18 public and 8 private secondary schools, making a total of 26 secondary schools which are not enough for the Local Government Area with 65,928 secondary school aged population. Findings also shows that many students walk between 5-15km to and from school daily as schools are not evenly distributed in the L.G.A. This study therefore, suggests the establishment of more schools by private proprietors and government at all levels in order to achieve the Millennium Development Goals of the United Nations and the Universal Basic Education Law of Nigerian Government.

**Keywords**— Distance to School; Locational Attributes; Millennium Development Goals; School Facilities; Secondary Schools; Spatial Pattern; Universal Basic Education Board.

## I. INTRODUCTION

Globally, education is considered as a fundamental human right. In 1990, the United Nations Millennium Development Goals (MDGs) and goal number 2 particularly, was set up to ensure that by 2015, children everywhere, boys and girls alike, would be able to complete a full course of primary schooling. That same year, the World Education Forum met in Dakar, Senegal and adopted the Dakar Framework for Action, reaffirming the commitment to achieving education for all by the year 2015. At that time, only 57% of African children were enrolled in primary schools, the lowest enrolment rate in any region of the world (United Nations, UN, 2000).

Bassat (2013) in studying spatial distribution of educational facilities in the Concepción Metropolitan Area (CMA) of Chile used the spatial justice theory and discovered that in the CMA, educational facilities were distributed unequally. Specifically, the most disadvantaged places were located in Tomé, Hualpén, some places in San Pedro de la

Paz, Coronel, Lota and Santa Juana. The singularity of this case is that most of its population constitute the low socioeconomic class. She used data from both primary and secondary sources and the nearest neighbor analysis to determine the distribution of educational facilities in the study area. Data considered included; student-teacher ratio and number of schools per district. She realized that children in the five disadvantaged communities had to walk at least eight kilometers to the location of educational facilities. Distance, therefore, was a factor that clearly determined access to educational facilities, implying injustice to the residents of disadvantaged areas.

Bala (2012) in a study carried out in Bida, India examined the distribution of primary and secondary schools. The result revealed that the distribution of primary and secondary schools was not guided by the theory of spatial justice in the wards sequel to the fact that 45% of the wards benefited more than others. This implies that some areas in Bida city were deficient in location of educational facilities and quite a number of the inhabitants had no access to adequate educational facilities. Similarly, Alzeer (2005) studied the spatial distribution of school facilities in Saudi Arabia. He examined the efficiency of the spatial distribution of public secondary schools in Riyadh city. He used the questionnaire to collect data and application of Geographic Information Systems to ascertain the location of educational facilities so as to determine their variation in space. The result indicated shortage of public secondary schools in the north of the city and overcrowding of the majority of secondary schools (owing to limited availability of primary schools).

Aldugairi (2013) examined the spatial characteristic of public high schools for girls in Buraidah city, Saudi Arabia. He collected data using questionnaire and from secondary sources. The study revealed that secondary schools were unevenly distributed across the 70 districts that makes up the city. In the city, there are six schools distributed over 30 districts (three districts with three schools, eight districts with 2 schools, and 19 districts with only one school), where the remaining 40 districts were without schools, although representing 43% of districts and 57% of the city area. He also realized that there were eight districts having below standard, seven wards having a balanced ratio, and 10 wards having more than standard.

In Nigeria for example, with the 1990 MDGs of the UN, and in order to achieve goal 2, prompted the establishment of

universal free basic education throughout the country, leading to the creation of Universal Basic Education Boards in all the States of Nigeria with the mandate to give free education to all Nigerians up to age 24, aimed at improving the literacy rate of Nigerian youths. However, this effort is bedeviled by poor allocation of funds (budget), leading to impediments in the provision of educational facilities. It has been observed therefore, that the inadequacy of educational facilities in most parts of the country has resulted to low standard of education. Existing educational facilities are inadequate and poorly distributed in many States of Nigeria. The distance between two secondary schools within neighborhoods ranges from three to five kilometers, thereby making the students to adopt unsafe modes of transportation like motorcycles and bicycles with associated high risk of accidents. About 10.5 million Nigerian children aged 5-14 are out of school and 50% of this population forms the secondary school age bracket (UNICEF, 2019).

Consequent upon the uneven distribution of secondary schools, there has been a high level of discouragement within the disadvantaged wards. Young people of secondary school age consider the distance from their residences to where educational facilities are located. They often take advantage of the proximity to their farms and stay away from school. It is also worthy of note that there has been an uncomfortable classroom condition where a classroom size meant to house thirty to forty students is populated with more than 100 students. This in turn increase noise level, distraction and make the students uncomfortable while in class. An ideal classroom by standard takes about 36-40 students (O’Connell, 2015). This study, therefore, aimed at analyzing the spatial pattern of secondary schools in Odukpani Local Government Area of Cross River State, Nigeria.

II. METHODOLOGY

This study is conducted in Odukpani Local Government Area of Cross River State, Nigeria located between latitude 4°15<sup>11</sup>N, 5°25<sup>11</sup>N and longitude 8°00<sup>11</sup>E, 8°15<sup>11</sup>E and made use of primary and secondary data. The primary data collection was carried out through questionnaire administration which is useful in determining the spatial pattern of secondary schools in the study area. Secondary sources of data employed in the study were a collection of journal articles, text books and the number of secondary schools (private and public) from the State Secondary Education Board, Calabar. Data on population of Odukpani Local Government Area (LGA) were also sourced secondarily in relation to number of secondary schools and population of secondary school going age from the National Population Commission (NPC), Calabar from the 2006 census.

Data on distances from students’ homes to schools, time of travel to school, facilities in schools (such as libraries, laboratories, arts studios, and introductory technology workshops), ownership of schools and number of teachers per school were captured in the questionnaire. A total of 100 questionnaires were distributed across five secondary schools in the study area and 20 questionnaires were administered in each secondary school and returned same.

Respondents were students and teachers of the selected secondary schools and were interviewed in order to assess their views on the subject matter. The secondary schools selected include Government Secondary school, Creek Town; Government secondary school, Odukpani Central; Government Migrant Science and Technical College, Creek Town; Government Secondary School, Adiabo Okurikang; and Government Secondary School, Usung Esuk. Descriptive statistics with Tables and percentages were adopted for the analysis and GIS mapping was also introduced for the locational attributes of both private and public secondary schools in the study area as used in Obongha (2019). Figure 1 is map of Cross River State, Nigeria showing Odukpani L.G.A. as the study area.

III. ANALYSIS AND RESULTS

The data collected on distances from students’ homes to their schools, time of travel to school, facilities in schools (such as libraries, laboratories, arts studios, and introductory technology workshops), ownership of schools and number of teachers per school are analysed using descriptive statistics.

TABLE 1: Distance to School

| S/N | Distance     | Frequency  | Percentage |
|-----|--------------|------------|------------|
| 1   | 5km          | 38         | 38         |
| 2   | 8km          | 35         | 35         |
| 3   | 10km         | 13         | 13         |
| 4   | 15km         | 10         | 10         |
|     | <b>Total</b> | <b>100</b> | <b>100</b> |

Source: Researchers Field Survey, 2020

Table 1 above shows that out of the 100 students interviewed in five secondary schools, 38% of them walk over 5km of distance from home to school on daily basis. 35% walk 8km, 13% walk 10km and 10% walk 15km. This long distances of trekking on daily bases to and from school could be seen as one of the reasons why students prefer going to their farms, fishing, and other activities that are closer to them than secondary schools located far from their homes.

TABLE 2: Travel Time to School

| S/N | Time          | Frequency  | Percentage |
|-----|---------------|------------|------------|
| 1   | 20 minutes    | 13         | 13         |
| 2   | 45 minutes    | 30         | 30         |
| 3   | 60 minutes    | 38         | 38         |
| 4   | 120 minutes + | 15         | 15         |
|     | <b>Total</b>  | <b>100</b> | <b>100</b> |

Source: Researchers Field Survey, 2020

Table 2 shows that only 13% of the interviewed students used 20 minutes to walk/travel to school on daily basis, 30% used 45 minutes, 38% used 60 minutes, and 15% used more than two hours on the road to go to school. This also depend on the terrain as most of these communities are riverine and have movement difficulties especially during the rainy season. This again, depend on the location of school in relation to the students’ homes. Those living close to school might take a short time to get to school, whereas, those living far might take a longer time to travel to school depending on their mode of transport.

TABLE 3: Facilities Available in Schools

| S/N | Facilities          | No. of Schools | Frequency  | Percentage |
|-----|---------------------|----------------|------------|------------|
| 1   | Library             | 4              | 80         | 50         |
| 2   | Laboratory          | 3              | 60         | 37.5       |
| 3   | Intro-tech workshop | 1              | 20         | 12.5       |
| 4   | Fine Arts studios   | 0              | 0          | 0          |
|     | <b>Total</b>        |                | <b>160</b> | <b>100</b> |

Source: Researchers Field Survey, 2020

Table 3 shows that out of five secondary schools interviewed, four have library, three have laboratory, only one secondary school has Introductory Technology workshop and non of the five has Fine Art studio. This is an indication that students in Odukpani L. G. A. would be lacking technical skills that would have developed interest in them to always avail themselves to school despite distance.

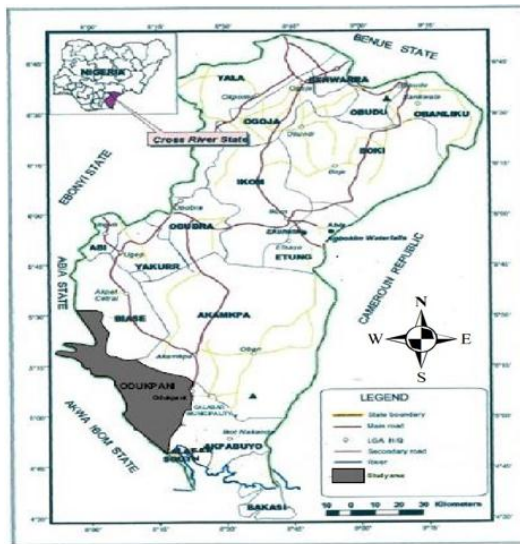


Figure 1: Map of Cross River State Showing Odukpani L. G. A.

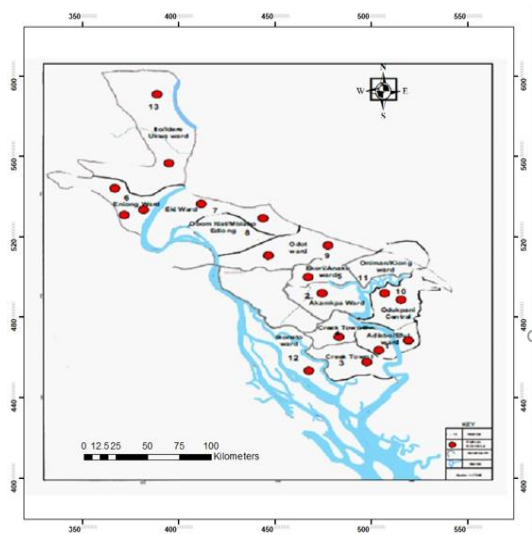


Figure 2: Spatial Pattern of the Location of Public Secondary Schools

Figure 2 shows the spatial pattern of the location of public secondary schools in the study area. It shows that there are about 18 public secondary schools which are unevenly

distributed and their locations affect some communities that are far from them. Some of these communities have problems of accessibility due to poor roads, swamps and rivers which has affected students enrolments at schools. This also has effect on the availability of facilities as shown in Table 2 above . Below are Figures 1-4 showing location of the study area and spatial pattern of secondary schools.

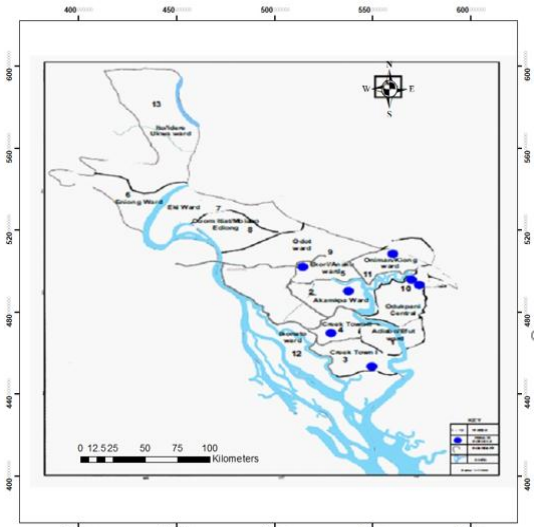


Figure 3: Spatial Pattern of the Location of Private Secondary Schools

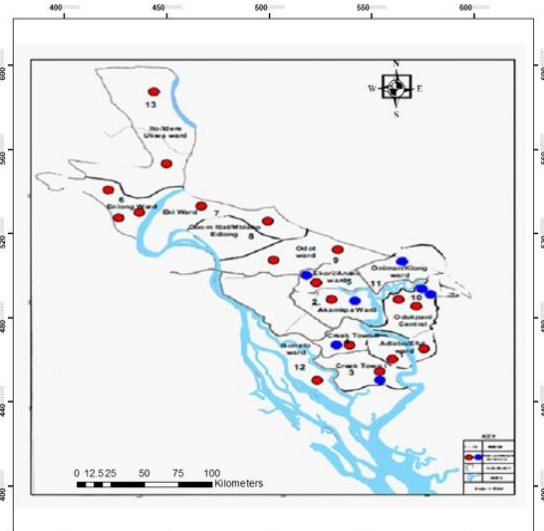


Figure 4: Spatial Pattern of the Location of Public and Private Secondary schools

Figure 3 shows the distribution of private secondary schools in the study area. From the analysis, private schools are concentrated on the south eastern part of the study area leaving other areas without private schools. This shows that inhabitants whose location is far from the public schools would also be affected by the non availability of private schools within their areas.

TABLE 4: Ownership of Secondary Schools by Location

| S/N | Location                 | Public | Private | Total |
|-----|--------------------------|--------|---------|-------|
| 1   | Adiabo Efut              | 2      | 0       | 2     |
| 2   | Akamkpa                  | 1      | 1       | 2     |
| 3   | Creetown 1               | 1      | 1       | 2     |
| 4   | Creetown 11              | 1      | 1       | 2     |
| 5   | Ekori Anaku              | 1      | 1       | 2     |
| 6   | Eniong                   | 3      | 0       | 3     |
| 7   | Eki                      | 2      | 0       | 2     |
| 8   | Obom Itiat/Mbiabo/Ediong | 0      | 0       | 0     |
| 9   | Odot                     | 2      | 0       | 2     |
| 10  | Odukpani Central         | 2      | 2       | 4     |
| 11  | Oniman-kiong             | 0      | 1       | 1     |
| 12  | Ikoneto                  | 1      | 0       | 1     |
| 13  | Akim Akim                | 0      | 1       | 1     |
| 14  | Ito Idere/ Ukwa          | 2      | 0       | 2     |
|     | Total                    | 18     | 8       | 26    |

Source: Researchers Field Survey, 2020

Table 4 above shows the ownership of secondary schools and their locations. The analysis reveals that there are 18 public secondary schools and 8 private secondary schools in the study area. This number, the study considers as inadequate for a local government area that needed to improve upon their young people and standard of education. Many communities were found without any secondary school be it private or public which affects students' enrolment at the available schools located far from their homes. Table 5 below explains the population of secondary school age as projected from 2006 census to 2020.

TABLE 5: Population of Secondary School Age

| S/No. | Age Distribution | 2006 Census    | 2020 Projected |
|-------|------------------|----------------|----------------|
| 1     | 0-9 Years        | 51,487         | 75,789         |
| 2     | 10-19 Years      | 44,788         | 65,928         |
| 3     | 20-29 "          | 34,960         | 51,421         |
| 4     | 30-39 "          | 24,488         | 36,046         |
| 5     | 40-49 "          | 17,370         | 25,569         |
| 6     | 50-59 "          | 9,721          | 14,309         |
| 7     | 60-69 "          | 5,678          | 8,358          |
| 8     | 70-79 "          | 2,673          | 3,935          |
| 9     | 80+ Years        | 1,719          | 2,530          |
|       | <b>TOTAL</b>     | <b>192,884</b> | <b>283,885</b> |

Source: National Population Commission (NPC) 2006 Census, Calabar

Table 5 shows age distribution of population with age 10-19 as the recommended age group of Secondary School. The age distribution of population of Odukpani was collected from the NPC Office, Calabar for 2006 and was projected using the exponential formula with growth rate of 2.8 being classified as Odukpani Urban and other rural communities that make up the L. G. A. The formula is explained below.

$$PN = Po \left( 1 + \frac{r}{100} \right)^n$$

Where: PN = population projection, Po = existing population, r = growth rate, n = number of years projected, 1 and 100 = constant terms.

It was however, revealed that an ideal class room in a secondary school system should contain 36-40 students. 40 students for example, in a class room with 6 classes (ie Jss1-3 and SS1-3) would give a population of 240 students in a secondary school. This would bring the student-teacher ratio

to normalcy and teachers in all the subjects would impact effectively on the students making teaching and learning participatory that would enhance rapid understanding on the part of the students. From Table 4 above there are 26 secondary schools in the study area, (private and public) and if standards of 40 students per class room is applied, therefore, these 26 secondary schools would only be accommodating 6,240 students in the study area. This number is inadequate as seen in Table 5, where the secondary school age of 10-19 in serial number 2 containing a population of 65,928 persons. These persons are supposed to be enrolled in secondary schools by law establishing the Universal Basic Education in Nigeria. But there are no enough secondary schools to accommodate all of them when standards are to be maintained.

By standards, 65,928 secondary school aged population would require a total number of 275 secondary schools spatially distributed at walking distance in all the communities of the study area. This would reduce students travelling for hours before getting to school. Figure 4 shows the spatial pattern and distribution of private and public secondary schools in the study area. It shows a total of 26 secondary schools with many not adequately equipped with facilities needed for learning, some without appropriate students-teacher's ratio, some are inaccessible and others dilapidated and lacks maintenance.

#### IV. CONCLUSION

It is important to note here that the study area has been disadvantaged in terms of the United Nations MDGs policy on education. The 2015 target has not been met in the study area as majority of young people are out of school due to non-accessibility of schools within their localities. 26 secondary schools in a local government area in the South Eastern Nigeria are not enough to cater for secondary educational needs of 65,928 aged bracket in the L.G.A. These needs combine vocational training, technical skills, verbal and quantitative skills in its curriculum. This combination according to the Nigerian educational curriculum enables students of secondary school to be equipped with skills that provides them with the opportunity to be useful in the society peradventure there are no resources to further their education into the higher institutions of learning.

The study therefore, recommends for establishment of more secondary schools especially in areas and wards where they are conspicuously not located. Private individuals who are also involve in school business should be encouraged to establish secondary schools in the study area. There are many private Nursery/Primary schools and the owners should be encouraged to develop further by establishing secondary schools so as to give access to students who finished from their primary schools to proceed to secondary without suffering the effect of distance and travel time to and from schools. The Local Government Education Authority should as a matter of urgency liaise with State Secondary Education Board towards appropriate measures of establishing more secondary schools in Odukpani Local Government Area.

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